Republic of the Philippines
Department of Education
BUREAU OF LEARNING RESOURCES

INSPECTION AND TEST PROTOCOL

Project Title: **Mass Production, Supply, and Delivery of Science and Mathematics Equipment Packages to Public Elementary Schools for Grades 1 to 3 and Grades 4 to 6, Public Junior High Schools for Grades 7 to 10, and Public Senior High Schools for Grades 11 to 12 (Core & STEM)**

A. General Inspection Protocol. This general protocol shall serve as guide in the conduct of the Evaluation Samples/predelivery inspection for all market items (where the following statement is applicable).

a.) verify/evaluate the parameters of the goods or product as indicated in the specifications e.g. material, dimensions, capacity, power rating, etc.;

b.) check the goods for any evidence of defects visually as follows:
- i) rust formation
- ii) cracked/broken parts
- iii) warps/dents
- iv) loose parts
- v) discoloration

c.) look into the completeness of parts/accessories;

d.) all goods powered by dry cell (AA, AAA, etc.) shall be included with corresponding batteries ready for use;

e.) the bidder shall unbox, set up (if applicable), and manipulate the goods to be evaluated and shall perform corresponding performance and/or functionality tests.

f.) Markings and Labels shall be in English, with correct spelling, permanent.

g.) For models with key card, verify and identify the structures if correct.

h.) The bidder/supplier shall provide the materials and consumables.

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
I. MASS PRODUCTION ITEMS		
LOT 1: BLR-DEVELOPED BASIC SCIKIT		
1	**BLR-developed Basic Scikit: Ø 9.5mm x 250mm long Stand Rod**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure the diameter and length of the rod.
		(d) Do material evaluation.
		(e) Check the straightness of the rod taking into consideration the maximum allowable linear deflection as specified in the technical specifications.
		(f) Inspect the surface finish.
		(g) Check the radius of the rounded ends of the rod.
		(h) Do functionality test to validate the level of performance and accuracy of the rod especially when used as component of the Stand Setup.
2	**BLR-developed Basic Scikit: Ø 9.5mm x 500mm long Stand Rod**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure the diameter and length of the rod.
		(d) Do material evaluation.
		(e) Check the straightness of the rod taking into consideration the maximum allowable linear deflection as specified in the technical specifications.
		(f) Inspect the surface finish.
		(g) Check the radius of the rounded ends of the rod.
		(h) Do functionality test to validate the level of performance and accuracy of the rod especially when used as component of the Stand Setup.
3	**BLR-developed Basic Scikit: Ø 12.7mm x 1000mm long Stand Rod**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure the diameter and length of the rod.
		(d) Do material evaluation.

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		(e) Check the straightness of the rod taking into consideration the maximum allowable linear deflection as specified in the technical specifications.
		(f) Inspect the surface finish.
		(g) Check the radius of the rounded ends of the rod.
		(h) Do functionality test to validate the level of performance and accuracy of the rod especially when used as component of the Stand Setup.
4	**BLR-developed Basic Scikit: Rail**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure the diameters and length of the rail.
		(c) Do material evaluation.
		(d) Check the straightness of the rail.
		(e) Inspect the surface finish.
		(f) Check the radius of the rounded ends of the rail.
		(g) Do functionality test to validate the level of performance and accuracy of the rail especially when used as component in the Cart-Rail System.
5	**BLR-developed Basic Scikit: Ring with stem**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure the length, rod diameter, and ring diameter of the item.
		(d) Do material evaluation.
		(e) Inspect the surface finish.
		(f) Do functionality test to validate the level of performance of the item especially when used as component of the Stand Setup.
6	**BLR-developed Basic Scikit: Test Tube Rack**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic materials to the technical specifications, the materials should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate/s should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified materials. A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to testing facility. All expenses for the said test shall be shouldered by the Supplier.
		(c) Do material evaluation of the non-plastic parts.
		On the Individual Parts:
		(d) Do dimensional inspection of the individual parts. Measure lengths, widths, depths, diameters, holes, distances between holes, threads, etc.
		(e) Inspect the surface finish of individual parts. Material colors specified in the technical specifications must be followed.
		(f) There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the individual parts.
		On the Assembly:
		(g) Check the horizontality and verticality of the test tube rack when this is laid flat on a horizontally-level table surface.
		(h) Do functionality test to validate the level of performance of the Test Tube Rack.
7	**BLR-developed Basic Scikit: Wire Gauze**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure the length, width, wire diameter, and mesh per inch of the item.
		(c) Do material evaluation.
		(d) Inspect the jackets and their thickness.
		(e) See to it that the jackets are properly welded on the four (4) corners of the item.
		(f) Do functionality test to validate the level of performance of the item especially when used as component of the Stand Setup.
8	**BLR-developed SCIKIT BASIC 001: Stand Base**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.

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		(b) To determine the conformity of the plastic materials to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies/defects on the item
		(c) Do material evaluation on non-plastic parts.
		(d) Do dimensional inspection. Measure the height, width, length, depth, hole diameters, distances between holes, and thickness. Check the parallelism and perpendicularity of the holes with respect to each other. Check the horizontality of the front holes as well as the verticality of the top hole when the item is laid flat on a horizontally-level table surface. Also, check the distance from the said table surface to the center/s of the front hole/s
		(e) Inspect the embossed markings.
		(f) Inspect the surface finish. The color should conform to what is specified in the technical specifications. There must be no warping of material.
		(g) Inspect the setscrews and their threads as well as the threads of the inserts.
		(h) Inspect the rubber soles.
		(i) Do functionality test to validate the level of performance and accuracy of the item especially when used as component of the Stand Setup and/or as component of the Cart-Rail System. The Stand Setup assembly (stand base, stand supports, and stand rods) should be stable and level when laid on a flat surface
9	**BLR-developed SCIKIT BASIC 001: Stand Support**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic materials to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies/defects on the item
		(c) Do material evaluation on the non-plastic parts.
		(d) Do dimensional inspection. Measure the height, width, length, depth, hole diameter, and thickness. Check the horizontality of the hole when the item is laid flat on a horizontally-level table surface. And check the distance from the said table surface to the center of the hole.
		(e) Also, check the centricity of the hole with respect to the sides of the item.
		(f) Inspect the embossed markings.
		(g) Inspect the surface finish. The color should conform to what is specified in the technical specifications. There must be no warping of material.
		(h) Inspect the rubber sole.
		(i) Do functionality test to validate the level of performance and accuracy of the item especially when used as component of the Stand Setup. The Stand Setup assembly (stand base, stand supports, and stand rods) should be stable and level when laid on a flat surface.
10	**BLR-developed SCIKIT BASIC 001: SCIKIT BASIC Storage Case 001 (With Cover and Base Sheathing)**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic material to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimen to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure lengths, widths, thicknesses, diameters, radii, depths, draft angles, etc.
		(d) Check the surface finish. The color of the material should conform to what is specified in the technical specifications. Note: There must be no warping and/or twisting of material.

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		(e) Check the perpendicularity and parallelism of the sides/walls with respect to each other.
		(f) Check the printed markings.
		(g) Using a spirit level, check the horizontality of the case when this is laid flat on a horizontally-level table surface.
		(h) Check the cover. There must be no warping and/or twisting of the cover.
		(i) Check the base sheathing and its fixation on the case.
		(j) Do functionality test to validate the storage case's level of performance and accuracy by loading the specific science equipment intended for it to store.
11	**BLR-developed SCIKIT BASIC 002: Multiclamp**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the Aluminum-Silicon-Copper Alloy material to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do material evaluation on the non-zinc alloy parts.
		(d) Do dimensional inspection. Measure the height, width, length, depth, hole diameters, and thickness. Check the parallelism and perpendicularity of the sides with respect to each other.
		(e) Inspect the embossed markings.
		(f) Check the holes and their threads as well as their alignment to the V-cuts situated opposite them. Also, check the perpendicularity of the said holes with respect to the surfaces on which they were drilled.
		(g) Inspect the surface finish.
		(h) Inspect the setscrews and their threads.
		(i) Do functionality test to validate the level of performance and accuracy of the item especially when used as component of the Stand Setup. (Note: Special attention shall be given to the perpendicularity and parallelism of the assembled parts of the Stand Setup.)
12	**BLR-developed SCIKIT BASIC 002: Test Tube Holder**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure the length, width, and wire diameter.
		(d) Do material evaluation.
		(e) Inspect the surface finish.
		(f) Do functionality test to validate the level of performance of the item. Test the item by picking up and holding a Ø16mm test tube full of sand. Check the grip if it is evenly applied on the surface of the test tube. Check and see if the test tube would not slide down when held in an upright position.
13	**BLR-developed SCIKIT BASIC 002: SCIKIT BASIC Storage Case 002 (With Cover and Base Sheathing)**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic material to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimen to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure lengths, widths, thicknesses, diameters, radii, depths, draft angles, etc.
		(d) Check the surface finish. The color of the material should conform to what is specified in the technical specifications. Note: There must be no warping and/or twisting of material.
		(e) Check the perpendicularity and parallelism of the sides/walls with respect to each other.
		(f) Check the printed markings.

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		(g) Using a spirit level, check the horizontality of the case when this is laid flat on a horizontally-level table surface.
		(h) Check the cover. There must be no warping and/or twisting of the cover.
		(i) Check the base sheathing and its fixation on the case.
		(j) Do functionality test to validate the storage case's level of performance and accuracy by loading the specific science equipment intended for it to store.
14	**BLR-developed SCIKIT BASIC 003: Universal Clamp**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the Aluminum-Silicon-Copper Alloy material to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do material evaluation on the non-zinc alloy parts.
		(d) Do dimensional inspection. Measure the height, width, length, depth, diameters, and thickness.
		(e) Do dimensional inspection on Arm A, Arm B, the handle, and the adjusting screw.
		(f) Inspect the embossed markings.
		(g) Inspect the surface finish.
		(h) Inspect the cork linings.
		(i) See if the item has a clamp opening of Ø 6mm minimum and Ø 92 mm maximum as specified in the technical specifications.
		(j) Do functionality test to validate the level of performance and accuracy of the item especially when used as component of the Stand Setup.
15	**BLR-developed SCIKIT BASIC 003: Universal Bosshead**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the Aluminum-Silicon-Copper Alloy material to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do material evaluation on the non-zinc alloy parts.
		(d) Do dimensional inspection. Measure the height, width, length, depth, hole diameters, and thickness. Check the concentricity of the Ø 13.5mm hole from one end to the other end of the item.
		(e) Inspect the embossed markings.
		(f) Check the threaded holes and their alignment to the semi-circular cuts situated opposite them.
		(g) Inspect the surface finish.
		(h) Inspect the setscrews and their threads.
		(i) Do functionality test to validate the level of performance and accuracy of the item especially when used as component of the Stand Setup. (Note: Special attention shall be given to the perpendicularity and parallelism of the assembled parts of the Stand Setup.)
16	**BLR-developed SCIKIT BASIC 003: SCIKIT BASIC Storage Case 003 (With Cover and Base Sheathing**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic material to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimen to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the item.

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		(c) Do dimensional inspection. Measure lengths, widths, thicknesses, diameters, radii, depths, draft angles, etc.
		(d) Check the surface finish. The color of the material should conform to what is specified in the technical specifications. Note: There must be no warping and/or twisting of material.
		(e) Check the perpendicularity and parallelism of the sides/walls with respect to each other.
		(f) Check the printed markings.
		(g) Using a spirit level, check the horizontality of the case when this is laid flat on a horizontally-level table surface.
		(h) Check the cover. There must be no warping and/or twisting of the cover.
		(i) Check the base sheathing and its fixation on the case.
		(j) Do functionality test to validate the storage case's level of performance and accuracy by loading the specific science equipment intended for it to store.
17	**BLR-developed Free Fall Apparatus (Mechanics 001): Ball Case (with Cover and foam)**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic material to the technical specifications, a certificate from DOST, which would attest to the said conformity, is required for the Supplier to submit. (Note: A representative of the Procuring Entity should be present during preparation and submission of the material test specimen to DOST. All expenses for the said test shall be shouldered by the Supplier.) There must be no sharp edges, cracks, scratches, warping, chipped edges, breakage, and other deficiencies/defects on the item.
		(c) Do dimensional inspection of the Case and its Cover. Measure lengths, widths, thicknesses, diameters, radii, depths, draft angles, etc.
		(d) Check the surface finish. The color of the material should conform to what is specified in the technical specifications. There must be no warping of material.
		(e) Check the DepED-BLR embossed markers (on the Case and Cover).
		(f) Check the cushion (soft foam). Measure length, width, and thickness.
		(g) Do functionality test to validate its level of performance and accuracy by loading the spherical balls intended for it to store.
18	**BLR-developed Free Fall Apparatus (Mechanics 001): Digital Timer Assembly (Digital Stopwatch)**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection of the electronic digital stopwatch and the female electronic jack (RCA jack).
		(c) There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies on the assembly.
		(d) Open the back cover of the stopwatch and using the Schematic Wiring Diagram as reference, inspect how the wiring (inside the stopwatch) is done. Check, also, the type (or kind) of wire used.
		(e) Do functionality test to validate the level of performance and accuracy of the Digital Timer Assembly by using it as component of the Free-Fall Apparatus in conducting experiment on free fall.
19	**BLR-developed Free Fall Apparatus (Mechanics 001): Metertape with hooks and plastic pointer**	**METERTAPE**
		(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no sharp edges, chipped edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure the lengths, widths, thicknesses, diameters, radii, etc.
		(d) Inspect the meter tape (or measuring tape). Check the printed numerals, graduations, and printed letters. Inspect the plastic case. (Note: The meter tape should be able to measure in Metric and English units.) Check the accuracy of measurements. Check the maximum measuring capacity of the meter tape.
		(e) Inspect Hook A and Hook B and their fixations on the meter tape.
		(f) Inspect the surface finish.
		(g) Do functionality test to validate the level of performance and accuracy of the Meter Tape with hooks Assembly especially when used as component of the Free-Fall Apparatus in conducting experiment on free fall.

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		POINTER
		(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic material to the technical specifications, a certificate from DOST, which would attest to the said conformity, is required for the Supplier to submit. (Note: A representative of the Procuring Entity should be present during preparation and submission of the material test specimen to DOST. All expenses for the said test shall be shouldered by the Supplier.) There must be no sharp edges, cracks, scratches, warping, chipped edges, breakage, and other deficiencies/defects on the item.
		(a) Do dimensional inspection. Measure the length, width, height, thicknesses, radii, angles, etc.
		(c) Inspect the surface finish. The color of the material should conform to what is specified in the technical specifications.
		(b) Do functionality test to validate the level of performance and accuracy of the Pointer especially when used as component of the Free-Fall Apparatus in conducting experiment on free fall.
20	**BLR-developed Free Fall Apparatus (Mechanics 001): Ø 12.7mm Steel Spherical Ball**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no cracks, scratches, dents, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure the diameter of the chrome-plated steel ball.
		(d) Check the weight. The weight should conform to what is specified in the technical specifications.
		(e) Inspect the surface finish.
		(f) Test the level of performance by using it as component of the Free-Fall Apparatus in conducting experiment on free fall.
21	**BLR-developed Free Fall Apparatus (Mechanics 001): Ø 25mm Plastic Spherical Ball with metal screw**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no cracks, scratches, dents, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure the diameter of the plastic ball as well as the diameter of the hole intended for the steel screw.
		(d) Inspect the steel screw. It must be new and rust-free.
		(e) Inspect the surface finish. The color of the plastic ball should conform to what is specified in the technical specifications.
		(f) Check the weight (of the plastic ball with screw). The weight should conform to what is specified in the technical specifications.
		(g) Test the level of performance by using it as component of the Free-Fall Apparatus in conducting experiment on free fall.
22	**BLR-developed Free Fall Apparatus (Mechanics 001): Ø 25mm Steel Spherical Ball**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no cracks, scratches, dents, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure the diameter of the chrome-plated steel ball.
		(d) Check the weight. The weight should conform to what is specified in the technical specifications.
		(e) Inspect the surface finish.
		(f) Test the level of performance by using it as component of the Free-Fall Apparatus in conducting experiment on free fall.
23	**BLR-developed Free Fall Apparatus (Mechanics 001): Pad Switch Assembly**	a. In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		b. To determine the conformity of the plastic material to the technical specifications, a certificate from DOST, which would attest to the said conformity, is required for the Supplier to submit. (Note: A representative of the Procuring Entity should be present during preparation and submission of the material test specimen to DOST. All expenses for the said test shall be shouldered by the Supplier.)
		On the Individual Parts:
		(a) Do dimensional inspection of the individual parts. Measure lengths, widths, depths, diameters, holes, distances between holes, threads, etc.
		(b) Inspect the surface finish of the individual parts.

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		(c) There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies on the individual parts.
		(d) Inspect the Handle Shaft and the Spindle. Check the holes, their diameters, locations, and concentricity. Check the threaded holes. Check the perpendicularity and/or parallelism of the holes with respect to each other and with respect to the shaft/spindle.
		(e) Inspect the Landing Pad. Check the width, length, and thickness. Check the rivet holes, their diameters, and locations. Check the concentricity and alignment of the holes intended for the spindle. Check the punched "DepED-BLR" marker. Check the horizontality/flatness of the pad.
		On the Assembly:
		a. Inspect the fixations of the individual parts of the assembly.
		b. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies on the assembly.
		c. Check the perpendicularity of the spindle with respect to the handle shaft.
		d. Check the magnet and its capacity to hold the landing pad in place.
		e. Do functionality test to validate the level of performance and accuracy of the Pad Switch Assembly by using it as component of the Free-Fall Apparatus in conducting experiment on free fall.
24	**BLR-developed Free Fall Apparatus (Mechanics 001): Solenoid Assembly**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic material to the technical specifications, a certificate from DOST, which would attest to the said conformity, is required for the Supplier to submit. (Note: A representative of the Procuring Entity should be present during preparation and submission of the material test specimen to DOST. All expenses for the said test shall be shouldered by the Supplier.)
		On the Individual Parts:
		(c) Do dimensional inspection of the individual parts. Measure lengths, widths, depths, diameters, holes, distances between holes, threads, etc.
		(d) Inspect the surface finish of individual parts. Material color/s specified in the technical specifications must be followed.
		(e) Inspect the outer frame. Check the perpendicularity and parallelism of the walls with respect to each other. Check the holes intended for the rivets, their diameters, the distances between them, and their conformance to the technical specifications/approved sample. Check the punched "DepED-BLR" marker.
		(f) Inspect the inner frame. Check the hole intended for the Core Shaft, its diameter, and its concentricity. Check the perpendicularity of the said hole with respect to the end faces. Check the holes intended for the rivets, their diameters, the distances between them, and their conformance to the technical specifications/approved sample.
		(g) There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the individual parts.
		On the Assembly:
		(h) Inspect the windings of the Solenoid. It should be # 22 AWG Magnet Wire (600 +/- 5 windings) with wax paper cover. Check the magnetic holding capacity of the Solenoid. Note: The Solenoid must have a magnetic holding capacity of 250 grams (minimum) using a zinc-plated mass as test specimen. During the test, make sure that the battery or dry cell in the Synchro Box is new.
		(i) There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the assembly.
		(j) Check the perpendicularity of the outer frame with respect to the extension rod.
		(k) Inspect the binding posts and their fixations on the outer frame.
		(l) Check the wires that connect the binding posts to the Solenoid. Check the continuity of the said wires.
		(m) Inspect the fixation of the individual parts of the assembly.
		(n) Do functionality test to validate the level of performance and accuracy of the Solenoid Assembly by using it as component of the Free-Fall Apparatus in conducting experiment on free fall.
25	**BLR-developed Free Fall Apparatus (Mechanics 001): Synchro Box Assembly**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.

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		(b) To determine the conformity of the plastic materials to the technical specifications, a certificate from DOST, which would attest to the said conformity, is required for the Supplier to submit. (Note: A representative of the Procuring Entity should be present during preparation and submission of the material test specimen to DOST. All expenses for the said test shall be shouldered by the Supplier.)
		On the Individual Parts:
		(c) Do dimensional inspection of the individual parts. Measure lengths, widths, depths, diameters, holes, distances between holes, threads, etc.
		(d) Inspect the surface finish of individual parts. Material color/s specified in the technical specifications must be followed.
		(e) There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the individual parts.
		(f) Inspect the (Main) Body. Check for perpendicularity, parallelism, and contours of the walls. Check the embossed dry cell outline marker as well as the embossed positive (+) and negative (-) sign markers. Inspect the counterbore holes, their diameters, and locations. Check the threaded holes. Check the 0.5mm-deep holes/cuts intended for the rubber soles. Check the provision for a snap-on locking system.
		(g) Inspect Cover A. Check for perpendicularity, parallelism, and contours of the walls. Check the embossed "DepED-BLR", "Stopwatch", Pad Switch", and "Solenoid" markers. Inspect the counterbore hole intended for the push button switch. Check the threaded holes.
		(h) Inspect Cover B. Check for perpendicularity, parallelism, and contours of the walls. Check the embossed "DepED-BLR" marker. Check the provision for a snap-on locking system.
		(i) Inspect the battery/dry cell holders, both positive (+) and negative (-).
		(j) Inspect the rubber soles, wire holders, terminal strip, transistor (semiconductor), resistor, push button switch, and hook-up wire.
		(k) Inspect the stopwatch connector (with RCA plug), pad switch connector (with Y-terminal lugs), and solenoid connector (with needle probe terminal rods).
		On the Assembly:
		(l) With the use of the Circuit Schematic Diagram as reference, inspect the electronic circuit of the assembly.
		(m) Inspect the fixations and/or connections of the individual parts of the assembly.
		(n) There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the assembly.
		(o) Inspect the continuity of the wire connectors.
		(p) Inspect/test the snap-on locking system (for the body and Cover B)
		(q) Do functionality test to validate the level of performance and accuracy of the Synchro Box Assembly by using it as component of the Free-Fall Apparatus in conducting experiment on free fall.
26	**BLR-developed Free Fall Apparatus (Mechanics 001): SCIKIT MECHANICS Storage Case 001 (With Cover and Base Sheathing)**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic material to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimen to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure lengths, widths, thicknesses, diameters, radii, depths, draft angles, etc.
		(d) Check the surface finish. The color of the material should conform to what is specified in the technical specifications. Note: There must be no warping and/or twisting of material.
		(e) Check the perpendicularity and parallelism of the sides/walls with respect to each other.
		(f) Check the printed markings.
		(g) Using a spirit level, check the horizontality of the case when this is laid flat on a horizontally-level table surface.
		(h) Check the cover. There must be no warping and/or twisting of the cover.
		(i) Check the base sheathing and its fixation on the case.

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		(j) Do functionality test to validate the storage case's level of performance and accuracy by loading the specific science equipment intended for it to store.
27	**BLR-developed Dynamics Carts-Rail System (Mechanics 002): Cart-spring loaded**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic materials to the technical specifications, the materials should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate/s should be issued by the testing unit; the original copy should be submitted to BLR-Cebu to validate the specified materials. A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do material evaluation of the non-plastic parts.
		On the Individual Parts:
		(d) Do dimensional inspection of the individual parts. Measure lengths, widths, depths, diameters, holes, distances between holes, threads, etc.
		(e) Inspect the surface finish of individual parts. Material colors specified in the technical specifications must be followed.
		(f) Check the verticality or uprightness of the sides, front face, and rear face of the cart body when this is laid flat on a horizontally-level table surface. Check, also, the horizontality of the holes as well as their alignment and parallelism with respect to each other.
		On the Assembly:
		(g) Do dimensional inspection of the assembly. Measure length, width, height, gaps between assembled parts, distances between wheels, etc.
		(h) There must be no breakage, cracks, chipped edges, sharp edges, scratches, warping, and other deficiencies/defects on the assembly.
		(i) Inspect the linear clearances between the axle shafts and the teflon bearings.
		(j) Inspect the alignment of the wheels with respect to each other as well as with respect to the rails on which they are to operate. The cart should run smoothly on the rails.
		(k) Check the verticality or uprightness of the assembly when this is laid flat on a horizontally-level table surface.
		(l) Check, also, the perpendicularity of the top surface of the assembly with respect to the front face, rear face, and sides.
		(m) Test run the cart and check the performance of the wheels.
		(n) Check the performance of the spring and the setting plate that would set or hold the spring in its compress state.
		(o) Check the weight of the cart. Note: The difference in weight between Cart A (spring-loaded) and Cart B (with counterweight) should not exceed 5 grams.
		(p) Do functionality test to validate the level of performance and accuracy of the cart especially when this is used as component in conducting laboratory experiments on the Law of Conservation of Momentum and Newton's Second Law of Motion, among others. During the conduct of Explosion Expirement, the Dynamic Carts A and B should reach the end of the one (1) meter rails at the same time.
28	**BLR-developed Dynamics Carts-Rail System (Mechanics 002): Cart-with counterweight**	a. In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		b. To determine the conformity of the plastic materials to the technical specifications, the materials should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate/s should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified materials. A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(a) Do material evaluation of the non-plastic parts.
		On the Individual Parts:
		(b) Do dimensional inspection of the individual parts. Measure lengths, widths, depths, diameters, holes, distances between holes, threads, etc.
		(c) Inspect the surface finish of individual parts. Material colors specified in the technical specifications must be followed.

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		(d) Check the verticality or uprightness of the sides, front face, and rear face of the cart body when this is laid flat on a horizontally-level table surface. Check, also, the horizontality of the holes as well as their alignment and parallelism with respect to each other.
		On the Assembly:
		(e) Do dimensional inspection of the assembly. Measure length, width, height, gaps between assembled parts, distances between wheels, etc.
		(f) There must be no breakage, cracks, chipped edges, sharp edges, scratches, warping, and other deficiencies/defects on the assembly.
		(g) Inspect the linear clearances between the axle shafts and the teflon bearings.
		(h) Inspect the alignment of the wheels with respect to each other as well as with respect to the rails on which they are to operate. The cart should run smoothly on the rails.
		(i) Check the verticality or uprightness of the assembly when this is laid flat on a horizontally-level table surface.
		(j) Check, also, the perpendicularity of the top surface of the assembly with respect to the front face, rear face, and sides.
		(k) Test run the cart and check the performance of the wheels.
		(l) Check the weight of the cart. Note: The difference in weight between Cart A (spring-loaded) and Cart B (with counterweight) should not exceed 5 grams.
		(m) Do functionality test to validate the level of performance and accuracy of the cart especially when this is used as one of the components in conducting laboratory experiments on the Law of Conservation of Momentum and Newton's Second Law of Motion, among others. During the conduct of Explosion Expirement, the Dynamic Carts A and B should reach the end of the one (1) meter rails at the same time.
29	**BLR-developed Dynamics Carts-Rail System (Mechanics 002): <u>Cylindrical Mass, 50-gram</u>**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure the outside and inside diameters and the thickness.
		(d) Do material evaluation.
		(e) Inspect the weight to know its conformity to the technical specifications.
		(f) Test the item's level of performance and accuracy by using it as component of the Cart-Rail System in performing laboratory experiment on the Law of Conservation of Momentum and Newton's 2nd Law of Motion, among others.
30	**BLR-developed Dynamics Carts-Rail System (Mechanics 002): <u>Driving Mass, 3-gram</u>**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure the outside and inside diameters, the thickness, the slit, and the eccentricity of the inside diameter to the outside diameter of the item.
		(d) Do material evaluation.
		(e) Inspect the weight to know its conformity to the technical specifications.
		(f) Test the item's level of performance and accuracy by using it as component of the Cart-Rail System in performing laboratory experiment on the Law of Conservation of Momentum and Newton's 2nd Law of Motion, among others.
31	**BLR-developed Dynamics Carts-Rail System (Mechanics 002): <u>Leveling Pad Assembly</u>**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic material to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do material evaluation of the non-plastic parts.
		(d) Do dimensional inspection. Measure length, width, depth, diameters, and thickness.

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		(e) Check the horizontality of the pad when this is laid flat on a horizontally-level table surface.
		(f) Inspect the jack bolts and their threads as well as the threads of the inserts.
		(g) Inspect the surface finish. The color of material as specified in the technical specifications must be followed.
		(h) Do functionality test to validate the level of performance and accuracy of the pad especially when used as component of the Cart-Rail System.
32	**BLR-developed Dynamics Carts-Rail System (Mechanics 002): Plastic Hammer**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic material to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimen to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure diameters, length, radius, etc.
		(d) Check the surface finish. The color of the material should conform to what is specified in the technical specifications.
		(e) Test the item's level of performance and accuracy by using it as component of the Cart-Rail System in performing laboratory experiment on the Law of Conservation of Momentum as well as in conducting experiment on Explosion.
33	**BLR-developed Dynamics Carts-Rail System (Mechanics 002): Modelling Clay, 1 bar/set**	(a) Check compliance of the item with the technical specifications.
		(b) Do functionality test to validate the level of performance of the item especially when used as accessory to the Cart-Rail System during laboratory experimentation.
34	**BLR-developed Dynamics Carts-Rail System (Mechanics 002): Stopper-Fork Assembly**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic materials to the technical specifications, the materials should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate/s should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified materials. A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies/defects on the item.
		(c) Do material evaluation of the non-plastic parts.
		On the Individual Parts:
		(d) Do dimensional inspection of the individual parts. Measure lengths, widths, depths, diameters, holes, distances between holes, threads, etc.
		(e) Inspect the surface finish of individual parts. Material colors specified in the technical specifications must be followed.
		(f) Inspect the wheel, to include the concentricity of its outside diameter to its center hole, the parallelism of its faces, and the perpendicularity of its center hole with respect to the said faces.
		(g) There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the individual parts.
		On the Assembly:
		(h) Check the horizontality and verticality of the stopper-fork when this is laid flat on a horizontally-level table surface.
		(i) Check the performance of the Wheel by having it rotate freely without load and having it rotate with load. The wheel must turn and run smoothly.
		(j) Do functionality test to validate the level of performance and accuracy of the Stopper-Fork Assembly especially when used as component of the Cart-Rail System.
35	**BLR-developed Dynamics Carts-Rail System (Mechanics 002): String (thin), 1 ball/set**	(a) Check compliance of the item with the technical specifications.
		(b) Do functionality test to validate the level of performance of the item especially when used as accessory to the Cart-Rail System during laboratory experimentation.

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36	**BLR-developed Dynamics Carts-Rail System (Mechanics 002): SCIKIT MECHANICS Storage Case 002 (With Cover and Base Sheathing)**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic material to the technical specifications, the material should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimen to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the item.
		(c) Do dimensional inspection. Measure lengths, widths, thicknesses, diameters, radii, depths, draft angles, etc.
		(d) Check the surface finish. The color of the material should conform to what is specified in the technical specifications. Note: There must be no warping and/or twisting of material.
		(e) Check the perpendicularity and parallelism of the sides/walls with respect to each other.
		(f) Check the printed markings.
		(g) Using a spirit level, check the horizontality of the case when this is laid flat on a horizontally-level table surface.
		(h) Check the cover. There must be no warping and/or twisting of the cover.
		(i) Check the base sheathing and its fixation on the case.
		(j) Do functionality test to validate the storage case's level of performance and accuracy by loading the specific science equipment intended for it to store.
37	**BLR-developed SCIKIT MECHANICS 003: 10-Newton Spring Balance**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic materials to the technical specifications, a certificate from DOST, which would attest to the said conformity, is required for the Supplier to submit. (Note: A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to DOST. All expenses for the said test shall be shouldered by the Supplier.)
		On the Individual Parts:
		(c) Do dimensional inspection of the individual parts. Measure lengths, widths, heights, depths, diameters, holes, thicknesses, threads, etc.
		(d) Inspect the surface finish of individual parts. Material color specified in the technical specifications must be followed.
		(e) There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, twisting, and other deficiencies/defects on the individual parts.
		(f) Inspect the outer tube. Check the straightness of the tube. Check the concentricity of the outside diameter and inside diameter. Inspect the printed description (marker) on the outer surface of the tube. Check the threads and their lengths.
		(g) Inspect the top cover. Check the outside thread, inside thread, and the thread lengths.
		(h) Inspect the stopper. Check the concentricity of the outside diameter and inside diameter. Check the thread and its length. The material (of the stopper) should be transparent (clear).
		(i) Inspect the inner tube. Check the concentricity of the outside diameter and inside diameter. Check the flared end (where the rim was curved outward) of the tube.
		(j) Inspect the extension spring. Check the outside diameter, wire diameter, pitch, and length. Check the material. The material should conform to what is specified in the technical specifications.
		(k) Inspect the spring and hook adaptor. Check the outside thread, inside thread, and their lengths.
		(l) Inspect the hook. Check the alignment of the center of the curved end to the stem.
		On the Assembly:
		(a) There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, twisting, and other deficiencies/defects on the assembly.
		(b) Inspect the surface finish of the assembly.

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		(c) Inspect the calibration (graduation) sticker. Inspect the printed numbers, letters, and graduation lines. Check the color/s. Check the surface finish of the sticker. Check the accuracy of the graduations using a force gauge.
		(d) Check the fixations of the individual parts of the assembly.
		(e) Do functionality test to validate the level of performance and accuracy of the Spring Balance by using it in conducting experiment on force.
38	**BLR-developed SCIKIT MECHANICS 003: Friction Block and Friction Board**	**FRICTION BLOCK**
		(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure lengths, widths, heights, depths, diameters, thicknesses, angles, etc.
		(c) There must be no chipped edges, sharp edges, cracks, scratches, and other deficiencies on the item.
		(d) Check the hardness of the rubber.
		(e) Check the surface finish of the wood as well as the surface roughness of the rubber and plastic sidings.
		(f) Check the fillers provided to fill the 4 holes on the wood surface. These fillers should be levelled with respect to the wood surface.
		(g) Check the stainless steel rods (inserts).
		(h) Do functionality test to validate the level of performance of the Friction Block by using it in conducting experiment on surface friction.
		FRICTION BOARD
		(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure lengths, widths, heights, depths, diameters, thicknesses, angles, etc.
		(c) There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies on the item.
		(d) Check the red upholstery velvet, its surface, and how it is fastened on the plywood.
		(e) Check the surface finish of the plywood and the direction of its grain. The grain direction should be in accordance to what is specified in the technical specifications.
		(f) Inspect the brass screws and how they are arranged on the sidings to hold the aluminium J-clip.
		(g) Inspect the aluminium J-Clip and its fixation on the plywood.
		(h) Check the punched DepED-BLR markers.
		(i) Do functionality test to validate the level of performance of the Friction Board by using it in conducting experiment on surface friction.
39	**BLR-developed SCIKIT MECHANICS 003: Leveling Hose**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure the length, outside diameter, and inside diameter.
		(c) Inspect the transparent plastic material.
		(d) There must be no cracks, scratches, chipped edges, and other deficiencies/defects.
		(e) Do functionality test to validate the level of performance of the hose especially when used in determining whether the two (2) stand bases are horizontally level during experiment on momentum, acceleration, and inertia within the realm of the Cart-Rail System.
40	**BLR-developed: User's Manual (SCIKIT MECHANICS)**	(c) Check the number of pages. If needed, do proof-read.
		(d) Do dimensional inspection. Check the width, length, and thickness of the papers.
41	**BLR-developed: Experiment Module (SCIKIT MECHANICS)**	(e) Inspect the binding. See how the manuals/modules are bound.
		(f) There must be no tear/s on the covers and pages. There must be no crumpled cover/s or page/s.

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LOT 2: BLR-developed SCIENCE AND MATHEMATICS EQUIPMENT (Elem, JHS, & SHS)		
1	**BLR-developed Blackboard Compass**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure lengths, widths, heights, diameters, thicknesses, angles, radii, etc.
		(c) There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other defects on the item.
		(d) Check the surface finish. Materials specified in the technical specifications should be followed.
		(e) Inspect the pivot arm and adjustable arm. Check the screw (with wing nut and washer) that locks the two (2) arms together.
		(f) Test the unlocking, swinging, and locking of the said two (2) arms.
		(g) Inspect the pen/chalk holder and its fixation on the adjustable arm. Check the threaded insert of the pen/chalk holder. Check the pen/chalk lock and clip.
		(h) Inspect the pivot pen and its fixation on the pivot arm. Check the silicon suction cap. (Test the functionality of the said suction cap.)
		(i) Check the engraved DepED-BLR marker.
		(j) Do functionality test to validate the level of performance of the Blackboard Compass by: (1) using it in drawing circles and arcs on a blackboard or whiteboard; and (2) performing geometric constructions such as (a) Perpendicular Bisector of a Line Segment; (b) Angle Bisector; and (c) Locating the Centroid
2	**BLR-developed Blackboard Protractor**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure lengths, widths, heights, diameters thickness, angles, radii, etc.
		(c) There must be no chipped edges, sharp edges, cracks, scratches, warping, twisting, delamination, and other defects on the item.
		(d) Check the printed graduation lines, numbers, letters, and DepED-BLR marker. Check the accuracy of the linear and angular graduations. Check the positioning of the numbers with respect to the graduation lines
		(e) Check the surface finish. Note: The surface must be coated with protective gloss varnish. The said varnish must be on top of the printed graduation lines, numbers, letters, and DepED-BLR marker.
		(f) Inspect the steel handle and its fixation on the protractor.
		(g) Do functionality test to validate the level of performance of the Blackboard Protractor by using it in drawing and measuring angles and lines on a blackboard or whiteboard.
3	**BLR-developed Fresh Water Aquarium with Stand**	A. Inspection:
		1. Shall comply with the design (drawing) specifications.
		2. There must be no breakage, no chipped and sharp brim, no cracks, no scratches, and other deficiencies/defects on the item.
		B. Leak Test:
		Fill water up to half of an inch below the brim (top) of the aquarium. Pour the water carefully so as not to spill any and the surroundings to remain dry. Let the water stay for three (3) hours.
		C. Materials Needed to Perform Inspection and Test:
		1. Digital Vernier Caliper
		2. Steel tape measure
		3. Pail
		4. Tap water
4	**BLR-developed Heat Conductivity Apparatus**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no sharp edges, cracks, scratches, chipped edges, breakage, and other defects on the item.
		(c) Do dimensional inspection. Measure lengths, widths, diameters, radii, thicknesses, etc.
		(d) Inspect the surface finish. Check the materials. The materials should conform to what is specified in the technical specifications.
		(e) Inspect the five (5) test plates and their arrangement on the assembly. Check the punched description markers (Mild Steel, Copper, Aluminum, Stainless Steel, and Brass).

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		(f) Check the Heating Ring and its holes.
		(g) Check the Handle.
		(h) Do functionality test to validate the level of performance and accuracy of the Heat Conduction Apparatus by using it in conducting experiment on heat conduction of metals.
5	**BLR-developed Light Source (Single Slit)**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure lengths, widths, heights, diameters, thicknesses, angles, radii, etc.
		(c) There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other defects on the item.
		(d) Check the surface finish. Materials specified in the technical specifications should be followed.
		(e) Inspect the bulb, its voltage rating, and wattage.
		(f) Inspect the binding posts and their connections. Check the color/s of the binding posts.
		(g) Inspect the switch and its connection.
		(h) Inspect the bulb socket and its connection.
		(i) Inspect the insulator board.
		(j) Check the embossed DepED-BLR markers.
		(k) Do functionality test to validate the performance and accuracy of the Light Source by using it in conducting experiment on diffraction of light.
6	**BLR-developed Set of Coils (Transformer)**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) To determine the conformity of the plastic materials to the technical specifications, the materials should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimens to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the item.
		(c) Do material evaluation of the non-plastic materials.
		(d) Do dimensional inspection. Measure lengths, widths, depths, heights, thicknesses, diameters, etc.
		(e) Check the surface finish.
		(f) Inspect the windings in the primary and secondary sides.
		(g) Inspect the magnet wire size of both primary and secondary windings.
		(h) Inspect the core dimensions
		(i) Inspect the step-up voltages.
		(j) Inspect the step-down voltages.
		(k) Inspect the banana plugs and their colors
		(l) Inspect the bobbin material and dimensions.
		(m) Inspect the label of the number of turns.
		(n) Inspect the printed warning sticker that says "Do not operate more than 6 volts".
		(o) Inspect the connected banana plug at the C-core.
		(p) Inspect the rivets and how they are fixed..
		(q) Inspect the insulator tape of coils and its color
		(r) Inspect the continuity of the windings.
		(s) Do functionality test to validate the level of performance and accuracy of the Set of Coils and check the voltage output of the AC side only: a) Step-up setting from 1.5 to 12 volts; and b) Step-down setting from 1.5 to 12 volts. AC output voltage must be at least 80 % efficient.
		Note: See attached Step Up & Step Down Diagrams & their Tolerance Values
7	**BLR-developed Variable Power Supply with 5 pcs. Terminal Board**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other defects on the item.
		(c) Do material evaluation.
		(d) Do dimensional inspection. Measure lengths, diameters, thicknesses, depths, distances, gaps, clearances, etc.
		(e) Inspect the surface finish.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		(f) Inspect the voltage settings in the primary & secondary: (f.1) Inspect the 3 wires out for connection: 0, 220 & 240 volts
		(f.2) Inspect the 9 wires out for connection: 0, 1.5, 3.0, 4.5, 6.0, 7.5, 9.0, 10.5 & 12 volts
		(g) Inspect the primary and secondary winding sizes of the magnetic wire.
		(h) Inspect the magnetic wire sizes of primary and secondary windings.
		(i) Inspect the solid wire AWG 14 AC / DC binding post connection.
		(j) Inspect the core dimension
		(k) Inspect the insulator between transformer base and casing.
		(l) Inspect the Insulator between aluminum heat sink and siding case.
		(m) Inspect the terminal lug connected on voltage selector switch.
		(n) Inspect the bridge diode 35 amperes, 1000 volts with (+) positive and (–) negative marks.
		(o) Inspect the thermal switch 65°C, auto reset.
		(p) Inspect the royal cord.
		(q) Inspect the main fuse.
		(r) Inspect the binding post of AC output.
		(s) Inspect how the binding posts are fixed.
		(t) Inspect the fuse holder.
		(u) Inspect the vinyl sticker markings and their alignment
		to the knob pointer.
		(v) Inspect the stainless steel casing and the Plexiglas (or acrylic) side covers and how they are fixed.
		(w) Inspect the voltage selector knob and how it is fixed or fastened to the casing.
		(x) Inspect the wires (one color black) connected from AC side of toggle switch going to binding post.
		(y) Inspect the fastening bolts of the Plexiglas (or acrylic)
		side cover/s.
		(z) Inspect the four (4) corners of stainless steel casing
		and stainless steel upper cover. See to it that these
		are properly fixed together, no gaps (closed).
		(aa) Inspect the binding post spacers and how they are
		installed.
		(bb) Inspect the AC / DC sign output which should be hot
		stamped with 0.3 mm deep and painted with green color..
		(cc) Inspect the Main switch lighting indicator.
		(dd) Inspect the Toggle switch 15 Amperes, 250 VAC, with
		heat resistance housing.
		(ee) Inspect the 10K resistor parallel to the 1000 Uf, 25
		Volts capacitor, connected to the bridge diode.
		(ff) Inspect the connecting wires that are connected to the
		transformer terminal going to the voltage selector.
		(gg) Do functionality test to validate the level of
		performance and accuracy of the Variable Power
		Supply, as follows:
		1. Check the voltage output both AC and DC by plugging in
		the unit to the 220/240 volts power source and measure the output voltages from 1.5 to 12 volts using analog or digital multi-meter
		2. Check the temperature rating of thermal sensor by
		plugging in the unit to the 220/240 volts power source and measure the temperature using infrared temperature meter.
		3. Check the load capacity of the unit by loading a **150 watts, 12 volts D.C. halogen bulb** for four (4) hours for endurance test. The thermal switch should activate once the unit temperature reaches 70 degrees centigrade by shutting off the power source to prevent damage
		4. The thermal switch should activate at 55 to 75 degrees centigrade temperature by cutting off the power source and shutting down the unit
		5. The unit will be rejected if the thermal switch will not activate at the temperature of 75 degrees centigrade.
		6. Check the reset timer, it should be 3 to 10 minutes after cutting off the power source and shutting down the unit.
		TERMINAL BOARD
		(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		(b) To determine the conformity of the plastic material/s to the technical specifications, the material/s should be tested by DOST material testing facilities or at any DOST-accredited testing institution. Test certificate should be issued by the testing unit, the original copy should be submitted to BLR-Cebu to validate the specified material. A representative of the Procuring Entity should be present during preparation and submission of the material test specimen/s to testing facility. All expenses for the said test shall be shouldered by the Supplier. There must be no breakage, chipped edges, sharp edges, cracks, scratches, warping, and other deficiencies/defects on the item.
		(c) Do material evaluation of the non-plastic materials.
		(d) Do dimensional inspection. Measure lengths, widths, depths, heights, thicknesses, diameters, etc.
		(e) Check the surface finish.
		(f) Inspect the stainless sheet body.
		(g) Inspect the Plexiglas (or acrylic) body cover.
		(h) Inspect the fuse holder
		(i) Inspect the duplex/speaker wire (with banana plugs connected at the end), its size, and its length.
		(j) Inspect the AWG #14 solid wire connected at the binding post.
		(k) Inspect the fuse.
		(l) Inspect the hot stamped 2 amperes rating near the fuse holder (which should have green color)
		(m) Inspect the cable gland.
		(n) Inspect all binding posts, including colors and size and how they are fixed.
		(o) Do functionality test to validate the level of performance and accuracy of the Terminal Board.
8	**BLR-developed: Fraction Set**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure lengths, widths, heights, diameters, thicknesses, angles, radii, etc.
		(c) There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other defects on the item.
		(d) Check the surface finish. Materials specified in the technical specifications should be followed.
9	**BLR-developed: Linear Pair/Angle Demonstrator**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure lengths, widths, heights, diameters, thicknesses, angles, radii, etc.
		(c) There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other defects on the item.
		(d) Check the surface finish. Materials specified in the technical specifications should be followed.
		(e) Do functionality test to validate the level of performance of the Linear Pair/Angle Demonstrator by (1) forming three (3) different kinds of angle and verify its measurement using a standard protractor.
10	**BLR-developed: Number Blocks**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure lengths, widths, heights, diameters, thicknesses, angles, radii, etc.
		(c) There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other defects on the item.
		(d) Check the surface finish. Materials specified in the technical specifications should be followed.
11	**BLR-developed: Place Value Chart with decimal pockets**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		(b) Do dimensional inspection. Measure lengths, widths, heights, diameters, thicknesses, angles, radii, etc.
		(c) There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other defects on the item.
		(d) Check the surface finish. Materials specified in the technical specifications should be followed.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
LOT 3: BLR-DEVELOPED STORAGE CABINETS		
1	**BLR-developed Storage Cabinet**	(a) In the evaluation of sample, the technical specifications, as part of the Contract, will be used as reference. However, in the pre-delivery inspection, it will be the approved sample that will be used as reference.
		On the individual parts (when the cabinet is at its collapse state):
		(b) Conduct visual inspection of the individual parts. The material/s must conform to what is specified in the technical specifications. There must be no deformities, breakage, sharp edges, cracks, chipped edges, scratches, dents, and other defects on the individual parts.
		(c) Do dimensional inspection of the individual parts. Measure lengths, widths, heights, thicknesses, holes, distances between holes, etc.
		(d) Check the surface finish. Surface that needs powder coating, as specified in the technical specifications, must be powder-coated.
		(e) Inspect the doors, the transparent Plexiglass (acrylic), and the rubber linings. Note: There must be no cracks, warping, bending, scratches, and other defects on the transparent Plexiglass (acrylic).
		(f) Check the door lock and its keys. Check the door handles, detachable shelf supports, and hinges.
		(g) Inspect the top cover, bottom cover, side covers, back covers, and the shelves. Check the holes for the detachable shelf supports.
		(h) Check the fittings of the lock posts of the top cover, front base, and rear base to the (square) openings of the side and back covers.
		(i) Check the bolts and nuts. Check the rivets.
		(j) Check the welds and their locations. Note: Messy or untidy welds are not acceptable.
		On the Assembly:
		(k) The assembled cabinet will be subjected to stress test by moving it sideways, forward, and backward and tilt 30 degrees both ways from the vertical position. During stress test, if the assembled cabinet is found not sturdy and defects are noted, it will be subjected to re-inspection to verify the quality of welded joints, locking rivets, bolts, nuts, and their spacing and determine whether these conform to the technical specifications.
		(l) Do dimensional inspection of the assembly. Measure the height, width, depth, length, etc.
		(m) Check the uprightness of the assembly when laid flat on a (horizontal) ground.
		(n) Check the perpendicularity and/or parallelism of the top cover, bottom cover, side covers, and back covers with respect to each other.
		(o) Check the alignment of the holes (for the detachable shelf supports) both vertically and horizontally.
		(p) Using a spirit level, check the horizontality of the shelves when these are laid to rest on their (detachable) supports in the cabinet. Check, also, the horizontality of the top and bottom covers.
		(q) There must be no deformities, breakage, sharp edges, cracks, chipped edges, cracks, scratches, dents, and other defects on the assembly.
		(r) Check for gaps between the assembled parts.
		(s) Test the opening, closing, swinging, and locking of the doors. Check the performance of the hinges including the performance of the door lock & its keys.
		(t) Inspect the rivets. Check the bolts and nuts. Check their fixations.
		(u) Do functionality test to validate the level of performance of the cabinet by placing in it the equipment intended for it to store.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
II. SCIENCE AND MATHEMATICS EQUIPMENT (MARKET ITEMS)		
LOT 4: CHEMICALS		
1	**Benedict's Solution, 100 mL/bottle**	A. (Refer to General Inspection Protocol)
		B. Tests
		1. Visual Test
		Perform visual inspection of the following: a) Blue liquid
		b) With original screw type plastic packing with threaded chemical seal pack bottle.
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		2. Volumetric Test
		Measure the volume of the Benedict's solution using the 100 mL graduated cylinder if it is 100 mL
		3. Functionality Test
		a. Place 5 mL each of glucose, milk and sugar solution in three test tubes

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		b. Pour 20 drops of Benedict's solution.
		c. Gently shake or swirl the test tube
		d. Heat this mixture in a hot water bath for approximately 4-5 minutes
		e. Take the test tube out from the bath and place in test tube rack. Cool down
		f. Do the same procedures(1-5) with table sugar and milk
		Expected Result: A visible change in color occurs
		Glucose - a color change from clear blue to orange precipitate
		Milk (skim/whole) - a color change from clear blue to orange precipitate
		Table Sugar- still blue (non-reducing sugar)
		Expected Results: A positive test with Benedict's reagent is shown by a color change from clear blue to: a) blue- 0 g % (no trace of simple reducing sugar) b) green precipitate - 0.5 to 1.0 g % (traces of simple reducing sugars) c) yellow precipitate- 1.0-1.5 g % (low presence of simple reducing sugar)) d) orange precipitate - 1.5 to 2.0 g % (moderatepresence of simple reducing sugar)) e) brick-red precipitate - greater than 2.0 g % (high presence of simple
		C. Materials
		Beaker, 250 mL
		4 pc Test tube, 16 x 150
		Benedict's reagent
		Glucose - 5 mL
		Sugar, 10 g
		Test tube rack
		Stirring rod
		Hand gloves
		Safety goggles
		Face mask
		Detergent
		Sponge
		Rags/tissue paper
		Water
		Milk (skim/whole)
		Bunsen burner
		LPG with accessories
2	**Boric Acid, 100 grams/bottle**	A. (Refer to General Inspection Protocol)
		B. Test
		I. Visual Inspection
		Perform/check the following: a) A colorless or white, odorless crystaline solid.
		b) With original screw type plastic packing with threaded chemical seal pack bottle.
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		B. Get the mass of the sample= 100 g

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		a) Weigh the empty threaded chemical seal packbottle sample (a) using a balance
		b) Weigh the sample with the threaded chemical seal pack bottle (b) using the same balance
		c) Subtract (b-a) = 100 g
		C. Function (flame) test
		a)Get a nichrome wire and make a small loop at the end by bending the wire. b)Dip the nichrome wire in hydrochloric acid to clean it
		c)Close the air holes and light the Bunsen burner. A yellow flame is produced
		d)Adjust the height of the flame. Open the air holes of the Bunsen burner so that an invisible or pale blue flame is observed e)Burn the loop end of the wire to remove any dust at the tip of the inner flame. f)Dip the loop into boric acid on the nichrome wire loop and ignite it in the clear or bluish part of the flame. g) Heat the loop with the boric acid at the tip of the inner blue flame
		Expected result: The emission of **pale green** color in the flame is observed, which indicates that the unknown element/ ion is boron present in boric acid
		D. Materials needed to perform test and inspection protocol
		Nichrome wire loop
		Empty threaded chemical seal pack bottle from supplier
		Burner with LPG
		Watch glass
		Spatula
		Lighter/match
		Hydrochloric acid, 0.1N
		Hand gloves
		Safety goggles
		Face mask
		Detergent
		Sponge
		Water
		Rags/tissue paper
3	**Bromothymol Blue**	A. Inspection:
		1. Shall comply with the design specifications.
		B. Tests:
		1. Functionality test:
		Add 1 to 2 drops of BTB to approximately 5 mL of water in a test tube. Gently blow into the tube using a straw until it changes color to yellow (This is a commonly used pH indicator. Low levels of CO2 with BTB will appear blue. As the level of CO2 increases, the solution will gradually take a yellow tint).
		2. Volumetric Test:
		Measure the volume using Graduated cylinder 100 mL.
		C. Materials Needed to Perform Inspection and Test:
		1. Test tube
		2. Graduated Cylinder, 100 mL
		3. Water
		4. Beral pipette or medicine dropper
		5. Drinking straw
4	**Calcium Chloride, 100 grams / bottle**	A. (Refer to General Inspection Protocol)
		B. Test
		I. Visual Inspection
		Perform/check the following: a) White, powder, crystals or granules.
		b) With original screw type plastic packing with threaded chemical seal pack bottle.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		B. Get the mass of the sample= 100 g
		a) Weigh the empty threaded chemical seal packbottle sample (a) using a balance
		b) Weigh the sample with the threaded chemical seal pack bottle (b) using the same balance
		c) Subtract (b-a) = 100 g
		C. Function (flame) test
		a)Get a nichrome wire and make a small loop at the end by bending the wire. b)Dip the nichrome wire in hydrochloric acid to clean it
		c)Close the air holes and light the Bunsen burner. A yellow flame is produced
		d)Adjust the height of the flame. Open the air holes of the Bunsen burner so that an invisible or pale blue flame is observed e)Burn the loop end of the wire to remove any dust at the tip of the inner flame. f)Dip the loop into calcium chloride on the nichrome wire loop and ignite it in the clear or bluish part of the flame. g) Heat the loop with the calcium chloride at the tip of the inner blue flame
		Expected result: The emission of **orange red** color in the flame is observed, which indicates that the unknown element/ ion is boron present in calcium chloride
		C. Materials needed to perform test and inspection protocol
		Nichrome wire loop
		Empty threaded chemical seal pack bottle from supplier
		Burner with LPG
		Watch glass
		Spatula
		Lighter/match
		Hydrochloric acid, 0.1N
		Hand gloves
		Safety goggles
		Face mask
		Detergent
		Sponge
		Water
		Rags/tissue paper
5	**Chemicals Storage Box**	A. (Refer to General Inspection Protocol)
		B. Test
		A. Visual Inspection
		Check all the visual attributes/parameters as per technical specifications
		B. Dimensional test
		Using the tape rule, measure the dimensions of the box as per Technical Specifications
		C. Chemicals (acid/base) Resistance Test
		Place one to two drops of acid/base into the box, if it resists
		chemical attacks. If the container showed any discoloration,
		deformity, or any signs of defects, it failed. If not, it passed.
		C. Materials needed to perform test and inspection
		Acid , HCl

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Base, NaOH
		Two (2) medicine droppers
		Tape rule
6	**Copper Sulfate, CuSO4, 100 grams/bottle**	A. (Refer to General Inspection Protocol)
		B. Test
		I. Visual Inspection
		Perform/check the following: a) Aa blue, odorless crystalline solid
		b) With original screw type plastic packing with threaded chemical seal pack bottle.
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		II. Get the mass of the sample= 100 g
		a) Weigh the empty threaded chemical seal pack bottle sample (a) using a balance
		b) Weigh the sample with the threaded chemical seal pack bottle (b) using the same balance
		c) Subtract (b-a) = 100 g
		III. Functionality (Flame) Test.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		a. Get a nichrome wire and make a small loop at the end by bending the wire. b. Dip the nichrome wire in hydrochloric acid to clean it.
		c. Close the air holes and light the Bunsen burner. A yellow flame is produced
		d. Adjust the height of the flame. Open the air holes of the Bunsen burner so that an invisible or pale blue flame is observed e. Burn the loop end of the wire to remove any dust at the tip of the inner flame. f. Dip the loop into copper sulfate on the nichrome wire loop and ignite it in the clear or bluish part of the flame. g. Heat the loop with the copper sulfate at the tip of the inner blue flame
		Expected result: The emission of **green** color in the flame is observed indicating the presence of copper/ion
		C. Materials needed to perform inspection and test
		Bunsen burner with LPG
		Empty threaded chemical seal pack bottle from supplier
		Alcohol burner
		Lighter
		Denatured alcohol
		Nichrome wire loop
		Hydrochloric acid
		Spatula
		Hydrochloric acid, 0.1 N
		Hand gloves
		Safety goggles
		Face mask
		Watch glass
		Stirring rod
		Detergent
		Sponge
		Water
7	**Gentian Violet, 100 ml / bottle**	A. Inspection:
		1. Shall comply with the design specifications.
		B. Staining Test:
		1. Add a drop of water at the center of a clean glass slide;
		2. Using a flat end of a clean toothpick, gently scrape the inside of your cheek.
		3. Stir the used flat end of thetoothpick to the drop of water on the slide. (Dispose the toothpick in the trash can)
		4. Place one edge of the cover slip (45°) over the sample and lowering it carefully to finally cover. Make sure there are no air bubbles being trapped under the cover slip.
		5. Bring the glass slide on the stage of the microscope.
		6. Examine the specimen using the scanner (4x) and LPO (10x). Take a picture.
		7. This time, take out the slide and add less than a drop of Gentian violet to one side of the cover slip. Make sure it gets into the specimen (wipe any excess with a tissue paper).
		8. Bring the glass slide back on the stage and reexamine using the scanner and LPO. The visibility of the animal cell is enhanced. Take a picture for comparison.
		Note: Be careful not to break the slide. Always look at the side when you lower the body tube, to avoid damaging the mounted specimen.
		C. Materials Needed to Perform Inspection and Test:
		1. Compound Microscope
		2. Glass slide
		3. Water
		4. Tooth pick
		5. Cover slip

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		6. Beral pipette
		7. Tissue paper
8	**Iodine Solution, 100 ml / bottle**	A. Inspection:
		1. Shall comply with the design specifications.
		B. Staining Procedure:
		1. Carefully cut a small section at the topmost portion of the onion bulb, preferably the second layer.
		2. Peel off a very thin layer of onion skin using forceps.
		3. Place the thin layer of onion skin at the center of a clean slide and add a drop of water.
		4. Place one edge of the cover slip (45°) over the sample and carefully lowering it to finally cover. Make sure there are no air bubbles being trapped under the cover slip.
		5. Bring the glass slide on the stage of the microscope.
		6. Examine the specimen using the scanner (4x) and LPO (10x). Take a picture.
		7. This time, take out the slide and add a drop of iodine to one side of the cover slip. Make sure the iodine gets into the specimen (wipe any excess with a tissue paper).
		8. Bring back the glass slide on the stage and reexamine it using the scanner and LPO. The visibility of the plant cell this time is enhanced. Take a picture for comparison.
		Note: Be careful not to break the slide. Always look at the side when you lower the body tube, to avoid damaging the mounted specimen.
		C. Materials Needed to Perform Inspection and Test:
		1. Compound Microscope
		2. Onion bulb
		3. Forcep
		4. Glass slide
		5. Cover slip
		6. Beral pipette
		7. Water
9	**Magnesium Ribbon, 25 grams, 1 roll**	A. (Refer to General Inspection Protocol)
		B. Tests
		I. Visual Inspection
		Perform/check the following: a) Colorless, yellow fuming liquid
		b) With original screw type plastic packing with threaded chemical seal pack bottle.
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		II. Get the mass of the sample= 100 g
		a) Weigh the empty threaded chemical seal pack bottle sample (a) using a balance
		b) Weigh the sample with the threaded chemical seal pack bottle (b) using the same balance
		c) Subtract (b-a) = 100 g
		III. Function test (Synthesis/Addition reaction)
		a) Cut 1 pc magnesium ribbon (2.54 cm)
		b) Rub with sand paper
		c) Ignite in the hottest portion of the Bunsen/alcohol burner using a test tube holder
		d) Observe
		Expected Result:

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		A blinding bright white light and a grayish solid (MgO) is observed
		C. Materials needed to perform test and inspection protocol
		Digital balance
		Empty threaded chemical seal pack bottle from supplier

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Digital vernier caliper
		Test tube holder
		Alcohol burner
		Lighter
		Denatured alcohol
		Pair of scissors
		Sand paper
10	**Manganese Dioxide, 50 grams / bottle**	A. (Refer to General Inspection Protocol)
		B. Tests
		I. Visual Inspection
		Perform/check the following: a) Brown-black solid/ blackish or brown solid
		b) With original screw type plastic packing with threaded chemical seal pack bottle.
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		II. Get the mass of the sample= 100 g
		a) Weigh the empty threaded chemical seal pack bottle sample (a) using a balance
		b) Weigh the sample with the threaded chemical seal pack bottle (b) using the same balance
		c) Subtract (b-a) = 100 g
		III. Function test : Decomposition reaction.
		a. Pour 10 mL of 10 % hydrogen peroxide into a 50 mL test tube.
		b. Add 1.0 g powdered manganese dioxide into the solution.
		Expected Result: A foamy product shoots out quickly in the vial; hence, the name elephant toothpaste. The manganese dioxide is used as a catalyst, making the reaction to proceed faster
		C. Materials needed to perform inspection and test
		Triple beam/top loading electronic balance
		Empty threaded chemical seal pack bottle from supplier
		Test tube, 16 x 150 mL
		Stirring rod
		Spatula
		Hand gloves
		Face mask
		Safety goggles
		Detergent
		Graduated cylinder, 10 mL
		Sponge
		Rags/tissue paper
11	**Microscope's Immersion Oil, 100mL/bot**	A. Inspection:
		1. Shall comply with the design specifications.
		B. Refractive-Index Test:
		1. Take any prepared slide and view it under the microscope.
		2. Consider using the oil (100x) objective.
		3. Make a comparison of the images with and without the immersion oil. Take both pictures for comparison.
		4. With oil, put a drop over the specimen slide and bring the oil objective (100x) into contact with the immersion oil. Placing a substance such as immersion oil with a refractive index equal to that of the glass slide (R.I.1.5) in the space filled with air, more light is directed through the objective and a clearer image is observed

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		4. Clean up after. Immersion oil can (and will) penetrate the microscope components and can damage 'dry' objectives, as immersion oil can corrode the cement used to hold objective front lenses in place. Clean the immersion objective with a lens paper to sweep across the surface of the objective front lens in one direction only. Continue cleaning until no oil is seen on the lens paper. Clean also the prepared slide being used
		C. Materials Needed to Perform Inspection and Test:
		1. Compound Microscope
		2. Any prepared slide
		3. Lens paper
12	**Phenolphthalein, 100 grams/bottle**	A. (Refer to General Inspection Protocol)
		B. Tests
		I. Visual inspection
		Perform/check the following: a) A white to cream, odorless solid powder
		b) With original screw type plastic packing with threaded chemical seal pack bottle.
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		II. Get the mass of the sample= 100 g
		a) Weigh the empty threaded chemical seal pack bottle sample (a) using a balance
		b) Weigh the sample with the threaded chemical seal pack bottle (b) using the same balance
		c) Subtract (b-a) = 100 g
		III. Function test: phenolpthalein indicator is used to distinguish an acid from a base
		a) First, add 5 mL ethanol and 5 mL water in a 50 mL beaker.
		b)Dissolve a pinch of phenolphthalein in the beaker with the ethanol solution. Mix well using a stirring rod
		c) Pour 5 mL acid to a test tube and another 5 mL base to another test tube and place both test tubes in the test tube rack
		d) Using a medicine dropper, place 2-3 drops of phenolphthalein
		indicator to an acid and a base.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Expected results: For a base - exhibits a pink color with phenolpthalein indicator
		For an acid - no color change
		C. Materials needed to perform inspection and test
		Triple beam/toploading electronic balance
		Empty threaded chemical seal pack bottle from supplier
		Beaker, 50 mL
		Stirring rood
		Funnel, glass
		Ethyl alchol
		Water, 5 mL
		Ethanol, 5 mL
		Pinch of phenolpthalein
		Acid
		Base
		Distilled water
		Safety goggles
		Face mask
		Medicine dropper
		Hand gloves
		Detergent
		Sponge
		Rag/tissue paper
13	**Potassium Chloride, 100 grams / bottle**	A. (Refer to General Inspection Protocol)
		B. Test
		I. Visual inspection
		a) White to cream, odorless solid powder
		b) With original screw type plastic packing with threaded chemical seal pack bottle.
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		II. Get the mass of the sample= 100 g
		a) Weigh the empty threaded chemical seal pack bottle sample (a) using a balance
		b) Weigh the sample with the threaded chemical seal pack bottle (b) using the same balance
		c) Subtract (b-a) = 100 g

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		III. Function test: a) Get a nichrome wire and make a small loop at the end by bending the wire. Dip the nichrome wire in hydrochloric acid to clean it b) Close the air holes and light the Bunsen burner. A yellow flame is produced c) Adjust the height of the flame. Open the air holes of the Bunsen burner so that an invisible or pale blue flame is observed d) Burn the loop end of the wire to remove any dust/impurities at the tip of the inner flame. e) Dip the loop into potassium chloride on the nichrome wire loop and ignite it in the clear or bluish part of the flame.
		Expected result: The emission of **light lilac or purple** color in the flame is observed which indicates the presence of potassium /ion.
		C. Materials needed to perform inspection and test
		Triple beam/toploading electronic balance
		Empty threaded chemical seal pack bottle from supplier
		Watch glass
		Stirring rod
		Bunsen burner with LPG
		Nichrome wire loop Hand gloves
		Safety goggles
		Face mask
		Detergent
		HCl
		Sponge
		Rag/Tissue paper
		Water
14	**Potassium Iodide, 100 grams / bottle**	A. (Refer to General Inspection Protocol)
		B. Tests
		I. Visual inspection
		a) White granules or crystals
		b) With original screw type plastic packing with threaded chemical seal pack bottle.
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		II. Get the mass of the sample= 100 g
		a) Weigh the empty threaded chemical seal pack bottle sample (a) using a balance
		b) Weigh the sample with the threaded chemical seal pack bottle (b) using the same balance
		c) Subtract (b-a) = 100 g
		III. Function test 1: Decomposition reaction.
		a) Pour 10 mL of 10 % hydrogen peroxide into a 50 mL vial. Dip the nichrome wire in hydrochloric acid to clean it
		b) Add 1.0 g powdered potassium iodide into the solution.
		Expected Result:
		A foamy product is produced in the vial; hence, the name elephant toothpaste. The potassium iodide is used as a catalyst, making the reaction to proceed faster

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Function test 2: Flame Test experiment. a) Get a nichrome wire and make a small loop at the end by bending the wire. Dip the nichrome wire in hydrochloric acid to clean it b) Close the air holes and light the Bunsen burner. A yellow flame is produced c) Adjust the height of the flame. Open the air holes of the Bunsen burner so that an invisible or pale blue flame is observed d) Burn the loop end of the wire to remove any dust/impurities at the tip of the inner flame. e) Dip the loop into potassium iodide on the nichrome wire loop and ignite it in the clear or bluish part of the flame. f) Heat the loop with the potassium iodide at the tip of the inner flame. **Expected Result:** The emission of **purple/very faint lilac** (light violet) color
		C. Materials needed to perform inspection and test
		10 % hydrogen peroxide
		Triple beam/toploading electronic balance
		Empty threaded chemical seal pack bottle from supplier
		Beaker
		Stirring rod
		Spatula
		Nichrome wire loop Hand gloves
		Safety goggles
		Face mask
		Detergent
		Sponge
		Rags/tissue paper
		Water
		Vial, 50 mL
15	**Sodium Hydroxide (Lye), 250 grams/bottle**	A. (Refer to General Inspection Protocol)
		B. Tests
		I. Visual inspection
		a) A white semi-transparent odorless hygroscopic solid
		b) With original screw type plastic packing with threaded chemical seal pack bottle.
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		II. Get the mass of the sample= 100 g
		a) Weigh the empty threaded chemical seal pack bottle sample (a) using a balance
		b) Weigh the sample with the threaded chemical seal pack bottle (b) using the same balance
		c) Subtract (b-a) = 100 g
		III. Function test .Double decomposition (neutralization)reaction
		a) Place 200 mL water in a beaker
		b) Submerge the test tube with 10 mL hydrochloric acid in it.
		c) Add sodium hydroxide one pellet at a time into the vial with hydrochloric acid.
		Expected Results: A fizzing sound and a white solid, sodium chloride and water is observed

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Function test 2: Using the pH meter, measure the pH of the sodium hydroxide sample a) Place 1 pellet of sodium hydroxide in a test tube b) Pour 5 mL of water into it. Stir well c) Measure the pH using the pH meter
		Expected Results: pH reading is pH 13-14
		C. Materials needed to perform inspection and test
		Triple beam/toploading electronic balance
		Steel tape/ ruler
		Empty threaded chemical seal pack bottle from supplier
		Hydrochloric acid
		Distilled water
		Beaker, 250 mL
		Graduated cylinder, 10 mL
		Test tube, 16 x 150 mL
		Watch glass
		Hydrochloric acid
		Hand gloves
		Face mask
		Safety goggles
		Stirring rod
		Watch glass
		Water
16	**Zinc Chloride, 100 grams / bottle**	A. (Refer to General Inspection Protocol)
		B. Test
		I. Visual inspection
		a) A white crystalline/granular solid powder
		b) With original screw type plastic packing with threaded chemical seal pack bottle.
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		II. Get the mass of the sample= 100 g
		a) Weigh the empty threaded chemical seal pack bottle sample (a) using a balance
		b) Weigh the sample with the threaded chemical seal pack bottle (b) using the same balance
		c) Subtract (b-a) = 100 g
		III. Functionality Test (Flame Test)
		a) Get a nichrome wire and make a small loop at the end by bending the wire.Dip the nichrome wire in hydrochloric acid to clean it
		b) Close the air holes of the burner. A yellow flame is produced. Light the Bunsen burner.
		c) Close the air holes. A yellow flame is produced.
		d) Adjust the height of the flame.
		e) Open the air holes of the Bunsen burner so that an invisible or pale blue flame is observed.
		f) Burn the loop end of the wire to remove any dust at the tip of the inner flame.
		g)Dip the loop into the zinc chloride powder.
		h)Heat the loop with the zinc chloride at the tip of the inner flame.
		Expected Result: A **bluish green/pale green** color of the flame is observed.
		C. Materials needed to perform inspection and test protocol
		Nichrome wire, 0.4 mm dia
		Empty threaded chemical seal pack bottle from supplier
		Bunsen burner

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		LPG with accessories
		Spatula
		Lighter/a box of Match
		Proper Protective equipment (safety goggles, hand
		Gloves, face mask
		Detergent
		Rag/tissue paper
		Sponge
		Water
17	**Zinc metal, pellets/mossy, 100 grams / bottle**	A. (Refer to General Inspection Protocol)
		B.Test
		I. Visual inspection
		a) A bluish white, or as a grey powder/pellets/mossy
		b) With original screw type plastic packing with threaded chemical seal pack bottle.
		c) With full chemical name, chemical formula, the name and address of the manufacturer and appropriate hazard warning"
		d) With manufacturing and expiry date (at least 2 years) and chemical assay
		e) With Certificate of Analysis and SDS (Safety Data Sheet)
		f) Brand printed into the product label
		g) Sample is brand new
		II. Get the mass of the sample= 100 g
		a) Weigh the empty threaded chemical seal pack bottle sample (a) using a balance
		b) Weigh the sample with the threaded chemical seal pack bottle (b) using the same balance
		c) Subtract (b-a) = 100 g
		III. Function test: single displacement (redox) reaction with copper
		sulfate, with zinc acting as a reducing agent . Zinc is a reducing agent
		and reduces copper
		Procedure:
		a) Place 5 g copper sulfate in 50 mL beaker. Mix well using a stirring rod
		b) Place the zinc strip in the solution and observe
		c. After some time copper ions will be oxidized to copper metal while zinc
		metal is reduced
		Expected result:
		In this reaction, zinc atoms reduce copper ions since the copper(II) ion has substantially greater reduction potential (+0.15 V) than zinc ion (-0.76 V), it is readily reduced by zinc metal. The Cu2+ ions become Cu atoms since the two electrons that are released by zinc will be gained by the Cu2+ ions (reduction). A dark coating of copper metal appears on the zinc within two minutes and when 45 minutes have elapsed, there is a thick coat of copper metal powder on the zinc strip and the blue color of the solution has lightened considerably be left in the solution for a longer period of time, the zinc will gradually darken and decay due to oxidation to zinc ions.The blue solution will change to light blue , then eventually to colorless
		The blue color of the aqueous copper(II) sulfate solution is due to the presence of the hexaaquacopper(II) ion in water. The solution becomes lighter in color as copper(II) ions, Cu2+(aq). in the solution is replaced by zinc(II) ions, Zn2+(aq).
		C. Materials needed to perform inspection and test protocol
		Triple beam/toploading electronic precision balance
		Copper sulfate
		Empty threaded chemical seal pack bottle from supplier
		Beaker
		Stirring rod
		Spatula
		Beaker, 50 mL
		Graduated cylinder, 100 mL

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Proper Protective equipment (safety goggles, hand gloves)
		Detergent
		Test tube brush
		Rag/tissue paper
		Water

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
LOT 5: GLASSWARES AND LAB TOOLS		
1	**Beaker, borosilicate, 250 mL**	A. (Refer to General Inspection Protocol)
		B.Tests
		a).Visual inspection
		Check the visible attributes/parameters of the 250 mL beaker, borosilicate as per technical specifications
		b)Dimensional inspection
		Measure the dimensions as per technical specifications of the 250 mL beaker, borosilicate
		c)Scratch test
		Scratch using your thumb nails the brand, white graduations and inscriptions and other markings , to test for the peel and adhesion properties of embossed brand and permanency of graduations, and other markings, If it wont peel off, it passed QC inspection. If not, it is rejected
		d) Refractive-index test
		Submerge the glass into vegetable oil or glycerin to determine whether the glass material is borosilicate.
		Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index, makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerin, 1.473 are some liquids with similar refractive index as to borosilicate glass).
		e) Volumetric Test
		a) Fill the dry beaker sample with water up to the 200 mL mark . Measure all its contents of the beaker sample using a dry, standard 100 graduated cylinder up to 200 mL and transfer the water to another beaker , to check the accuracy and preciseness of the printed graduations as stipulated in the technical specifications, is met. The capacity must be 200 mL, tolerance: ±5% b) Measure 250 mLwater using the standard 100 mL graduated cylinder and transfer all the contents to the beaker sample. The capacity must be 250 mL, tolerance: ±5%
		f) Functionality test
		1. Place half- full of water in the 250 mL beaker. Use boiling stones or boiling sticks in liquids to facilitate even heating and boiling
		2. Heat the beaker with water up to its boiling point of 100°C and let it continue boiling for 3 more minutes to check and verify its resistance to thermal shock without breakage, it Passed QC inspection or if it it fails to resist thermal shock, it is rejected.
		C. Needed Equipment and Material:
		1. Digital vernier caliper
		2. Steel tape measure
		3. Graduated cylinder, 100 mL
		4. Funnel, glass
		5. Denatured alcohol
		6. Rag/tissue paper
		7. Glycerine (1 liter)
		8. Tripod
		9. Lighter
		10. Wire gauze
		11. Thermometer, partial immersion
		12. Hand gloves
		13. Face mask
		14. Safety goggles 15. Boiling stones
2	**Beaker, borosilicate, 50 mL**	A. (Refer to General Inspection Protocol)
		B. Tests
		a).Visual inspection
		Check the visible attributes/parameters of the 50 mL borosilicate beaker as per technical specifications
		b)Dimensional inspection
		Measure the dimensions as per technical specifications of the 50 mL borosilicate beaker
		c)Scratch test

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Scratch using your thumb nails the brand, white graduations and inscriptions and other markings, to test for the peel and adhesion properties of embossed brand and permanency of graduations, and other markings. If it will not peel off, it passed QC inspection, if not, it is rejected
		d) Refractive-index test
		Submerge the glass into vegetable oil or glycerin to determine whether the glass material is borosilicate.
		Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index, makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerin, 1.473 are some liquids with similar refractive index as to borosilicate glass).
		e). Volumetric Test
		a) Fill the dry beaker sample with water up to its 40 mL mark. Measure all of its contents using a standard 10 mL graduated cylinder, to check the accuracy and preciseness of the printed graduations . The capacity must be 40 mL; tolerance: ±5% b) Measure 50 mL water using a standard dry graduated cylinder and transfer all the contents to the beaker sample, to verify whether the required minimum/maximum volumetric capacity as stipulated in the technical specifications , is met. The capacity must be 50 mL, tolerance: ±5% and it must not overflow, it passed QC inspection. If not, it is rejected
		f) Functionality test
		1. Place half- full water in the 50 mL beaker. Use boiling stones or boiling sticks in liquids to facilitate even heating and boiling
		2. Heat the beaker with water up to its boiling point of 100°C and let it continue boiling for 3 more minutes to check if it can resist thermal shock, it passed QC inspection. If not, it is rejected
		C. Needed Equipment and Material:
		1. Digital vernier caliper
		2. Steel tape measure
		3. Graduated cylinder, 10 mL
		4. Graduated cylinder, 100 mL
		5. Funnel, glass
		6. Denatured alcohol
		7. Rag/tissue paper
		8. Glycerine (1 liter)
		9. Tripod
		10. Lighter
		11. Wire gauze
		12. Thermometer, partial immersion
		13 Hand gloves
		14. Safety goggles 15. Boiling stones, Detergent, sponge, water
3	**Burette, 10 mL capacity (acid)**	A. (Refer to General Inspection Protocol)
		B. Tests
		a).Visual inspection
		Check the visible attributes/parameters of the burette as per technical specifications
		b)Dimensional inspection
		Measure the dimensions as per technical specifications of the burette
		c) Scratch test. Scratch using your thumb nails the brand and white graduations and inscriptions and other markings of thedistilling flask; to test for the peel and adhesion properties of embossed brand and permanency of graduations, and other markings. If it wont peel off, it passed QC inspection. If not, it is rejected
		d) Refractive-index test. Submerge the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate. Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index, the glass can no longer be seen or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to borosilicate glass
		e) Leak test

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Procedure: 1. Clean the burette. 2. Allow the temperature of burette and distilled water used for verification to equalize, 3. Note the water temperature. 4. The burette must be fixed in a vertical position in a burette clamp 5. Close the stopcock. 6. Initially fill the burette to a level a few millimetres above the zero mark/line with water. 7.With the key in one or other of the « closed » or shut off positions, the test time will last at least 30-51 minutes to ensure sufficiently accurate determination of water-tightness 8. If a drop appears, the stopcock may need to be tightened or cleaned. If the problem persists, the burette should be rejected. The rate of leakage for Class A burette shall not exceed one half of one scale subdivision in 30-51 min, it Passed QC inspection. If not, it is rejected
		f) Delivery time- is the time required for the free descent of the water meniscus, from the zero mark to the lowest numbered scale mark, with the stopcock fully open and with no restriction of flow. a) Fix/mount the burette in a vertical position using the burette clamp b) Close the stopcock. c) Fill initially the burette with distilled water way up the zero mark. d) Open the stopcock and slowly drain the liquid to set the zero point accurately,making sure the lower meniscus is up to zero mL/mark. d) Fully open the stopcock making sure its tip is not in contact with the wall of the receiving vessel but at the center . e) Drain the water into the beaker up to the lowest numbered scale mark with the stopcock fully open and with no restriction of flow. The delivery time determined in this way must be **minimum- 70 sec . maximum: 100 sec**
		g) Functionality Test 1. Add 0.33 mL of 12 N HCl to 10 ml of distilled water to obtain a 0.4 N HCl solution. 2. Set up the burette. 3. Fill the burette with 0.4 N hydrochloric acid slightly above the zero mark using a pipette to rinse its inside surface very well and align burette tube vertically. 4. Place a reading card at the back of the burette to take a more accurate initial reading at the level of the mensicus. 5. Drain the liquid to set the zero point accurately. 6. Pour 5 mL of the unknown NaOH solution in an Erlenmeyer flask using the 10 mL pipette and add three drops of phenolphthalein to get a pink color. Swirl the flask to mix all the substances. 7. Place the sheet of white paper under the flask for easiest recognition of the color change. 8. Begin the titration by adding HCl to the analyte. Open the stopcock and slowly add titrant to the sample in the flask 9. Gently keep swirling the flask with one hand while using the other hand to manipulate the burette adding the titrant simultaneously. Rinse the walls of the beaker and the tip of the burette with deionized water from a wash bottle when the endpoint is near. This ensures that all of the HCl delivered from the burette ends up in the reaction mixture. 10. The end point is reached when the pink color disappear and one drop changes the indicator color permanently from **pink to colorless** which lasts for at least 30 seconds 11. Take the reading of the burette
		C. Materials
		Beaker, 250 mL
		Test tube, 16 x 150
		Sodium hydroxide, 5 mL
		Hydrochloric acid,10 mL, 0.4 M

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Watch glass
		Burette, base
		Erlenmeyer flask, 250 mL
		Phenolpthalein indicator
		Glycerine (1L)
		Stand setup assembly/tripod
		Stirring rod
		Hand gloves
		Safety goggles
		Face mask
		Detergent
		Sponge
		Rags/tissue paper
		Pipette, 10 mL with pipettor Graduated cylinder, 10 mL Distilled water, 1 L Buret reading card, 3 x 5 index card White paper Funnel
4	**Burette, 10 mL capacity (base)**	A. (Refer to General Inspection Protocol)
		B. Tests
		a)Visual inspection
		Check the visible attributes/parameters of the burette as per technical specifications
		b)Dimensional inspection
		Measure the dimensions as per technical specifications of the burette
		c) Scratch test: Scratch using your thumb nails the brand and white graduations and inscriptions and other markings of thedistilling flask; to test for the peel and adhesion properties of embossed brand and permanency of graduations, and other markings. If it wont peel off, it passed QC inspection. If not, it is rejected
		d) Refractive-index test. Submerge the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate. Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index, the glass can no longer be seen or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to borosilicate glass
		e) Leak test
		Procedure: 1. Clean the burette. 2. Allow the temperature of burette and distilled water used for verification to equalize, 3. Note the water temperature. 4. The burette must be fixed in a vertical position in a burette clamp 5. Close the stopcock. 6. Initially fill the burette to a level a few millimetres above the zero mark/line with water. 7.With the key in one or other of the « closed » or shut off positions, the test time will last at least 30-51 minutes to ensure sufficiently accurate determination of water-tightness 8. If a drop appears, the stopcock may need to be tightened or cleaned. If the problem persists, the burette should be rejected. The rate of leakage for Class A burette shall not exceed one half of one scale subdivision in 30-51 min, it Passed QC inspection. If not, it is rejected

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		f. Delivery time- is the time required for the free descent of the water meniscus, from the zero mark to the lowest numbered scale mark, with the stopcock fully open and with no restriction of flow. a) Fix/mount the burette in a vertical position using the burette clamp b) Close the stopcock. c) Fill initially the burette with distilled water way up the zero mark. d) Open the stopcock and slowly drain the liquid to set the zero point accurately,making sure the lower meniscus is up to zero mL/mark. e) Fully open the stopcock making sure its tip is not in contact with the wall of the receiving vessel but at the center . f) Drain the water into the beaker up to the lowest numbered scale mark with the stopcock fully open and with no restriction of flow. The delivery time determined in this way must be **minimum- 70 sec**
		g) Functionality Test 1. Set up the burette. Fill the burette with 0.4 M sodium hydroxide solution slightly above the zero mark using a pipette to rinse its inside surface very well and align burette tube vertically. Place a reading card at the back of the burette to take a more accurate initial reading at the level of the meniscus. Drain liquid to set the zero point accurately. 2. Pour 5 mL of the unknown HCl solution in an Erlenmeyer flask using the 10 mL burette and add three drops of phenolphthalein. Swirl the flask to mix all the substances. 9. Place the sheet of white paper under the flask for easiest recognition of the color change 4 Begin the titration by adding NaOH solution to the analyte. Open the Rotaflow stopcock and slowly add titrant to the sample in the flask 5. Gently keep swirling the flask with one hand while using the other hand to manipulate the burette adding the titrant simultaneously. Rinse the walls of the beaker and the tip of the burette with deionized water from a wash bottle when the endpoint is near. This ensures that all of the NaOH delivered from the burette ends up in the reaction mixture. 6. The end point is reached when one drop changes the indicator color permanently from colorless to a very slight pink which lasts for at least 30 seconds . Take the final reading. Volume of the base = Final - intial reading Make three or more trials.
		C. Materials Erlenmeyer flask, 250 mL
		Sodium hydroxide, 0.4 M
		Hydrochloric acid, 30 mL
		Phenolpthalein indicator
		Stirring rod
		Glycerine (1L)
		Stand setup assembly/tripod
		Graduated cylinder, 10 mL
		Burette reading card Hand gloves
		Safety goggles
		Face mask
		Detergent
		Sponge
		Rags/tissue paper, Pipette, 10 mL with pipettor Graduated cylinder, 10 mL Distilled water, 1 L Buret reading card, 3 x 5 index card White paper Funnel
5	**Burner, Alcohol, glass, 150 mL Capacity**	A. (Refer to General Inspection Protocol)
		B. Tests
		a)Visual inspection
		Check the visible attributes/parameters of the alcohol burner, 150 mL, as per technical specifications

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		b)Dimensional inspection
		Measure the dimensions as per technical specifications of the alcohol burner, 150 mL
		c) Volumetric Test
		Measure 150 mL of denatured alcohol, using a standard 100 mL graduated cylinder. Fill the alcohol burner using a funnel.
		This test is used to check and verify whether the required minimum/ maximum volumetric capacity of the glass, as stipulated in the technical specifications, is met. The capacity must be 150 mL
		d) Leak Test
		1. Place a piece of white paper on a table.
		2. Place the alcohol lamp on top of the piece of paper. Observe.
		Expected Result: No leak of the alcohol on the piece of paper. This test is done to check if there is no leakage of the denatured alcohol inside the burner/lamp.
		e) Functionality (Heating) test Use the alcohol lamp for continuous heating of water for 20 minutes to test if it can resist thermal shock/withstand prolonged heating without breaking, it Passed QC inspection. If it failed to resist thermal shock and if the glass breaks, it is rejected
		C. Needed Equipment and Material:
		1. Digital vernier caliper
		2. Tape rule
		3. Graduated cylinder, 100 mL
		4. Funnel, glass
		5. Hand gloves
		6. Safety goggles
		7. Face mask
		8.Denatured alcohol
		9 Detergent
6	**Burner, Bunsen**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection
		Check the visible attributes/parameters of the Bunsen burner as per technical specifications
		Dimensional inspection
		Measure the dimensions as per technical specifications of the Bunsen burner
		Functionality test
		1. Install/connect the Bunsen burner to LPG tank.
		2. Check for leaks especially on the Bunsen burner's serrated inlet tube and threaded gas needle valve using soap solution (soap or detergent). No bubbles formed, it passed QC inspection. If not, it is rejected
		3. Close the air holes, a yellow flame (luminous) is produced.
		4. Open the air holes, a blue flame (non-luminous) is produced.
		Gas leak test before using the LPG tank
		1. Prepare a soap solution by mixing 5 mL detergent to 10 mL water; ensure that bubbles do not form during the preparation of the detergent.
		2. Open the LPG tank control valve one-fourth turn counterclockwise.
		3. Place the soap solution on both ends of the rubber hose and into the connection between the regulator and the LPG tank.
		4. If bubbles are formed, it indicates that there is a leakage;
		5. Shut off the LPG tank control valve.
		6. Locate the leak and fix.
		7. Repeat steps 1-3 to re-test the leakage.
		8. After the re-test, if there is no more leakage, continue with the succeeding activity
		C. Materials needed to perform inspection and test
		Digital vernier caliper
		Tape rule
		Stand set up assembly/tripod
		Lighter

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Beaker
		Detergent Water
7	**Cork Stopper # 5 (for Ø 16mm test tube)**	A. (Refer to General Inspection Protocol) B.Tests **Visual inspection** Check the visible attributes/parameters of the cork stopper, #5 for 16 x 150 mm test tube, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the cork stopper, #5 for 16 x 150 mm test tube **Functionality Test** Plug the cork stopper to a 16 mm test tube to check if it fits snugly into it. If it does, ot passed Qc inspection. If not, it is rejected C. Materials needed to perform inspection and test protocol
8	**Crucible with lid/cover**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection
		Check the visible attributes/parameters of the crucible with lid/cover as per technical specifications
		Dimensional inspection
		Measure the dimensions as per technical specifications of the crucible with lid/cover
		Volumetric test
		Measure 30 mL water and pour into it; to check and verify whether the its required minimum/maximum volumetric capacity as stipulated in the technical specifications, is met.
		Functionality test, by heating sugar until it melted to test its resistance to breakage of crucible.
		C. Materials needed to perform inspection and test protocol
		Steel tape/ ruler Vernier caliper Sugar Lighter Bunsen/alcohol burner Stand setup assembly LPG/match Burner Wire gauze Water
9	**Dish, Evaporating, 75 mL**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection
		Check the visible attributes/parameters of the evaporating dish, 75 mL as per technical specifications
		Dimensional inspection
		Measure the dimensions as per technical specifications of the evaporating dish, 75 mL
		Function test by performing the evaporation of salt solution, to separate water from the salt crystals, with the salt residue remaining in the filter paper and the water evaporated, a to test for the functionality and the thermal shock resistance of the evaporating dish
		Volumetric test by measuring 75 mL of water using a standard 100 mL graduated cylinder and pouring all the contents into the evaporating dish sample , to check and verify whether the its required minimum/maximum volumetric capacity as stipulated in the technical specifications, is met.
		C. Materials needed to perform inspection and test
		Measuring tape/ ruler
		Caliper
		Stand setup assembly/tripod
		Alcohol/Bunsen Burner
		Wire gauze

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Evaporating dish
		LPG/match
		Graduated cylinder, 100 mL
		Denatured alcohol
		Lighter
		Stirring rod
		Salt
		Water
		Spatula, Graduated cylinder, 100 mL
10	**Distillation set-up: Condenser, Liebig-type**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Liebig condenser as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specificarions of the Liebig condenser
		Insert the rubber stopper to the distilling flask and to the Liebig condenser if there will be no leak or escape of the steam or rubber hose **Scratch test:** Scratch using your thumb nails the brand and inscriptions and other markings of theLiebig condenser; to test for the peel and adhesion properties of embossed brand and permanency of graduations, and other markings. If it wont peel off, it passed QC inspection. If not, it is rejected **Refractive-index test** (by submerging the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate. Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index, the glass can no longer be seen or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with
		Refractive-index test. Submerge the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate. Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index, the glass can no longer be seen or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to
		Functionality Test Assemble the distillation setup (Liebig Condenser, distilling flask, rubber hose, rubber stopper). Perform the distillation experiment (see attached procedure) **The distillate shall be obtained** (e.g. coffee to be distilled) without any breakage
		C. Materials needed to perform inspection and test tape rule, heat source, stand, water source, glycerine (1L), coffee solution, rag/tissue paper, wire gauze, ring with stem, stand setup assembly, universal clamp, Bunsen burner, LPG
11	**Distillation set-up: Distilling Flask, borosilicate, 250mL**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes of the distilling flask, borosilicate, 250 mL, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specificarions of the distilling flask, borosilicate, 250 mL **Scratch test:** Scratch using your thumb nails the brand and white graduations and inscriptions and other markings of thedistilling flask; to test for the peel and adhesion properties of embossed brand and permanency of graduations, and other markings. If it wont peel off, it passed QC inspection. If not, it is rejected

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Refractive-index test. Submerge the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate. Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index, the glass can no longer be seen or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to
		Volumetric Test Fill the 250 mL distilling flask with 250 mL water using a standard 100 mL graduated cylinder, to check if its volumetric capacity is met.
		Functionality Test . Assemble the distillation setup to perform distillation experiment (Liebig Condenser, distilling flask, rubber hose, rubber stopper). (See attached procedure). **Distillate shall be obtained** (e.g. coffee to be distilled) without any breakage .
		C. Materials needed to perform test and inspection
		tape rule, heat source, stand, water source, glycerine (1L), coffee solution, rag/tissue paper, wire gauze, ring with stem, stand setup assembly, universal clamp, Bunsen burner, LPG
12	**Double burette clamp/holder**	A. (Refer to General Inspection Protocol)
		B. Tests Visual inspection Check the visible attributes/parameters of the double burette clamp as per technical specifications Dimensional inspection Measure the dimensions as per technical specifications of the double burette clamp Functionality Test Let the clamp hold the burettes (acid, base) securely and in place to check its functionallty.
13	**Electrolysis Apparatus, student-type (Brownlee)**	A. (Refer to General Inspection Protocol)
		B. Tests
		a) Do the refractive-index test for the four graduated 25 mL glass test tubes and beaker/glass jar (by submerging the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate. Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to borosilicate glass
		b) Do the function test by performing the Electrolysis of water experiment, to separate water into its elements to produce two part hydrogen and one part oxygen gases. (See attached sheets), to check the accuracy and preciseness of the printed graduations and verify whether the required minimum/maximum volumetric capacity of the glass, as stipulated in the technical specifications, is met. If the hydrogen gas is present, it pops. If oxygen gas is tested, it supports combustion, making the ember glow more or re-ignites
		c) Do volumetric test:
		i) Fill each of the two (2) graduated test tube samples up to their 25 mL mark, using a standard 10 mL graduated cylinder to check the accuracy and preciseness of the printed graduations b) Measure 27 mL water and fill the two graduated test tube samples. It wont overflow , it passed QC inspection. If not, it is rejected
		ii) Measure 1000 mL of water using a standard 100 mL graduated cylinder and pour into glass jar sample, to test and verify its volumetric capacity and to check the accuracy and preciseness of the printed graduations and verify whether the required minimum/maximum volumetric capacity of the glass jar (1000 mL); as stipulated in the technical specifications, is met
		d) Do the scratch test: scratch using your thumb nails the **white graduations** and large white enamel marking spot of the 27 mL graduated test tubes and 1000 mL beaker to test for the peel and adhesion properties of embossed/enamelled brand and permanency of graduations, If they are peeled off, the item is rejected.
		C. Materials needed to perform inspection and test

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Tape rule
		9 V battery
		Connecting wires
		Beaker, 250 mL
		Power supply with switch selector
		Stirring rod Sodium hydroxide solution Glycerine (1L)
14	**Flask, Erlenmeyer, borosilicate, narrow-mouth, 250 mL**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Erlenmeyer flask, 250 mL, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Erlenmeyer flask, 250 mL **Scratch test:** Scratch using your thumb nails the brand and white graduations and inscriptions and other markings of the glass jar and four (4) graduated test tubes; to test for the peel and adhesion properties of embossed brand and permanency of graduations, and other markings. If it wont peel off, it passed QC inspection. If not, it is rejected.
		Refractive-index test (by submerging the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate. Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to borosilicate glass
		Volumetric test, 1) Fill the flask up to its 200 mL mark. Measure all its contents using a standard graduated cylinder and transfer to a beaker, to check the accuracy and preciseness of the printed graduations and verify whether the required minimum/maximum volumetric capacity of the glass, as stipulated in the technical specifications, is met. The capacity must be 200 mL 2) Measure 250 mL water using a standard graduated cylinder and transfer all the contents to the Erlenmeyer flask sample, to check its volumetric capacity. The

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Functionality (Boiling Point) Test. Use boiling stones 1. Fill the flask with half-full water 2. Heat the flask with water up to its boiling point of 100°C and let it continue boiling for 3 minutes, to check if it can resist thermal shock, it Passed QC inspection or its failure to resist thermal shock when the glass breaks, it is rejected
		C. Materials needed to perform inspection and test
		Measuring tape/ ruler
		Boiling stones Measuring tape/ ruler Vernier Caliper, Graduated cylinder, 100 mL, Glycerine (1L)Measuring tape/ ruler Caliper Stand setup assembly/tripod Alcohol/Bunsen Burner Wire gauze Evaporating dish LPG/match Graduated cylinder, 100 mL Denatured alcohol Lighter Stirring rod Water Spatula, Stand setup assembly Wire gauze Universal clamp
15	**Funnel, borosilicate, fluted**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the funnel, borosilicate,fluted, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the funnel, borosilicate, fluted
		Functionality test 1. Make a filter cone out of a filter paper and place it snugly in a funnel
		2. Place a little sand and pour 10 mL water in beaker
		3. Filter and collect in a flask
		Expected Result: The sand- water mixture must be separated The sand is retained on the filter paper as residue and the water as the filtrate passes through the filter paper and is collected in the flask
		C. Materials needed to perform inspection and test
		Measuring tape/ ruler
		Digital vernier caliper
		Graduated cylinder, 100 mL
		Erenmeyer flask, 250 mL
		Stirring rod
		Beaker, 250 mL
		Filter paper
		Pair of scissors
		Sand TapWater
16	**Glass Tubing, Ø 6 mm x Ø 4 mm x 1500 mm long**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the glass tubing, Ø 6 mm x Ø 4 mm x 1219-1500 mm long as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the glass tubing

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Function test
		Cut a 1 foot glass tubing using the triangular file
		Fire polish the ends
		C. Materials needed to perform inspection and test
		Tape rule
		Digital vernier caliper
		Triangular file
		Alcohol /Bunsen burner
		Funnel
		Denatured alcohol Lighter
17	**Manometer, Open U-tube**	A. (Refer to General Inspection Protocol)
		B. Tests **Visual inspection** Check the visible attributes/parameters of the Open U-tube manometer, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Open U-tube manometer **Leak Test for the rubber hose** 1. Fill the rubber hose with water for at least a minute. Water must not leak. 2. Immerse the rubber hose in water. Gently blow air through the tube. There shall be no bubbles coming out from the rubber hose
		1. Fill the U-tube manometer with colored water following instructions in the accompanying User's Manual.
		2. The height/level of the colored water in the two (left an right) tubes must be the same.
		3. Insert the rubber hose into the rifted tip of the U-tube manometer
		3. Apply slight pressure onto the rubber hose. There is now a difference in the level of the left and right) tubes of the manometer colored water. The colored water inside the U-tube manometer moves up and down.
		4. Allow the liquid to stop moving before taking the reading
		5. Read the height/level difference between both the tubes (arms)
		6. Record the height of the liquid in the left tube (arm).
		7. Record the height of the liquid in the right tube (arm).
		8. The pressure difference is measured by taking the difference between the two heights/levels of colored water.
		C. Materials needed to perform inspection and test
		Steel tape/ruler Vernier caliper Colored dye Water Beker, 250 mL Spatula Ruler
18	**Mortar and Pestle, porcelain, 150 mL.**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the mortar and pestle, 150 mL, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the mortar and pestle, 150 mL
		Volumetric test
		Fill the mortar with 150 mL of water using a standard 100 mL graduated cylinder, to check its maximum volumetric capacity , as stipulated in the technical specifications, is met.
		Functionality test
		Cut a leaf into smaller pieces
		Use the mortar and pestle to extract the juice out of the leaf

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		C. Materials needed to perform inspection and test
		Steel tape
		Mortar and pestle
		Pair of scissors
		Graduated cylinder, 100 mL
		Beaker, 250 mL Water
19	**Osmosis Apparatus**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Osmosis apparatus, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Osmosis apparatus
		Functionality Test
		Set up the Osmosis apparatus and conduct experiment (See attached procedure on Osmosis experiment) Procedure: 1 Soak the animal membrane in water for at least 30 seconds and cover the thistle tube with it, and tie it with rubber band. Make sure that the membrane is smooth and tight against the lip of the thistle tube to prevent leakage 2. Fill the thistle tube funnel up to a its neck with the 50 % sugar and remove trapped air using a barbecue stick 3. Invert and mount the thistle funnel in an upright position using the alumnum stand . Make sure that it does not touch the bottom of the jar. 4. Fill the jar with water up to the neck of the thistle funnel. Use the barbecue stick when there is a gap on the glass tube 5. Mark the initial level of the sugar solution with a marking pen 6. Mark the next level of the sugar solution in the thistle tube after 5 minutes 7. Monitor the change of the level of the sugar solution in the thistle tube every after 5 minutes for 20 minutes **Expected Result:** There is a **continuous rise of the level** of sugar solution in the thistle tube until rising of the level stops when equilibrium is reached
		C. Materials
		Sugar solution, 50%
		Sugar, 10 g
		Tape rule Balance. digital Ruler Vernier caliper Stopwatch Beaker, 250 mL Barbecue stick Water Rubber band
20	**Reagent Bottle, narrow-mouth, amber, borosilicate, 250 mL**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the reagent bottle, narrow mouth, amber, 250 mL , as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the reagent bottle, narrow mouth, amber, 250 mL
		(by submerging the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate. Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to borosilicate glass.
		Volumetric test
		Measure 250 mL water using a standard 100 mL graduated cylinder and fill the reagent bottle sample, to check its capacity.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Scratch test Scratch using your thumb nails the white large white markings and brand of the reagent bottle to test for the peel and adhesion properties of embossed brand and permanency of the big white enamel marking spot and other markings. If the marking spot and brand name and other markings are peeled off, the item is rejected.
		C. Materials needed to perform test and inspection
		Tape rule
		Digital vernier caliper Graduated cylinder, 100 mL
21	**Reagent Bottle, wide-mouth, transparent, borosilicate, 250 mL**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the reagent bottle, wide mouth, clear, 250 mL , as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the reagent bottle, wide mouth, clear, 250 mL
		Scratch test Scratch using your thumb nails the white large white markings and brand of the reagent bottle to test for the peel and adhesion properties of embossed brand and permanency of the big white enamel marking spot and other markings. If the marking spot and brand name and other markings are peeled off, the item is rejected.
		Refractive index test (by submerging the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate. Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to borosilicate glass.
		Volumetric test
		Measure 250 mL water using a standard 100 mL graduated cylinder and fill the reagent bottle sample, to check its capacity.
		C. Materials needed to perform inspection and test
		Tape rule
		Vernier caliper
		Graduated cylinder, 100 mL
		Glycerine
		Hand gloves
		Face mask
		Stirring rod
		Safety goggles
		Detergent
		Sponge
		Rags/Tissue paper
		Water
22	**Rubber Stopper # 0 (for Ø 16mm test tube)**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the rubber stopper, #0, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the rubber stopper, #0
		Hardness test by using the durometer.
		Hardness: 40± 5 Duro
		Fitting test to validate the level of performance and accuracy of the item by placing
		the bottom part of the rubber stopper into the mouth of a 16 mm x 150 mm test tube,
		and see if it fits well. It passed QC, if not, it failed QC.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		C. Materials needed to perform inspection and test
		Steel tape// ruler
		Digital vernier caliper
		Durometer
23	**Spatula, spoon, porcelain and glazed**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Spoon-spatula, porcelain and glazed, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Spoon-spatula, porcelain and glazed
		Functional test by transferring liquid or powder from one container to another
		Volumetric test
		i) Measure 0.3 mL of water using a standard 10 mL graduated cylinder
		ii) Pour the 0.3 mL water into the spoon portion
		This test is used to check and verify whether the required minimum/maximum volumetric capacity of the spoon, as stipulated in the technical specifications, is met
		C. Materials needed to perform inspection and test
		Vernier caliper
		Steel tape/ ruler, Graduated cylinder, 10 mL Water
24	**Stirring Rod, Ø 6 mm x 250 mm long**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Stirring Rod, Ø 6 mm x 250 mm long, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Stirring Rod, Ø 6 mm x 250 mm long
		Functionality Test
		Mix salt and water using the stirring rod. A solution is formed, one phase.
		Refractive-index Test
		Submerge the glass into vegetable oil or glycerin to determine whether the glass material is borosilicate.
		Borosilicate glass is identified by its refractive index, 1.474.
		Immersing the glass in a container of liquid of similar refractive
		index, makes the glass not visible or will disappear. (Vegetable oil,
		1.47 and glycerin, 1.473 are some liquids with similar refractive
		index as to borosilicate glass).
		C. Materials needed to perform inspection and test
		Tape rule
		Digital vernier caliper
		Glycerine (1L)
		Hand gloves
		Face mask
		Safety goggles
		Detergent
		Sponge, Rags/tissue paper
25	**Test tube brush**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the test tube brush, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the test tube brush

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Function test by cleaning a test tube using the test tube brush
		C. Materials needed to perform inspection and test
		Vernier caliper
		Steel tape/ ruler
		Water
		Detergent, Rags/tissue paper
26	**Test Tube, borosilicate, Ǿ 16 mm x 150 mm long**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the test tube, borosilicate,Ǿ 16 x 150 mm long, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the test tube, borosilicate, Ǿ16 x 150 mm long
		Volumetric test
		Fill the test tube with 20 mL water using a standard graduated cylinder to check its capacity.
		Refractive-index test
		Submerge the glass into vegetable oil or glycerine to determine whether the glass material is borosilicate.
		Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to borosilicate glass.
		Scratch test:
		Scratch using your thumb nails the white large white markings and brand of the test tubes to test for the peel and adhesion properties of embossed brand and permanency of the big white enamel marking spot and other markings. If the marking spot and brand name and other markings are peeled off, the item is rejected
		Functionality (Boiling Point) Test: Fill the test tube half-full with water. Use boiling stones or boiling sticks in liquids to facilitate even heating and boiling. Heat to boiling and let it continue boiling for at least three more minutes to check and verify if it can resist thermal schock or withstand prolonged heating wihout breaking, it Passed QC inspection, or if it fails to resist thermal shock, it i rejected
		C. Materials needed to perform inspection and test protocol
		Tape rule
		Vernier caliper
		Glycerine (1 L)
		Graduated cylinder, 10 mL
		Hand gloves
		Face mask
		Safety goggles
		Detergent
		Sponge Water
27	**Tong, Crucible**	A. (Refer to General Inspection Protocol)
		B. Test
		Visual inspection Check the visible attributes/parameters of the Crucible tong, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Crucible tong
		Functionality Test
		Check if it is easy to remove the lid from a crucible, transfer
		evaporating dish or pick small objects out of a reaction container
		using the tong. If it does, it passed. if not, reject it
		C. Needed tools and materials:
		Steel tape rule/ ruler Vernier caliper

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Steel tape/ ruler
28	**Vial, screw-neck, 25 ml. (with screw-type plastic cap)**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the vial, screw-neck, 25 mL (with screw-type plastic cap), as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the vial, screw-neck, 25 mL (with screw-type plastic cap)
		Volumetric test
		Measure 25 mL water using the standard 10 mL graduated cylinder and transfer all the contents to the dry 25 mL vial sample, to check its volumetric capacity. It must not overflow and it passed QC inspection. If not. It is rejected
		Refractive-index test
		Submerge the glass into vegetable oil or glycerin to determine
		whether the glass material is borosilicate.

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index, makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerin, 1.473 are some liquids with similar refractive index as to borosilicate glass).
		C. Needed tools and materials:
		tape rule
		Vernier caliper
		Glycerine (1 L)
		Graduated cylinder, 10 mL
		Hand gloves
		Face mask
		Safety goggles
		Detergent
		Water Sponge Rags/tissue paper
29	**Vial, screw-neck, 50 mL. (with screw-type plastic cap)**	A. (Refer to General Inspection Protocol)
		B.Tests
		Check the visible attributes/parameters of the vial, screw-neck, 50 mL (with screw-type plastic cap), as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the vial, screw-neck, 50 mL (with screw-type plastic cap)
		Dimensional inspection Measure the dimensions as per technical specifications of the vial, screw-neck, 50 mL (with screw-type plastic cap)
		Volumetric test
		Fill the vial with 50 mL water using a standard 10 mL graduated cylinder to check its capacity
		Refractive-index test
		Submerge the glass into vegetable oil or glycerin to determine whether
		the glass material is borosilicate.
		Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index, makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerin, 1.473 are some liquids with similar refractive index as to borosilicate glass).
		C. Needed tools and materials:
		tape rule
		Vernier caliper
		Glycerine (1 L)
		Graduated cylinder, 10 mL
		Hand gloves
		Face mask
		Safety goggles
		Detergent
		Sponge Water Rags/tissue paper
30	**Watch Glass, Ø 90 mm**	A. (Refer to General Inspection Protocol)
		B.Tests

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Visual inspection Check the visible attributes/parameters of the watch glass, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the watch glass
		Refractive-index Test
		Submerge the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate.
		Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to borosilicate glass.
		Functionality Test
		Fill the watch glass with 5 mL acetone using a standard 10 mL graduated cylinder . Observe Fill the watch glass with 5 mL water and observe. **The acetone evaporates faster than water since it is more volatile than water**
		C. Needed tools and materials:
		Tape rule
		Vernier caliper
		Acetone Glycerine (1 L)
		Graduated cylinder, 10 mL Stirring rod
		Hand gloves
		Face mask
		Safety goggles
		Detergent
		Sponge
		Rags/tissue paper

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
LOT 6: SCIENCE DEVICES, INSTRUMENTS, AND MEASURING TOOLS - MATTER		
1	**Balance, Toploading, Electronic**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Balance, Toploading, Electronic, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Balance, Toploading, Electronic
		Functionality test
		a) Set up and operate the unit using the User's Manual . b) Place the balance on a sturdy, level surface. c) Get the bubble centered to ensure the balance is correctly level on the bench top d) First, before weighing , it needs to be "tared," or recalibrated to read 0.01 g. e) Press the button and turn it on f) Press the Tare button and release to effect this recalibration to check **its** accuracy . g) Place the 500 g calibration mass to be weighed at the center of the pan h) Take the reading
		C. Materials needed to perform inspection and test
		Tape rule, Vernier caliper
2	**Balance, Triple Beam, with tare, 2610-gram**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Balance, Triple Beam, with tare, 2610-gram, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Balance, Triple Beam, with tare, 2610-gram
		Functionality Test
		1. Set up and operate the unit using the User's Manual . 2.Zero the balance first before weighing by sliding back all the weight poises (that slide along the beams) so that the pointer is right at the zero line. Adjust and turn the zero adjustment knob a little bit to get it right at the zero line. 3. Place the 500 g mass at the left pan , the pointer immediately goes up and is no longer zeroed. 4. Slide the weight poises until the pointer is at zero again to find the weight of the object. Start with the two heavier weight poises and then use the lightest one (the rider) to do the fine tuning. 5. Add up all the number that each weight poise is at when the pointer is zeroed. 6. Take two or more trials to verify its accuracyConduct weighing using a known mass , 500 g, to check accuracy. Take three or more trials to verify its reliability and functionality. 7. Conduct determination of specific gravity of an object experiment to
		C. Materials needed to perform inspection and test
		Vernier caliper, tape rule, 500 g mass
3	**Calorimeter**	A. (Refer to General Inspection Protocol)
		B. Tests **Visual inspection** Check the visible attributes/parameters of the calorimeter, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the calorimeter **Functionality Test:**
		Perform Heat of Fusion experiment
		1. Weigh an empty calorimeter using a triple beam balance.
		2. Record the mass in Table 1.
		3. Heat 500 mL of water in a beaker using a Bunsen/alcohol burner until the temperature is 60 °C. Observe what happens.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		4. Pour the warm water into the calorimeter and measure the weight using the triple beam balance. Stir well using the stirrer provided.'
		5. Record the temperature reading when it stabilizes as the initial temperature. Note: Do not use the thermometer to stir the mixture.
		6. Weigh 50 g crushed ice and add it to the calorimeter making sure that the stirrer is covered with the ice.
		7. Stir until the ice melts and record the final temperature.
		C. Materials Needed to Perform Inspection and Tests:
		1. Tape rule, vernier caliper 2. Hot water, 60 deg 3. Ice (shall be brought by the supplier), 50 g 4. Thermometer -20 to 110 deg C 5. Beaker, 500 mL 6. Triple beam/toploading electronic balance
4	**Centrifuge**	A. (Refer to General Inspection Protocol) B. Tests **Visual inspection** Check the visible attributes/parameters of the centrifuge, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the centrifuge **Functionality Test** Install, set up and operate the unit using the User's Manual. a) Remove the centrifuge from the box and inspect for any possible shipping damage. If the centrifuge appears to be damaged from shipping, it is rejected. b) Place the centrifuge on a sturdy, level surface. c) Turn the lid latch to the UNLOCK position ("U"). Open to verify that there are no loose objects or packing material in the tube chamber, and that the 8 large blue tube shields and the 8 smaller black tube shields are in place and seated in the angled 8-place rotor.
		d) Verify that the power switch on the front of the unit is in the OFF position. e) Connect the 3-prong wall power cord to the AC power adapter, and then connect the AC power adapter to the back of the centrifuge. f)Plug the power cord into an approved and properly grounded outlet. Do not insert specimen test tubes prior to initial test run. g) Close the lid, turn the lid latch to the LOCKED position ("L") and turn power switch ON. For fixed unit, turn the timer to 10 minutes. h) Press RUN. If there is a smooth whirring sound and the unit accelerates with little or no vibration, your E8 centrifuge is ready to operate. The unit PASSED If there are loud, unusual sounds or if you experience excessive vibration,
5	**Electrical Conductivity (Conductivity of Solutions) Apparatus**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Electrical Conductivity (Conductivity of Solutions) Apparatus, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Electrical Conductivity (Conductivity of Solutions) Apparatus **Functionality test** by performing the Electrical Conductivity of Substances, wherein conductors/electrolytes cause the bulbs to light while non-conductors/non-electrolyte will not cause the bulbs to light
		Procedure:
		1. Prepare 10% salt solution,(10 g salt, 90 g water)
		2. Clean the electrode using sand paper
		3. Fill the jar with the salt solution
		4. Connect the ECA to the power source
		Expected Result: The bulb will light up if (salt solution) electrolyte. If non-electrolyte, it will not light up(sugar)

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		C. Materials needed to perform test and inspection
		Measuring tape/ ruler
		2 Battery, AA
		Power supply (0-12 V) with switch selector Beaker, 250 mL
		Alligator clips Connecting wires Stirring rod 10% salt solution Sugar solution
6	**Filter Paper, crepe, 580mm x 580 mm sheet, Grade 0905**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the filter paper, crepe, 580 x 580 mm as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the filter paper, crepe, 580 x 580 mm
		Procedure:
		1. Prepare a filter cone from a sheet of filter paper, as shown in Figures 1-6.
		a. Measure 120cm x 120cm filter paper, cut, and fold it in half and then fold again in half, as shown in Figure 1.
		b. Cut a circular filter paper using a pair of scissors, as shown in Figure 2.
		2. Fold the filter paper to fit in the funnel.
		a. Open the circular filter paper and fold in half to form a semi-circle and crease lightly, as shown in Figure 3.
		b. Fold it once again with the top section smaller than the bottom to form a quarter circle. Tear off a corner of the smaller side of the filter paper, as shown in Figure 4.
		c. Open the folded filter paper into a cone by keeping three folds on one side and one fold on the other side such that the torn off corner is outside, as shown in Figure 5.
		3. Make the opening wider by squeezing slightly together at the creases, as shown in Figure 6.
		a. Place the filter paper cone to the glass funnel by pressing its top edge of the cone so that it makes continous contact with the funnel. Adjust the filter cone to fit the funnel snugly. The edge of the paper should be about 1-2 cm below the rim of the funnel, as shown in Figure 7.
		4. Using distilled water, wet the filter paper and carefully press it with a stirring rod so that it makes maximum contact with the funnel - particularly around the upper edge in the region of the tear, as shown in Figure 8.
		5. Mount the funnel into the stand setup assembly using the universal clamp, as shown in Figure 9.
		6. Measure 10 mL distilled water using a standard graduated cylinder.
		7. Let someone operate the stopwatch. Simultaneously/at the same time, turn on the stopwatch and pour the distilled water, using a stirring rod, to guide it into the funnel to prevent spillage until it is nearly filled to about 1 cm from the top of the filter paper to prevent liquid mixture to flow between the filter paper and the funnel
		8. Continue pouring the distilled water until the last drop has been filtered, and simultaneously, turn the timer off.
		9. Take the time it takes for all the 10 mL water to be filtered.
		10. Take two or more trials.
		Expected Result: The 10 mL distilled water shall be filtered in less than or within 20 seconds ± 1 second.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		C. Materials needed to perform inspection and test
		Funnel, fluted, short stem with a diameter of 75 mm
		Filter paper Grade 0905 - with size of 120 cm x 120 cm commensurate to the diameter of the funnel, distributed to the recipient schools nationwide.
		Distilled water - 1 Liter
		1 pc Stirring rod
		1 pc Stand setup assembly
		1 pc beaker/Erlenmeyer flask, 250 mL
7	**Gloves, Hand, super nitrile**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the hand gloves, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the hand gloves
		Test for pinholes by blowing or trapping air inside and rolling them out
		Waterproof Test by wearing it on one's hands and then immersing your hands in water with the gloves on. If your hand does not get wet, it passed. If not, it is rejected/failed.
		C. Materials needed to perform inspection and test protocol
		Measuring tape/tape rule Vernier caliper Water
8	**Graduated Cylinder, borosilicate, 10 mL**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the 10 mL graduated cylinder, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the 10 mL graduated cylinder
		Refractive-index Test
		Submerge the glass into vegetable oil or glycerin to determine whether the glass material is borosilicate.
		Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerin, 1.473 are some liquids with similar refractive index as to borosilicate glass.
		Volumetric test
		a) Fill the graduated cylinder sample up to its 10 mL mark. Measure all of its contents using the standard graduated cylinder, to test and verify its volumetric capacity. The capacity must be 10 mL ±0.20 mL, 9.80 mL to 10.20 mL b) Measure 10 mL water using the standard graduated cylinder and trasnfer to the graduated cylinder sample to test and verify its capacity
		Scratch test
		Scratch the markings with the thumb nails e.g., brand name, graduations and other markings, to check their adhesion property/permanency. If these markings wont peel off, it passed QC inspection. If not, it is rejected
		C. Materials needed to perform inspection and test
		Measuring tape/ ruler
		Digital vernier Caliper
		Stirring rod
		Graduated cylinder, 10 mL
		Funnel
		Glycerin
		Hand gloves
		Safety goggles
		Face mask
		Detergent
		Sponge

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Rag/tissue paper, water
9	**Graduated Cylinder, borosilicate, 100 mL**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the 100 mL graduated cylinder, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the 100 mL graduated cylinder
		Refractive-index test
		Submerge the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate. Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to borosilicate glass
		Volumetric test
		a) Fill the graduated cylinder sample up to its 100 mL mark. Measure all of its contents using the standard 100 mL graduated cylinder, to test and verify its volumetric capacity. The capacity must be 100 mL ±0.60 mL, 99.40 mL to 100.60 mL
		b) Measure 100 mL water using the standard graduated cylinder and transfer to the graduated cylinder sample to test and verify its capacity
		Scratch Test Scratch with your thumb nails the markings e.g., brand name, graduations and other markings, to check the adhesion property/permanency. If these markings wont peel off, it passed QC inspection. If not, it is rejected
		C. Materials needed to perform inspection and test
		Measuring tape/ ruler
		Digital vernier Caliper
		Stirring rod
		Graduated cylinder, 100 mL
		Funnel
		Glycerine
		Hand gloves
		Safety goggles
		Face mask
		Detergent
		Sponge
		Rag/tissue paper Distilled water Beaker, 500 mL
10	**Graduated pipette with rubber pipettor, borosilicate, 10 mL**	A. (Refer to General Inspection Protocol)
		B. Tests

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Visual inspection Check the visible attributes/parameters of the 10 mL graduated pipette with rubber pipettor, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the 10 mL graduated pipette with rubber pipettor **Refractive-index Test** Submerge the glass into vegetable oil or glycerine) to determine whether the glass material is borosilicate. Borosilicate glass is identified by its refractive index, 1.474. Immersing the glass in a container of liquid of similar refractive index makes the glass not visible or will disappear. (Vegetable oil, 1.47 and glycerine, 1.473 are some liquids with similar refractive index as to borosilicate glass. **Volumetric test.** Fill the pipette sample up to the zero mark with 10 mL water using the rubber pipettor. Run down all the 10 mL water into a standard 10 mL graduated cylinder .The capacity must be 10 mL (± 0.060 mL), to check its accuracy b) Measure 10 mL water using the standard graduated cylinder and transfer
		Scratch Test Scratch using your thumb nails the amber graduations and large white markings of the graduated test tubes to test for the peel and adhesion properties of etched brand name and permanency of graduations, and other markings. If these markings wont peel off, it passed QC inspection. If not, it is rejected
		C. Materials needed to perform inspection and test protocol
		tape rule, Vernier caliper, graduated cylinder 10 mL, glycerine, beaker, 500 mL.
11	**Hydrometer for heavy liquids**	A. (Refer to General Inspection Protocol)
		B. Test
		Visual inspection Check the visible attributes/parameters of the Hydrometer for heavy liquids, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Hydrometer for heavy liquids
		Functionality Test:
		1. Measure 80 mL glycerine using the standard 100 mL graduated cylinder and pour slowly down the side of another 100 mL graduated cylinder. 2. Place the hydrometer in the graduated cylinder and give it a quick gentle twirl or spin to dispel/dislodge any formed air bubbles 3 Hold the hydrometer by the top of the stem as fingerprints down the scalecan affect accuracy 4. Slowly lower the hydrometer into the cylinder with glycerine and release when it is approximately at its position of equilibrium 5. Let the hyrometer rest between the finger and the thumb and push the hydrometer down a few millimeters below equilibrium 6. Release the hydrometer It should rise steadily and settle to its equilibrium position 7. Take a reading corresponding to the plane of intersection of the horizontal liquid surface and the stem, not the point the liquid touches the hydrometer stem 8.Use the scale to get the reading of 1.26
		C. Materials need to perform test and inspection
		80 mL Glycerine
		Graduated cylinder, 100 mL
		Stirring rod
		Hand gloves, test tube brush
		Safety goggles
		Face mask
		Detergent
		Sponge
		Rags/tissue paper, water
12	**Hydrometer for light liquids**	A. (Refer to General Inspection Protocol)

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		B. Tests **Visual inspection** Check the visible attributes/parameters of the Hydrometer for light liquids, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Hydrometer for light liquids **Functionality Test**
		1. Measure 90 mL water using the standard 100 mL graduated cylinder and pour slowly down the side of another 100 mL graduated cylinder. 2. Place the hydrometer in the graduated cylinder and give it a quick gentle twirl or spin to dispel/dislodge any formed air bubbles 3 Hold the hydrometer by the top of the stem as fingerprints down the scalecan affect accuracy 4. Slowly lower the hydrometer into the cylinder with water and release when it is approximately at its position of equilibrium 5. Let the hydrometer rest between the finger and the thumb and push the hydrometer down a few millimeters below equilibrium 6. Release the hydrometer It should rise steadily and settle to its equilibrium position 7. Take a reading corresponding to the plane of intersection of the horizontal liquid surface and the stem, not the point the liquid touches the hydrometer stem 8.Use thehydrometer scale to get the reading of 1.00 C. Materials needed for test and inspection 90 mL distilled water Stirring rod Graduated cylinder, 100 mL Detergent Sponge Laboratory gloves
13	**Laboratory Hot Plate with magnetic stirrer**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection/parameters Check the visible attributes/parameters of the Laboratory Hot Plate with magnetic stirrer, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Laboratory Hot Plate with magnetic stirrer
		Functionality test
		a)Place half full water in a beaker. Use boiling stones or boiling sticks in liquids to facilitate even heating and boiling
		b)Heat the water up to its boiling point and let it continue boiling for three more minutes to check functionality
		Monitor the motor temperature based on NEMA Standards MG 1-2011, 12.43, defines temperature rise for motors in a maximum ambient of 40°C. *Its vibration is within the tolerance of the given motor rating without irregular noise in motor bearing and in other moving mechanical parts:
		Endurance Test for a series of five Test Runs with one minute each to determine how the machine behaves under sustained use. Turn On and Off method is applied
		Powder coating test
		Rub a ball of cotton with alcohol into the surface of the plate. If the color of the paint sticks to the cotton, it is not powder coated. Reject the item. If not, accept the item as it is powder coated
		C. Materials needed to perform inspection and test
		Steel / ruler
		Digital vernier caliper
		Stand setup assembly
		Beaker
		Wire gauze
		Boiling stones
		Ring with stem

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Alcohol burner
		Lighter
		Denatured alcohol
14	**Safety Goggles, polycarbonate**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the safety goggles, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the safety goggles
		Assembled Eyewear Inspection
		a)Abrasion Resistance Check by forcefully rubbing the lens with a clean cotton cloth by hand and check for scratches or transfer of color.
		b) Lens Tightness of Fit – Verify that lenses are fitted into the frame with appropriate tightness so that they do not fall off under normal use.
		c) Cosmetic Defects Check – Inspect eyewear for any sign of manufacturing defects and handling damage including scratches, chips, coating pits, drips, and blemishes.
		d) Labeling – Verify that the labels used in the product comply with relevant standards as well as with the specifications provided for by the importer including brand name, model, UV rating, and (ANSI Z87.1, EN 166 or CSA Z94.3 certification compliance)
		f) Packaging – Check that retail and shipper's packaging are in accordance with existing regulations and contractual specifications.
		g) Flammability – Check that eyewear is made from non-combustible materials including its attachments, if any.
		h) Biocompatibility – Verify that products are made from materials that are non-toxic, non-irritating, and may cause significant allergic reaction to wearer under normal use.
		i) Fitting test to validate the level of performance and accuracy of the sample. Ensure your safety eye wear fits properly. Eyewear should cover from the eyebrow to the cheekbone, and across from the nose to the boney area on the outside of the face and eyes. Eye size, bridge size and temple length all vary. Eyewear should fit over the temples comfortably and over the ears. The frame should be as close to the face as possible and adequately supported by the bridge of the nose.
		C. Materials needed to perform inspection and test
		Steel tape/ ruler
		Digital vernier caliper
15	**Thermometer, Laboratory type, Alcohol, -20°C to 110°C**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Thermometer, Laboratory type, Alcohol, -20°C to 110°C, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Thermometer, Laboratory type, Alcohol, -20°C to 110°C
		Scratch test
		Scratch the brand, permanent white graduations and large white markings using your thumb nail, to test for the peel and adhesion properties of embossed brand and permanency of graduations, and other markings. If these markings wont peel off, it passed QC inspection. If not, it is rejected
		Functionality (Boiling Point) Test
		i) Immerse both the alcohol thermometer and a standard reference mercury thermometer together in distilled the water (up to their immersion lines of the sample)
		ii) Heat the water to its boiling point
		The accuracy of the temperature reading obtained must be 100°C, tolerance; (±1°C) meaning, the temperature reading must be from 99°C-101°C .
		This test is used to validate the accuracy and preciseness of the printed
		graduations
		C. Needed Equipment and Material:

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		1. Standard thermometer, partial immersion thermometer (-20-110 ° C)
		2. Digital Vernier Caliper
		3. Steel tape measure
		4. Graduated Cylinder, 100 mL
		5. Distilled Water, 1 L
		6. Pail of water
		7. String, 1 meter 8. Rags/tissue paper, Graduated cylinder , 100mL, detergent, sponge

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
LOT 7: SCIENCE DEVICES, INSTRUMENTS, AND MEASURING TOOLS - EARTH & SPACE and LIVING THINGS		
1	**Anemometer with Wind Vane, Cup type**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Check if there are no random readings registered.
		Example if the revolving cups of the anemometer is not
		rotating then the reading should be zero.
		2. At a certain distance from an air blower measure the
		wind speed using the evaluated anemometer and a
		standard anemometer, difference in values should not
		exceed 10%.
		3. If resource and time permits get a vehicle and travel
		around a track and field oval when it is not windy or
		during calm periods.
		4. Let the vehicle move and maintain a speed of 10kph, 20kph, 30kph as you initiate the anemometer.
		5. Anemometer reading and vehicle speedometer should
		be within ±10% of the afformentioned speed.
		6. Check the wind vane. The arrow head shall point in the
		direction the vehicle is heading.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 Steel rule/meter tape
		2. 1 Vernier caliper
		3. 1 Standard anemometer with wind vane
		4. 1 Electric air blower or fan
		5. optional: open vehicle to run in oval track
2	**Anemometer, Simple**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		1. Place the evaluated simple anemometer 1 meter in front
		of an air blower.
		2. Set the air blower at lowest setting and switch ON.
		3. The cups of the anemometer should revolve around the
		vertical axis.
		4. Gradually increase the speed of the air blower. The
		anemometer cups should revolve faster.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 Steel rule/meter tape
		2. 1 Vernier caliper
		3. 1 Electric air blower or fan
3	**Aneroid Barometer Set (Demonstration Type)**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Adjust the dial of the demonstration barometer to 101 kPa as initial reading. The dial shall be adjustable by turning the adjustable screw.
		2. Compress the rubber bulb connected to the nozzle of the barometer; the dial of the barometer should turn clockwise
		3. Lock the valve. The dial should be stationary for at least two (2) minutes.
		4. Release the valve then the barometer dial should turn counter clockwise and shall go back to the initial reading of 101 kPa.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. 1 flat screw driver
4	**Aneroid Barometer, wall-mount**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Adjust the dial of the barometer wall type by its adjustment screw to 101 kPa, the dial shall respond accordingly.
		2. The barometer wall type is designed to response to changes in atmospheric pressure. Since atmospheric pressure may take some time to change, simulate atmospheric pressure changes by placing the barometer inside an air lock bag (zip loc type).
		3. Place the barometer inside the zip loc bag with air. Seal the bag. Now you have a plastic bag full of air with the barometer inside.
		4. To simulate high atmospheric pressure, compress the bag lightly.
		5. The dial of the barometer should turn clockwise.
		6. Ease the compression action on the plastic bag the barometer dial should fall back to the previous reading
		7. If time permits you can monitor barometer reading for several hours and observe changes in reading. (optional)
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. 1 flat screw driver
		4. 1 large zip loc bag
5	**Compass, Magnetic**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Check for correct color codes of the compass needle:
		red for north pole, blue or black or without color for
		south pole.
		2. Locate the north pole, using the sunrise method or smartphone compass.
		3. The red needle of the compass under evaluation shall point to the north pole direction.
		4. Rotate the compass in any direction and the red needle shall maintain pointing north direction.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		3. 1 smartphone compass
6	**Dissecting Set with pan**	A. Inspection:
		1. Shall comply with the design specifications.
		B. Tests:
		1. Acid Test
		a. Pick a spot on the piece that you don't mind damaging a little.
		b. Fill beral pipette with muriatic acid. Drop a small amount of the acid on the test spot. Wait half an hour.
		c. Wipe the acid off the piece. Examine the test spot. If it remains unaffected, the piece is stainless steel. There are cases where there is a reaction to acid depending on the type of stainless steel.
		2. Magnetic Test:
		a. For austenitic group of stainless steel– they are non-magnetic
		b. For martensitic and ferritic groups – they are magnetic but with less attraction as compared to iron material.
		C. Materials Needed to Perform Inspection and Tests:
		1. Steel tape measure
		2. Hydrochloric acid
		3. Beral Pipette
		4. Hand gloves
		5. Mask
		6. Rags
		7. Magnet
7	**Gloves, Surgical**	A. Inspection:
		1. Shall comply with the design specifications.
		B. Material Needed to Perform Inspection:
		1. Vernier caliper .
8	**Hand Lens, 10x magnification**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. The focal length of the 10x magnification hand lens based on 10"-rule is 1" or 25mm (±5mm).
		a. Place the magnifying lens between a distant object and screen (or wall), moving either the lens or screen until a sharp focused image of the distant object is attained such distance between the lens and focused image is the focal length which shall not be greater than 25mm (±5mm).
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 ruler
		2. 1 sheet of white paper
9	**Hand Lens, 5x magnification**	A. Inspection:
		1. Shall comply with the design specifications.
		B. Tests:
		1. Magnification Test:
		a. Stand close to a wall and shine the flashlight through the magnifying glass onto the wall.
		b. Move the flashlight closer to or farther away from the wall until the light refracts to a single point.
		c. Measure the distance from the lens to the wall to get a reading (in centimeters) to find the focal length (have someone to help you out).
		d.Choose a small object and bring the object as close to your eyes as you can before it becomes blurry and out of focus.
		e. Measure and record this distance. This is the least Distance of Distinct Vision, or LDDV.
		f. Calculate the magnifying power of the magnifying lens by using the formula Mp = LDDV/Lf

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Where: Mp is the magnifying power
		LDDV is the least distance of distinct vision
		Lf is the focal length of the lens
		2. Glass Lens Test:
		a. To verify glass lens, gently tap with a small
		rounded metal object (like a penny or wedding ring), the sound must be clear and high-pitched "tink" (plastics will render a soft "thud").
		b. Temperature can also be a method of distinguishing between glass and plastic. When exposed to a cold surroundings, glass lenses will be noticeably cold to the touch while plastic will have a neutral temperature.
		c. As to weight, glass is heavier than plastic.
		3. Material Test:
		Chrome is highly polished and smooth, with a high luster finish and is magnetic.
		C. Materials Needed to Perform Inspection and Tests:
		1. Steel tape measure
		2. Flashlight
		3. Any small object
		4. Magnet
10	**Lens Paper, 50's/pack**	A. Inspection:
		1. Shall comply with the design specifications.
		B. Tests:
		1. Paper Material Test:
		Run your thumb across the paper and it often feels noticeably fine and soft. It does not give up any fluff when used.
		2. Cleaning and Scratch Test:
		a. Take a piece of lens paper and clean the eyepiece lens by gently "swiping" across the surface of the lens in one direction only.
		b. If after using the lens paper, the lens is still dirty, you may need to use a distilled water solvent. Put a couple of drops of solvent on a piece of lens paper and hold it against the lens. Then gently wipe it off with another dry piece of lens paper.
		c. Put back the eyepiece lens and look through to check if it is clean and has no sratch.
		C. Materials Needed to Perform Inspection and Tests:
		1. Distilled water
		2. Beral pipette
		3. Ruler
11	**Microscope, Compound with 4 Objectives**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Inclined the arm to check if it is not loose.
		3. Check the mechanical stage if it is stable and properly aligned
		4. Move the stage clips left to right, to and fro to check if it is not defective
		5. The coarse and fine focus adjustments must bring the specimen into sharp focus
		6. Move the body tube up and down to check that it must not slide down on its own
		7. Check that mirror assembly is not defective.
		8. Shall comply in the submission of Training video as stated in the specifications.
		B. Glass LensTest:
		1. Gently tap with a small rounded metal object (like a penny or wedding ring), the sound must be clear and high-pitched "tink" (plastics will render a soft "thud").

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		2. Temperature can also be a method of distinguishing between glass and plastic. When exposed to a cold surroundings, glass lenses will be noticeably cold to the touch while plastic will seem like a neutral temperature.
		3. As to weight, glass is heavier than plastic
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Prepared glass slide
		3. Coin/Ring
12	**Microscope, Digital**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Move the stage clips left to right, to and fro to check if not defective
		3. Check the completeness of the parts and accessories
		4. Check for defects.
		5. Shall comply in the submission of Training video as stated in the specifications.
		B. PerformanceTest:
		Bidder's representative must do the demonstration on its operation during the sample evaluation.
		a. Set-up the unit
		b. Perform sample snapshots
		c. Conduct short videos
		C. Material Needed to Perform Inspection:
		1. Steel tape measure
13	**Pipette, Beral, 1 mL**	A. Inspection:
		1. Shall comply with the design specifications.
		2. There must be no leaks and cuts and other deficiencies on the item.
		3. Shall provide a manufacturer's certificate of non-toxicity of plastic material.
		B. Volumetric Test:
		1. Measure 1 mL of water using a standard 10 mL graduated cylinder to check its capacity.
		C. Materials Needed to Perform Inspection and Test:
		1.Graduated cylinder, 10 mL
		2. Steel Tape Measure
		3. Water
14	**Prepared Slide Set, Microscope, 25 pieces**	A. Inspection:
		1. Shall comply with the design specifications.
		2. There shall be no broken cover slip/glass cover protecting the specimen
		3. Check each slide under the microscope for examination and familiarity of specimen. Each specimen must be clear and distinct.
		B. Materials Needed to Perform Inspection:
		1. Digital Vernier Caliper
		2. Compound Microscope
15	**Prepared Slide Set, Mitosis and Meiosis**	A. Inspection:
		1. Shall comply with the design specifications.
		2. There shall be no broken cover slip/glass cover protecting the specimen
		3. Check each slide under the microscope for examination and familiarity of specimen. Each specimen must be clear and distinct.
		B. Materials Needed to Perform Inspection:
		1. Digital Vernier Caliper

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		2. Compound Microscope
16	**Reaction Plates with 6 Wells**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Conduct leak test using water.
		2. The dimension of the depth and diameter shall overrule the capacity of 1.6 mL to 2 mL.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
17	**Sedimentator Tube**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Shake the tube 5 times. The water and the solid particles shall mix altogether. The water shall not turn into black when shook.
		2. Vertically hold the tube still for alt least 20 seconds.
		3. The heavier solid particles shall settle at the bottom first than the lighter particles.
		4. Repeat steps 1 to 3 one more time.
		5. Conduct leak test. See to it that there is no leak.
		6. Water shall occupy 2/3 of the tube while the particle shall occupy 1/3 of it.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
18	**Sling Psychrometer**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Check the initial reading of both thermometers. The reading shall be the same and not exceed ±1° from each other.
		2. Follow the instructions in the accompanying user manual how to operate the sling psychrometer sample.
		3. Determine the relative humidity measured by the sling psychrometer. Refer to the manual.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
19	**Soil pH, Moisture, Sunlight Meter**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Demonstrate the functions indicated in the technical specifications.
		2. Look for a place outdoors where there is soil.
		3. Stick into the soil the probe of the pH/moisture/light meter.
		4. It shall show the weak and strong pH, weak and strong light, and weak and strong moisture.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
20	**Soil/Test Sieve***	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Collect a mixture of soils and sands of varying grain sizes. Sieve this in a series of mesh starting from 5 mesh to 230 mesh.
		2. Put the soil mixture into the 5 mesh sieve and start shaking. Collect the soil mixture that pass thru. Set aside the sieve with leftover.
		3. Sieve the collected soil sample that went thru the 5 mesh sieve into the next mesh sieve, so on and so forth.
		4. Compare what is left on each mesh. It shall show the different soil and sand grain sizes.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. soils of different grain sizes
21	**Thermometer, Classroom, wall-mount**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Check the liquid column inside the tube; it should be continuous and no gaps.
		2. Get a reference thermometer and compare the readings; deviation should be within ±2°C.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. BLR reference thermometer
22	**Tong, Beaker**	A. Inspection:
		1. Shall comply with the design specifications.
		B. Tests:
		1. Performance Test:
		Do actual holding of heated beakers of different sizes.
		2. Material Test:
		Chrome is highly polished and smooth, with a high luster finish and is magnetic.
		C. Materials Needed to Perform Inspection and Tests:
		1. Steel tape measure
		2. Different sizes of beakers
		3. Magnet
23	**Wash Bottle, plastic, 250 mL**	A. Inspection:
		1. Shall comply with the design specification.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material.
		B. Tests:
		1. Squeeze and Leak Test:
		Fill the wash bottle with water and squeeze the middle part to check if it dispenses water easily; with no extra liquid coming out from the other parts of the bottle.
		2. Volumetric Test:
		Measure 250 mL of water using a standard 100 mL graduated cylinder and pour into it to check its capacity.
		C. Material Needed to Perform Tests:
		a. Graduated cylinder, 100 mL.
		b. Tap water

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
LOT 8: MATHEMATICAL MANIPULATIVES		
1	Algebra Tile Set, plastic	A. (Refer to General Inspection Protocol)
		B. Test (Functionality and Performance)
		1. Identifying the Algebra Tiles.
		Lay down the Algebra Tiles submitted. Check the tiles. All three tiles shall come in set of 30 as per technical specification.
		2. The Zero Pair
		Using the Algebra tiles (ones tile), model the following integers:
		a. 5 + 3 d. -6 - (-2) b. 3 + (-3) e. 4 - 7 c. -6 + 4
		3. Simplifying Algebraic Expression
		Using the Algebra tiles model then simplify the following algebraic expressions:
		a. 3x + 2 - 4x - 5 b. -2x + 5 - 4x - 5
		4. Solving Linear Equation
		Using the Algebra tiles model then solve the following Linear Equations:
		a. x - 2 = 7 b. 5x + 6 = -4
		5. Modeling Polynomials
		Using the Algebra tiles model then simplify the polynomial:
		a. $2x^2 - 2x - 3$
		6. Addition and Subtraction of Polynomials
		Using the Algebra tiles model then perform the following operation:
		a. Add: $2x^2 + 3x + 5$ and $x^2 – 2x – 3$ b. Subtract: 2x2 + 4x – 5 – (x2 + 2x – 3)
		7. Multiplication of Polynomials
		Using the Algebra tiles model then multiply the following expressions:
		a. (x - 1)(x - 4) b. (-2x + 2)(x - 3)
		8. Factoring Polynomials
		Using the Algebra tiles model then factor the given polynomial expression:
		a. $x^2 + 5x + 6$ b. $x^2 – 7x + 12$
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
		2. Show me board (white board)
		3. White board marker
2	Base Ten Blocks	A. (Refer to General Inspection Protocol)
		B. Test (Functionality and Performance)
		1. Identifying the Base Ten Blocks.
		Lay down the Base Ten Blocks submitted. Check the blocks. All four types of blocks must demonstrate what was written as per technical specification.
		2. Lay out a number
		Use the base ten blocks and lay out a number such as the ff.:
		a. b.
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
		2. Show me board (white board)
		3. White board marker
3	Beads, Ø16mm	A. (Refer to General Inspection Protocol)
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
4	Circle Area Demonstrator	A. (Refer to General Inspection Protocol)
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
5	Compass, Drawing, student type	A. (Refer to General Inspection Protocol)

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		B. Tests:
		1. Conduct stainless steel (magnet/file test).
		2. Performance Test: Use the compass to draw circle with diameters of a) 20mm, b) 75mm and c) 150mm, in which the start and endpoint of the line should meet in the same point for three (3) consecutive trials.
		C. Materials to perform Inspection and Test Procedures:
		1. Tape rule.
		2. Sheet of Paper (for drawing/construction purposes)
		3. Magnet
		4. Triangular File
6	**Cuisenaire Rods, set of 5**	A. (Refer to General Inspection Protocol)

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		B. Test (Functionality and Performance)
		1. Identifying the Cuisenaire Rods
		Lay down all the rods submitted. Check all the rods and classify them according to lengths.
		2.Square Numbers
		Discover square numbers using rods. First, model the first 6 integers using their corresponding length and it shall form a square. Example, rod with length of 2 (red). In order to make it a square, I shall add another rod with length of 2. Next, fill the top of the square rod with a rod with length of 1cm until its covered. Count all white rod, it must be the square of the length of the rod below
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
7	**Elapsed Time (Clock) Set**	A. (Refer to General Inspection Protocol)
		B. Test:
		1. Should stick vertically to any metal surface without sliding or falling while manipulating/moving the hands of the clock.
		2. Using the Elapsed Time (Clock) Set, show the elapsed time asked in the problem below:
		The bus leaves the station at 7:50 AM and arrive at its destination at 11:23 AM. How long did the journey take?
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape rule.
8	**Geoboard, 11 x 11**	A. (Refer to General Inspection Protocol)
		B. Functionality Test
		1. Use the rubber bands (3) provided to create (3) basic 2-dimensional geometric shapes to test if the pins can withstand the tension.
		2. Using the rubber bands, create a) a triangle with an area of 8 square units, b) a rectangle with a perimeter of 8 units, and c) a trapezoid with 8 square units.
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
		2. Show me board (white board)
		3. White board marker
9	**Geoboard, 5 x 5**	A. (Refer to General Inspection Protocol)
		B. Functionality Test
		1. Use the rubber bands (3) provided to create (3) basic 2-dimensional geometric shapes to test if the pins can withstand the tension.
		2. Using the rubber bands, create a) a triangle with an area of 4 square units, b) a rectangle with a perimeter of 6 units, c) circle diagram showing 3
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
		2. White board marker
10	**Geostrips**	A. (Refer to General Inspection Protocol)
		B. Functionality
		1. Connect the strips with the fastened brads to create basic geometric shapes. The connected strips should not break-up when manipulated or moved.
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape rule.
11	**Ghost Grid Whiteboard, Mobile Magnetic, 72-inch x 40-inch**	A. (Refer to General Inspection Protocol)
		B. Test

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		1. Place a BLR procured magnets and let it attract with the Ghost Grid. Underneath the magnets is a standard Manila Paper. The BLR procured magnets shall not slide and shall sustain its place in a standard class hour duration if not moved.
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape rule
12	**Linking Cubes**	A. (Refer to General Inspection Protocol)
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
13	**Model, Basic 3D Geometrical Collapsible**	A. (Refer to General Inspection Protocol)
		B. Tests:
		1. Conduct leak test.
		2. Perform derivation of formula as to solids relational volume using sand/water.
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape rule
		2. Water
14	**Model, Basic 3D Geometrical Solids**	A. (Refer to General Inspection Protocol)
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
15	**Pattern Blocks, 250 pcs/set**	A. (Refer to General Inspection Protocol)
		B. Test
		1. Check if the sides of the blocks coincide with each other. Create a
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
16	**Pentominoes**	A. (Refer to General Inspection Protocol)
		B. Test
		1. Create two separate rectangles with different dimension using all the pentominoes pieces. The area shall be the same.
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
17	**Plastic Two-colored Counters, 1-inch diameter, 200 pcs/set**	A. (Refer to General Inspection Protocol)
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
18	**Probability Kit**	A. (Refer to General Inspection Protocol)
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
19	**Tangrams, set of 30**	A. (Refer to General Inspection Protocol)
		B. Test

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		1. Compare all the tangram pieces. All pieces shall be proportionate with each other.
		2. Using the seven pieces of tangram, create a square.
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
LOT 9: MATHEMATICAL TOOLS & INSTRUMENT		
1	Balance, Double-pan	A. (Refer to General Inspection Protocol)
		B. Tests:
		1. Test for metal material - Use magnet and/or by the sound produced on material tap with metal.
		2. Conduct stainless steel test by magnet attraction comparison, i.e., magnet attracts stainless steel less than iron and etc.
		Function test:
		1. Set up and operate the balance in accordance user's manual. 2. Conduct weighing using a known mass e.g., 500 g to check accuracy. Take 3 to 5 trials to verify reliability and serviceability.
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Magnet
		2. Tape rule
		3. Mass
2	Blackboard Triangle, 30° x 60° and 45° x 45°	A. (Refer to General Inspection Protocol)
		B. Test
		Using the Blackboard Triangles, trace it to construct the ff::
		a. Right Triangles with 30-60-90 degrees angles and 45-45-90 degrees angles.
		Use a standard protractor to measure the angles of the constructed triangles, the angles must be equivalent to mentioned angles above.
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
3	Calculator, Graphing, non-projectable	A. (Refer to General Inspection Protocol)
		B. Tests:
		1. Conduct Calculator Precision (see attached)
		2. Operate or run the calculator and validate the given functions and other functions included in the system through/by executing the instructions in the user's/operation manual and as indicated in the technical specifications (2, 7). (see attach file on what to input to calculator Annex E.2)
		3) Connect accessories from Graphing Calculator to PC/laptop and test if its functioning (get connected to the PC).
		C. Materials needed to perform Inspection and Test Procedures:
		1. Tape rule.
		2. Laptop or PC for connecting the accessories.
4	Calculator, Scientific	A. (Refer to General Inspection Protocol)
		B. Tests:
		1. Conduct Calculator Precision (see attached)
		2. Operate or run the calculator and validate the given functions and other functions included in the system through/by executing the instructions in the user's/operation manual and as indicated in the technical specifications (#2).
		C. Materials needed to perform Inspection and Test Procedures:
		1. Tape rule.
5	Digital Clock, tabletop	A. (Refer to General Inspection Protocol)
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
6	Measuring Kit (Volume)	A. (Refer to General Inspection Protocol)
		B. Volumetric Test:

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Measure 4000 mL,2000 mL,1000 mL,500 mL,250 mL of water using a standard 100 mL graduated cylinder, and pour into respective measuring kits (jars,pitcher,cups) to check the accuracy and preciseness of the printed graduations and verify whether the required minimum/maximum volumetric capacity of the glass, as stipulated in the technical specifications, is met. The capacity must be ± 10%
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Appropriate measuring tool.
		2. Graduated Cylinder
		3. Water
7	**Meterstick, plastic**	A. (Refer to General Inspection Protocol)
		B. Functionality
		Measure the Meterstick using the tape rule to check the accuracy and preciseness of the printed graduations and verify whether the required minimum/maximum length, as stipulated in the technical specifications, is met. The tolerance must be ± 1mm.
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule.
8	**Protractor (for student)**	A. (Refer to General Inspection Protocol)
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape rule
9	**Ruler, Plastic, 12 inches or 30 cm**	A. (Refer to General Inspection Protocol)
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
10	**Scale, Spring, Hanging type**	A. (Refer to General Inspection Protocol)
		B. Function test:
		1. Set up and operate the balance in accordance with the user's manual. 2. Conduct weighing using a known mass e.g., 500 g to check accuracy. Take 3 to 5 trials to verify reliability and serviceability.
		C. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
11	**Scale, Weighing, analog, 10 kg. capacity**	A. (Refer to General Inspection Protocol)
		B. Function test:
		1. Set up and operate the balance in accordance with the user's manual. 2. Conduct weighing using a known mass e.g., 500 g to check accuracy. Take 3 to 5 trials to verify reliability and serviceability.
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
12	**Scale, Weighing, bathroom-type**	A. (Refer to General Inspection Protocol)
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape Rule
13	**Tape Measure, 1.5 meters**	A. (Refer to General Inspection Protocol)
		B. Test:
		1) Rub surface with fingers, the color and graduation markings should not peel off.
		2) Fiberglass fabric test - Hold/grip the surface of the tape with fingertips then stretch. It should not elongate nor break.
14	**Template, shapes**	A. (Refer to General Inspection Protocol)
		B. Materials to be used to perform the Tests and Inspection Procedures:
		1. Tape rule.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
LOT 10: MODELS: EARTH AND OTHER HEAVENLY BODIES		
1	**Globe, Celestial**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. By means of the provided knob turn the sun at full
		circle to simulate its apparent annual track and its
		relative locations at different months of the year as
		viewed from the earth; the knob should not stuck up.
		2. Turn the knob for the earth globe inside the celestial
		globe to simulate earth's rotation, the knob should not
		stuck up.
		3. Let the Bidders demonstrate the accuracy of information using Encyclopedia
		Britannica or Wikipedia as reference
		a) search keywords celestial globe, astronomical
		map, celestial sphere
		b) navigate page/s until you see a diagrams of
		constellations on the 'Northern sky/Northern celestial
		hemisphere' and 'Southern sky/southern celestial
		hemisphere'
		c) compare the names and relative locations of
		constellations in the Britannica/Wikipedia diagrams
		to that of the celestial globe evaluated. 'Northern sky'
		in the Britannica diagram corresponds to the
		'northern hemisphere' in the celestial globe and the
		'Southern sky' corresponds to southern hemisphere;
		you should be able to see similar representations of
		constellations and their relative locations in the
		Encyclopedia Britannica/Wikipedia diagram and the
		celestial globe evaluated
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. phone or PC with reliable internet connection (for Encyclopedia search)
2	**Globe, Terrestrial**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Using Encyclopedia Britannica or Wikipedia as
		reference check accuracy of entries like:
		a) continents
		b) bodies of water
		c) mountains/ranges
		d) names of countries updated and their coordinate
		system location
		e) prime meridian
		f) latitude
		g) longitude
		2. Check the meridian ring. It shall have a graduation and the stand post shall fall in between 65° to 70° marks on the meridian ring, approximately illustrating a tilt of 23°.
		3. Spin the globe in both clockwise and counter clockwise
		directions. The spin should be smooth and unimpeded.
		4. The latitude and longitude lines should be correctly numbered.
		5. Pick at least 5 random cities (with 1 in the Philippines).
		6. Determine their latitude and longitude coordinates using the globe.
		7. Get a standard reference (Encyclopedia Britannica or
		Wikipedia) for the correct coordinates of the cities you
		selected. Your manually plotted coordinates should be
		within 5° of the referenced value.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		3. phone or PC with reliable internet connection
3	**Landform Demonstration Kit**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. The foam shall demonstrate the following:
		a. Mountain Formation
		b. Hogback Formation
		2. The fault structures shall demonstrate the following:
		a. Normal;
		b. Reverse; and
		c. Slide slip faults.
		3. Render leak test for the tray. Fill the tray with 3/4 full of water. Water shall not leak for at least 1 hour.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
4	**Model, Earth Internal Structure, 1/4 part detachable**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Check the accuracy of the labels. Preferably using Encyclopedia as reference.
		C. Materials Needed to Perform Inspection and Tests:
		1. steel rule/meter tape
		2. phone or PC with reliable internet connection
5	**Model, Seismograph**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Assemble the seismograph model
		2. Slowly pull the paper tape along the guides
		3. You should see a line pattern drawn on the paper tape.
		4. Gently shake the table .

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		5. The pattern drawn shall look like waves or spikes.
		6. Increase the shaking of the table. The spikes shall increase in length.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
6	**Model, Solar System**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Check check the accuracy of information represented in the solar system model:
		a) correct order of the planets from the sun and their characteristic's color:
		i) Mercury: Grey
		ii) Venus: Brown and Grey
		iii) Earth: Blue, brown, green and white
		iv) Mars: Red, brown, and tan
		v) Jupiter: Brown, orange, and tan with white cloud stripes
		vi) Saturn: Golden, brown, and blue-grey
		vii) Uranus: Blue-Green
		viii) Neptune: Blue
		Source: https://solarsystem.nasa.gov/resources/771/colors-of-the-innermost-planet-view-1/
		b) though not to scale the planets apparent relative size should be visually observable
		2. Simulate revolution manually. Each planet should go around the sun for a full 360° around the sun; without sign of stuck up or loosened parts
		3. The model should be stable during simulation
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. PC/phone with reliable internet connection
7	**Model, Sun-Earth-Moon**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Use Encyclopedia Britannica to check the accuracy of
		information represented in the model
		(a) Check if the Earth model is tilting. The tilting shall be consistent as it revolves around the sun.
		(b) Simulate revolution of the earth around the sun and the revolution of the moon around the earth

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		2. The model should be stable during the simulation
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. PC/phone with reliable internet connection
8	**Model, Tectonics Demonstrator**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. The item shall demonstrate the different simulation indicated in the technical specification.
		2. Verify the simulation preferrably using an Encylcopedia as reference.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
9	**Model, Volcano, cross section**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1) Verify the parts of the volcano as specified in the technical specification, preferrably using an Encyclopedia as a reference.
		2) Simulate Volcanic Eruption.
		C. Materials Needed to Perform Inspection and Tests:
		1. steel rule/meter tape
		2. phone or PC with reliable internet connection
		3. Materials for Volcanic Eruption (shall be brought by the supplier).
10	**Rock Samples, 24 pcs/set, (minerals of 3 rock types)**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Preferably, use encyclopedia as reference. Check if the appearance of each rock sample resembles the appearance in the reference picture.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. phone or PC with reliable internet connection
		4. Overflow can
		5. Graduated cylinder (100mL)
11	**Telescope, Astronomical (Reflecting)**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Measure the focal length-the effective physical length
		of the telescope:
		a) using a meter tape measure the distance from the rear of the telescope where the primary mirror (objective) is fixed to the secondary mirror is fixed. The secondary mirror is directly below the eyepiece. The measured distance is the focal length of the telescope. (To get the actual measure, get the length between the primary mirror and below the eyepiece.)
		2. Manipulate the controls of the telescope as presented
		in the accompanying manual, these includes the cradles,
		latitude, leveling and balancing, alignment, azimuth lock,
		declination etc.
		3.The telescope unit should respond accordingly as discussed in the manual.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
LOT 11: MODELS: THE HUMAN ANATOMY		
1	**Model, Human Circulatory System**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material.
		3. Refer to the key card to identify the arterial and venous systems.
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Soap/detergent and water
2	**Model, Human Endocrine System**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material.
		3. Refer to the key card to identify the glands.
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Soap/detergent and water
3	**Model, Human Nervous System**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material.
		3. Refer to the key card to identify the nerves.
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Soap/detergent and water
4	**Model, Human Nose (Nasal-Throat Anatomy)**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material
		3. Refer to the key card to identify the structures.
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Soap/detergent and water
5	**Model, Human Skeleton**	A. Inspection:
		1. Shall comply with the design specifications.
		2. There must be no breakage, chipped edges, sharp edges, cracks, and other deficiencies/defects on the item;
		3. Shall provide a manufacturer's certificate of non-toxicity of the plastic material.
		4. Refer to the key card to identify the bones.
		B. Tests: (for stainless steel rod and interconnectors)
		1. Acid Test
		a. Pick a spot on the piece that you don't mind damaging a little.
		b. Fill beral pipette with muriatic acid. Drop a small amount of the acid on the test spot. Wait half an hour.
		c. Wipe the acid off the piece. Examine the test spot. If it remains unaffected, the piece is stainless steel. There are cases where there is a reaction to acid depending on the type of stainless steel.
		2. Magnetic Test:
		a. For austenitic group of stainless steel– they are non-magnetic
		b. For martensitic and ferritic groups – they are magnetic but with less attraction as compared to iron material.
		C. Materials Needed to Perform Inspection and Tests:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Hydrochloric acid
		4. Beral Pipette

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		5. Hand gloves
		6. Mask
		7. Rags
		8. Magnet
6	**Model, Human Torso**	A. Inspection:
		1. Shall comply with the design specifications.
		2. There must be no breakage, chipped edges, sharp edges, cracks, scratches, and other deficiencies/defects on the item
		3. Shall provide a manufacturer's certificate of non-toxicity of plastic material
		4. Refer to the manual for details.
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Detergent/soap and water
7	**Model, Lung Demonstration**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material.
		3. Refer to the manual for details.
		B. PerformanceTest:
		Bidder's representative must do the demonstration on its operation during the sample evaluation.
		a. Set-up the unit
		b. Perform sample activity
		C. Material Needed to Perform Inspection:
		1. Steel tape measure
8	**Model, Pumping Heart**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		3. Refer to the manual for details.
		B. Performance Test:
		Bidder's representative must do the demonstration on its operation during the sample evaluation.
		a. Set-up the unit
		b. Perform sample activity
		C. Material Needed to Perform Inspection:
		1. Steel tape measure
9	**Model, Reproductive System, Female (Pelvic Anatomy)**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material
		3. Refer to the key card to identify the structures
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Soap/detergent and water
10	**Model, Reproductive System, Male**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material.
		3. Refer to the key card to identify the structures.
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Soap/detergent and water

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
LOT 12: MODELS: OTHER BIOLOGICAL STRUCTURES AND SPECIES		
1	**Model, Animal Cell**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material
		3. Refer to the key card to identify the structures
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Soap/detergent and water
2	**Model, Animal Meiosis**	A. Inspection:
		1. Shall comply with the design specifications
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material
		3. Refer to the manual for details
		B. Material Needed to Perform Inspection:
		1. Steel tape measure
3	**Model, Animal Mitosis**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material
		3. Refer to the manual for details
		B. Material Needed to Perform Inspection:
		1. Steel tape measure
4	**Model, Chloroplast**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material
		3. Refer to the key card to identify the structures
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Soap/detergent and water
5	**Model, DNA**	A. Inspection:
		1. Shall comply with the design specifications
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material
		3. Refer to the manual for details.
		B. PerformanceTest:
		Bidder's representative must do the demonstration on its operation during the sample evaluation.
		a. Perform uncoiling and unzipping;
		b. Base pairs, phosphate and deoxyribose assembly and disassembly.

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		C. Material Needed to Perform Inspection and Test:
		1. Steel tape measure
6	**Model, Invertebrates**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material.
		3. Refer to the key card to identify the structures.
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Detergent/soap and water
7	**Model, Mitochondrion**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of plastic material.
		3. Refer to the key card to identify the structures
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Soap/detergent and water
8	**Model, Plant Cell**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of the plastic material.
		3. Refer to the key card to identify the structures.
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Soap/detergent and water
9	**Model, Vertebrates**	A. Inspection:
		1. Shall comply with the design specifications.
		2. Shall provide a manufacturer's certificate of non-toxicity of the plastic material
		3. Refer to the key card to identify the structures.
		B. Paint AdhesionTest:
		Wash a part of the model with soap and water and check that the paint shall not be removed/washed out.
		C. Materials Needed to Perform Inspection and Test:
		1. Steel tape measure
		2. Digital Vernier Caliper
		3. Soap/detergent and water

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
LOT 13: MODELS: MOLECULAR GEOMETRY		
1	**Model, Atomic Orbital, 82-pc**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Model, Atomic Orbital Kit, as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Model, Atomic Orbital, 82-pc
		Functionality Test
		Assemble the 14 atomic orbitals to check its functionality.
		C. Materials
		Tape rule Vernier caliper
2	**Model, Biochemistry Molecular, (262 atom parts)**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/ parameters of the Model, Biochemistry Molecular, (262 atom parts), as per technical specifications Dimensional inspection Measure the dimensions as per technical specifications of the Model, Biochemistry Molecular, (262 atom parts)
		Functionality Test
		Assemble the different biochemistry molecular models samples to check functionality.
		C. Materials
		Steel tape/ruler
		Digital Vernier caliper
3	**Model, Crystal Structures Set (Graphite, diamond, sodium chloride, carbon dioxide)**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Model, Crystal Structures Set (Graphite, diamond, sodium chloride, carbon dioxide), as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Model, Crystal Structures Set (Graphite, diamond, sodium chloride, carbon dioxide)
		Functionality Test
		Assemble the four different crystal structures to check its functionality.
		C. Materials
		tape rule, vernier caliper
4	**Model, Molecular, Inorganic/Organic (307-pc)**	A. (Refer to General Inspection Protocol)
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Model, Molecular, Inorganic/Organic (307-pc), as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Model, Molecular, Inorganic/Organic (307-pc)
		Functionality Test
		Assemble the four different crystal structures to check functionality.
		C. Materials
		tape rule,vernier caliper
5	**Model, Sublevel Orbitals of the Atom (Quantum)**	A. (Refer to General Inspection Protocol)

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		B. Tests
		Visual inspection Check the visible attributes/parameters of the Model, Sublevel Orbitals of the Atom (Quantum), as per technical specifications **Dimensional inspection** Measure the dimensions as per technical specifications of the Model, Sublevel Orbitals of the Atom (Quantum)
		Functionality Test
		Construct and assemble the sublevel orbitals of the first ten elements in the Periodic Table using the molecular models, to check its functionality.
		C. Materials
		tape rule, vernier caliper
6	**Model, VSEPR, 14 shapes (50-pc)**	A. (Refer to General Inspection Protocol)
		B. Test
		Check the visible attributes/parameters of the Model, VSEPR, 14 shapes (50-pc), as per technical specifications Dimensional inspection Measure the dimensions as per technical specifications of the Model, VSEPR, 14 shapes (50-pc)
		Functionality test
		Assemble the fourteen VSEPR models to check its functionality.
		C. Materials needed to perform inspection and test
		tape rule, Vernier caliper
		Vernier caliper

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
LOT 14: FORCE, MOTION, AND ENERGY KITS		
1	**Advanced Electromagnetism Kit**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Magnetic Compass:
		a) check for correct color codes of the compass needle:
		red for north pole, blue or black or without color for south pole.
		b) check if each compass is correctly oriented to the geographic north pole. Do the following:
		c) get a reference compass without issue and note the orientation of the needle i.e. where the north pole is pointing. You may use smartphone compass as reference compass.
		d) place the reference compass at least 50 cm from the sample compass to be inspected
		e) one by one test the orientation each compass; the compass examined should at least be 50 cm away from the other compasses and away from metallic objects
		f) all compasses should have consistent north-south pole alignment that is if the color code for north pole is red then the red portion of the compass needle should always point to the magnetic north pole as pointed by the reference compass
		2. Bar magnets:
		a) check for labels and or color codes of each bar magnet: North or N for the north pole, South or S for the south pole and or red for north pole, blue for south pole.
		b) check if the north and south pole labels are correct:
		c) get a reference magnet without issue
		d) approach north pole of the reference bar magnet to the south pole of the bar magnet sample under evaluation; the two magnets should attract each other
		e) approach north pole of the reference bar magnet to the north pole of the bar magnet sample under evaluation; the two magnets should repel each other (you will feel the two bar magnets to be pushing against each other)
		f) Check the strength of each bar magnet:
		i) Let the magnets attached to each other in both ends.
		ii) Hang the two magnets vertically on a metal.
		iii) The magnets shall freely cling to the metal for at least a minute without falling.
		3. U-magnets:
		a) check for labels and or color codes of each U-magnet:
		North or N for the north pole, South or S for the south pole and or red for north pole, blue for south pole.
		b) check if the north and south pole labels are correct:
		c) get a reference U-magnet without issue
		d) approach reference U-magnet to the U-magnet sample under evaluation in a way that their north and south poles face each other; the two magnets should attract each other
		e) flip the position of reference U-magnet so that its south pole faces the south pole of the U-magnet under evaluation and its north pole faces the north pole of the U-magnet under evaluation
		f) approach the reference U-magnet to the U-magnet
		under evaluation; two U-magnets should repel each
		other (you will feel the 2 U-magnets to be
		pushing against each other)
		g) Check the strength of each U-magnet:
		i) Hang the one (1) U-magnets vertically on a metal.
		ii) Attached any object with weight equivalent to the hanging U-magnet
		iii) The U-magnet shall freely cling to the metal for at least a minute without falling.
		4. Magnetic field mapper
		a) slowly flip over several times the magnetic field
		mapper to evenly distribute the filings inside
		b) place a magnet (bar or U-magnet) on the table
		c) put the magnetic field mapper on top of the magnet
		d) the filings shall form pattern that traces the
		magnetic filed of the magnet underneath

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		5. Steel rod and magnet wire
		i) test the steel rod using magnet
		ii) the steel rod shall attract the magnet
		6. Spool Magnet Wire:
		i) Uncoil the magnetic wire from the spool.
		ii) Weigh the magnetic wire. It shall weigh not less than 500g.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 BLR reference U-Magnet
		3. Vernier Caliper
		4. Object with the same weight with U-magnet
2	**Air Blower**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Set the control knob of the air blower to lowest setting.
		2. Plug the power cord into the wall outlet
		3. Slowly turn the control knob the toward the higher
		setting until the unit starts blowing out air; observe for at
		least 1 minute; the operation should be steady and
		without interruption; there shall be no abnormalities in the unit (rattling, popping sound, sparks, signs of parts melting).
		4. Turn the control knob toward the next higher setting;
		the blowing of air should increase; again observe
		for at least 1 minute; the operation should be steady
		and without interruption; there shall be no abnormalities in the unit (rattling, popping sound, sparks, signs of parts melting).
		5. Repeat step 4 above until the highest setting is reached.
		6. Hold the Air Blower upright and switch on the air blower.
		7. Place a 4-inch plastic ball into the nozzle.
		8. It shall lift the ball and keep it airborne for as long as air blowing.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		2. 220 volts electrical outlet
		3. 4 inch plastic ball
3	**Archimedes Principle Set**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Dynamometer:
		a) Check the dynamometer accuracy:
		i) one at a time suspend the BLR standard masses
		into the hook of the dynamometer;
		ii) dynamometer reading should be within ±2.5% of the
		value of each BLR standard mass
		2. Bucket and Plummet (with color bands)
		a) insert the plummet into the bucket
		b) the plummet should slide into the bucket unimpeded
		c) when the plummet is fully embedded inside the
		bucket, the color bands of the bucket and plummet
		should align without sign of offset
		3. Overflow Can and Catch Bucket
		a) place the catch bucket directly below the spout of the
		overflow can
		b) fill the overflow can with water past the spout; wait
		until the overflow stops
		c) pour into the sink the collected water in the catch
		bucket
		d) put back the empty catch bucket below the spout of
		the overflow can
		4. Whole Setup Testing
		a) pull out the imbedded plummet from the bucket
		b) suspend the bucket onto the hook of the
		dynamometer
		c) suspend the plummet onto the lower hook of the
		suspended bucket
		d) the combined weight of the bucket and plummet
		should not go beyond the graduation scale of the
		dynamometer
		e) record the dynamometer reading
		f) slowly immerse the suspended plummet into the
		overflow can with water; water overflows trough the
		spout then goes into the catch bucket; do this until
		the plummet (only) is completely immersed in the
		water
		g) the plummet shall be made to stay in the water
		steadily until no more water comes out of the spout of
		the overflow can
		h) record the new dynamometer reading
		i) now slowly transfer the water from the catch bucket
		into the bucket suspended on the dynamometer;
		note that as the suspended bucket is filled with water
		it goes down pushing down the suspended plummet
		deeper into the water;
		j) compensate by slowly pulling up the dynamometer to
		prevent the plummet from touching the bottom of the
		overflow can
		k) continue pouring the water from the catch bucket
		unto the suspended bucket until there is no more
		water left in the catch bucket
		l) check the reading on the dynamometer; the reading
		should go back to the previous reading in step e)
		above
		C. Materials Needed to Perform Inspection and Tests:

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. tap water
4	**Basic Electronics Kit**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Keep a record of all readings because this test will be repeated using the digital multi meter sample included in the package.
		2. Resistors
		a) Each resistor has value inscribe on individual casing:
		check the correctness of indicated values using a standard digital multimeter
		3. Diodes
		a) The diodes shall be checked for one-way conduction;
		the negative (-) and positive (+) terminals of the diode
		are inscribed in the casing
		b) Construct a circuit:
		i) Forward biased: The bulb shall light.
		ii) Reverse biased: The bulb shall not light.
		4. Capacitor
		a) The capacitor has an indicated value inscribe on the cylinder body and on the casing; negative and positive terminals are also indicated in the casing
		b) Turn the selector knob multi meter to capacitance function "1000 μF" (or greater) range
		c) Connect the black probe test lead to the negative
		d) Terminal of the capacitor and the red probe test lead to the positive terminal of the capacitor
		e) After 3 seconds the meter should register value; multimeter reading should be within ±10% of the capacitance value
		5. Variable Resistor
		a) The variable resistor has 3 terminals and 1 rotary knob; to test do the following:
		b) Turn selector knob of the multimeter to"100 kΩ" range
		c) Connect the test leads of the black and red probes of the multi meter to the end terminals of the variable resistor (polarity does not matter)
		d) The multi meter should register value within ±10% of the variable resistor value
		e) This time transfer either the black or red probe of the multimeter to the middle terminal of the variable resistor slowly rotate the knob of the variable resistor clockwise or counterclockwise; the meter should register readings from zero (0) to rated the value of the variable resistor
		6. Transistors
		a) Insert the black probe into the "COM" terminal of the BLR reference digital multimeter and the red probe into the red terminal marked "VΩHz"
		b) Turn the selector knob of the multimeter to the diode test range
		c) The transistor terminals are labeled "base", "emitter" and "collector"
		d) Connect the red probe test lead of the multimeter to the "base" of the transistor
		e) Connect the black probe test lead to the "emitter"; the multi meter shall register value ranging from 200 to 1000 ohms; record reading
		f) Transfer the black probe to the "collector"; the multimeter shall register value ranging from 200 to 1000 ohms; record reading
		g) Now transfer the red probe test lead to the "emitter" and the black probe test lead to the "base"; the multimeter shall display infinity value; keep a record of the result
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 BLR reference digital multimeter
		3. connecting wires
		4. bulb (2.5V) with holder
		5. 2 dry cell (size D) with holder
5	**Basic Lens Set, acrylic**	A. (Refer to General Inspection Protocol)

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		B. Acrylic Test:
		OPTION 1:
		1. The lens will be tested for density using displacement
		method to verify the kind of material the lens is made of:
		a) using weighing scale measure the mass of each
		lens and record; note there are 7 types of lenses
		convex lens, concave lens etc.
		b) put the catch bucket directly below the spout of the
		overflow can
		c) fill the overflow can with water past the spout
		d) collect the overflowing water into the catch bucket
		until overflowing stops
		e) pour the collected water into the sink; place back the
		catch bucket below the spout of the overflow can
		f) carefully submerge the 50 mm double convex lens,
		into the water inside the overflow can
		g) measure the volume of the collected water using the
		100 mL graduated cylinder
		h) divide mass by volume; this is your calculated density
		of the lens sample; standard density for acrylic is
		1.18 grams/cm3; your calculated value should be
		within 10% of the standard value
		i) do steps c) to h) above for the rest of the remaining
		lenses
		OPTION 2: Combine the lenses altogether instead of single lens and do steps 1a) to 1h) above
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. 1 over flow can and catch bucket in Archimedes
		Principle Apparatus
		4. 1 weighing scale
		5. tap water
6	**Coefficient of Linear Expansion**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Assemble the setup as per instruction in the accompanying user manual

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		2. The Linear Expansion Apparatus comes with 3 different metal tubes: aluminum, brass, steel. Refer to the manual for identification of the metals.
		3. Select any of the metal rod samples either aluminum or brass or steel tubing; and measure its length. Record this as L.
		4. Insert the metal rod into the expansion jacket (see manual how to do this).
		5. Fix the expansion jacket onto the frame of the base of the linear expansion apparatus.
		6. Insert the thermometer into the rubber stopper.
		7. Insert the rubber stopper with thermometer into the built-in chamber of the expansion jacket (see manual).
		8. See to it that the metal tubing specimen you selected in step 4 above is align with the push rod of the dial gauge and the screw bolt of the lock mechanism of the base (see manual).
		9. Pour water (about 1/3) into the Erlenmeyer flask.
		10. Insert the 5 cm glass tubing into the rubber stopper.
		11. Insert the rubber stopper with glass tubing into the mouth of the Erlenmeyer flask.
		12. Assemble the stand set.
		13. Fix the Erlenmeyer flask onto the universal clamp of the stand set.
		14. Insert the glass tubing that is mounted on the mouth of the Erlenmeyer flask into one end of the rubber tubing
		15. Into the other end of the rubber tubing, insert the steam inlet of the expansion jacket of the linear expansion apparatus.
		16. Bring the hot plate in close proximity of stand set with the mounted Erlenmeyer flask.
		17. Sit the Erlenmeyer flask on the center of the platform of the hot plate.
		18. Set the scale of the dial gauge to"0" (refer to accompanying user manual how to do this).
		19. Record thermometer reading in oC as T1=the initial temperature of the metal tube.
		20. Turn ON the hot plate.
		21. Place the utility saucer underneath the condensed steam outlet of the expansion jacket.
		22. As the water boils, steam goes into the expansion jacket; you will see thermometer reading goes up and needle of dial gauge scale moves clockwise.
		23. When the thermometer reading becomes steady and so is the dial scale reading.
		24. At this instance the thermometer reading is your T2 in and dial scale reading is your ΔL (refer to manual how to interpret dial scale reading; convert reading to meter unit); record these values
		25. Calculate coefficient of linear expansion of the metal sample using the equation:
		$a = \Delta L / L\Delta T$
		where: a=coefficient of linear expansion
		ΔL=change in length of the metal (dial scale reading)
		ΔT=change in temperature T2-T1
		The following are the accepted values of coefficient of linear expansion of the following metals:
		Aluminum: 25 × 10-6 °C
		Brass: 19 × 10-6 °C
		Steel: 12 × 10-6 °C
		27. Your calculated coefficient of linear expansion should be within ±10% of the accepted value.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		2. 1 Vernier caliper
		3. 1 BLR stand set (1 stand base, 2 stand supports, 1-9.5 x 250 mm rod, 1-9.5 x 500 mm stand rod, 1 multi clamp, 1 universal clamp)
		3. 1 hot plate
		4. 1 thermometer
		5. 1 glass tubing 4 mm dia. X 5 cm long
		6. 1 rubber stopper with one hole
		7. 1 utility saucer
		8. 1 Erlenmeyer Flask (250 mL)
7	**Connector, Black (# 18 copper, AWG stranded) with alligator clip on one end and banana plug on the other**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Continuity test will be done for each connector using the
		BLR reference digital multimeter:
		a) insert the black probe into the "COM" terminal and
		the red probe into the "VΩHz" terminal of the BLR
		reference digital multimeter
		b) turn selector knob of the digital multimeter to "200 Ω"
		range
		c) switch ON the digital multimeter
		d) connect the test lead of the black probe to one end of
		the connecting wire and the test lead of the red probe
		to the other end of the connecting wire sample
		e) the digital multimeter should display a value in the
		range from 0 to 5 ohms
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. 1 BLR reference digital multimeter
8	**Connector, Red (# 18 copper, AWG stranded) with alligator clip on one end and banana plug on the other**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Continuity test will be done for each connector using the
		BLR reference digital multimeter:
		a) insert the black probe into the "COM" terminal and
		the red probe into the "VΩHz" terminal of the BLR
		reference digital multimeter
		b) turn selector knob of the digital multimeter to "200 Ω"
		range
		c) switch ON the digital multimeter
		d) connect the test lead of the black probe to one end of
		the connecting wire and the test lead of the red probe
		to the other end of the connecting wire sample
		e) the digital multimeter should display a value in the
		range from 0 to 5 ohms
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. 1 BLR reference digital multimeter
9	**Connector, Yellow (# 18 copper, AWG stranded) with alligator clip on one end and banana plug on the other**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Continuity test will be done for each connector using the
		BLR reference digital multimeter:

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		a) insert the black probe into the "COM" terminal and
		the red probe into the "VΩHz" terminal of the BLR
		reference digital multimeter
		b) turn selector knob of the digital multimeter to "200 Ω"
		range
		c) switch ON the digital multimeter
		d) connect the test lead of the black probe to one end of
		the connecting wire and the test lead of the red probe
		to the other end of the connecting wire sample
		e) the digital multimeter should display a value in the
		range from 0 to 5 ohms
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. 1 BLR reference digital multimeter
10	**DC Ammeter**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Insert the banana plug of the black connecting wire
		into the negative terminal of the DC ammeter and the
		banana plug of the red connecting wire into the
		positive terminal labeled "0.6A" of the DC Ammeter
		2. Fasten the alligator clip of the black wire used in 2
		above to the negative terminal of the dry cell
		3. Fasten the positive terminal of the dry cell using the
		alligator clip of the yellow connecting wire.
		4. Use the banana plug of the yellow wire in step 3 above
		to connect to one terminal of the bulb holder assembly
		5. Now use the alligator clip of the red connecting wire
		that is connected to the positive terminal "0.6A" of the
		DC of ammeter, to fasten the other terminal of the bulb
		holder assembly; this completes a closed circuit
		6. Record the reading of the DC ammeter
		7. do steps 1) to 6) above using the BLR reference
		digital multi meter; replace the DC ammeter by the BLR
		reference digital multimeter:
		a) turn selector knob of the BLR reference digital
		multimeter to 20A range
		b) pull out the banana plug of the black connecting wire
		from the DC ammeter and insert it into the 'COM'
		terminal of the BLR reference digital multimeter
		c) pull out the banana plug of the red connecting wire
		from the DC ammeter and insert it into the '20A'
		terminal of the BLR reference digital multimeter
		b) switch ON the BLR reference digital multimeter
		e) record the reading on the BLR reference digital multi
		meter.
		8. Compare the DC ammeter reading you obtained in step
		6 above to that of the BLR reference multi meter
		obtained in step 7e) above; DC ammeter reading should
		be within ±5% of the BLR reference digital multi meter
		reading
		9. do steps 1 to 8 above using 2 dry cells connected in
		series to replace the single dry cell
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. 1 miniature light bulb mounted on bulb holder
		4. 2-1.5 volt dry cell size D

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		5. 2-dry cell holder
		6. 1 black connecting wire
		7. 1 red connecting wire
		8. 1 yellow connecting wire
		9. 1 BLR reference digital multimeter
11	**DC String Vibrator, string included**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Connect the vibrator to 6 volt DC power supply; the
		power supply can either be 4 dry cells in series or a
		dedicated variable power supply set to 6 volt function
		2. Rotate the control knob of the DC vibrator back and
		forth; the speed of vibration of the hammer should
		increase or decrease correspondingly to the turning
		of the knob.
		3. Turn off the power supply
		4. Fasten the provided 4 mm string on the free end of the
		hammer of the DC vibrator.
		5. Switch ON the power supply
		6. Carefully stretch out the entire length of the string away
		from the hammer of the DC vibrator
		7. Tighten or loosen the tension of the string; you should
		see formation of wave patterns on the string changing
		8. Turn the control knob of the DC string vibrator back
		and forth to change the speed of vibration
		9. The wave pattern on the string should be changing
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. 1 variable power supply or 4-size D 1.5 volt dry cells
		and 4-dry cell holders
		4. 2-connecting wires (1 black, 1 red)
12	**DC Voltmeter**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Insert the banana plug of the black connecting wire
		into the negative terminal of the DC voltmeter and
		the banana plug of the red connecting wire into the
		positive terminal labeled "3V"of the DC voltmeter
		2. Clip the alligator end of the black connecting wire to
		the negative terminal of the dry cell holder
		3. Clip the alligator end the red wire connecting wire to the
		positive terminal of the dry cell holder
		4. Record the DC voltmeter reading
		5. Transfer the banana plug of the red connecting wire
		from positive terminal labeled "3V" of the DC voltmeter
		to positive terminal labeled "15V"
		6. Record the DC voltmeter reading
		7. Compare the reading at "3V" setting on the DC
		voltmeter with the reading at "15V" setting; difference
		should not exceed ±5%
		8. Replace the DC voltmeter with the BLR reference
		digital multimeter.
		a) turn the selector knob of the BLR reference digital
		multimeter to select "20 VDC" range
		b) pull out the banana plug of the black connecting
		wire from the DC voltmeter and insert it into the into
		the "COM" terminal of the BLR reference digital
		multimeter
		c) pull out the banana plug of the red connecting wire

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		from the DC voltmeter and insert it into the terminal
		labeled "VΩHz" of the BLR reference digital
		multimeter
		d) switch ON the BLR reference digital multimeter
		e) record the reading of the reference digital multimeter
		9. Compare the reading of the DC voltmeter in step 4
		above to the reading of the BLR reference digital
		multimeter in 8e above.
		10. DC voltmeter reading should be within ±5% of the
		BLR reference digital multimeter reading
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. BLR reference digital multimeter
		4. 1-black connecting wire
		5. 1-red connecting wire
		6. 1-1.5 volt dry cell size D
		7. 1-dry cell holder for size D dry cell
13	**Diffraction slits & Diffraction grating Set**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Single Slit:
		a) place a sheet of white paper in front of a laser pointer
		b) switch ON the laser pointer
		c) you should see the laser spot on the white sheet of
		paper
		d) place the single slit in between the laser pointer and
		the white sheet of paper
		e) you should see a pattern similar the diagram below:
		2. Double Slit
		a) do steps 1a to 1e above using the double slit
		b) you should see a pattern similar to the diagram below:
		3. Diffraction Gratings:
		a) A standard physics activity is illustrated in the diagram below to experimentally determine the wavelength of light emitted by a laser light source
		b) The objective of the activity is to determine the wavelength of light emitted by a laser pointer, using the evaluated diffraction gratings to diffract the emitted light, and apply the equation
		$n\lambda = d\sin\theta$ to calculate experimental value for the wavelength of light from the laser. From the equation:
		n=maxima order (has values 1, 2, 3
		etc.)
		λ=wavelength (read as lambda)
		d=slit width
		θ=is the angle formed between the
		normal and the line extending to a
		certain bright spot projected on
		screen
		c) If red laser light is used the accepted value for the red wavelength is in the range of 635 nm to 700 nm(nanometer).

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		Experimental results should be within the accepted wavelength range for a specific laser light color and shall not go beyond 10% in either the lower and upper limit of the range value.
		Example:
		1. Place the diffraction grating 0.7 meter distance from a wall; the wall becomes the screen
		2. Position the red laser light source at 1 cm distance from the diffraction grating.
		3. Switch ON the laser light source.
		4. You will see red dots on the wall with the brightest dot at the center; to the left and right of the central bright dot you will see the other dots get dimmer as they are farther away from the central bright dot.
		5. From the central bright dot measure the distance of each succeeding dot both to the left and right; your measurements should fall on the following ranges
		For the 50 lines per mm diffraction grating:
		i) 1st dot = 22 mm to 25 mm
		ii) 2nd dot = 44 mm to 50 mm
		iii) 3rd dot = 67 mm to 75 mm
		For the 100 lines per mm diffraction grating:
		iv) 1st dot = 44 mm to 50 mm
		v) 2nd dot = 89 mm to 100 mm
		vi) 3rd dot = 135 mm to 152 mm
		For the 300 lines per mm diffraction grating:
		vii) 1st dot = 135 mm to 152 mm
		viii) 2nd dot = 285 mm to 325 mm
		ix) 3rd dot = 480 mm to 576 mm
		For the 600 lines per mm diffraction grating:
		x) 1st dot = 285 mm to 325 mm
		xi) 2nd dot = 820mm to 1090 mm
		xii) 3rd dot = could be too dim to be seen or could be outside of projection area
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 laser pointer
		3. 1 white sheet of paper
		4. white wall
14	**Digital Geiger-Muller Counter with radioisotopes samples**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Geiger Counter main unit
		a) open the battery compartment of the Geiger Counter
		unit to check if there is battery inside
		b) switch ON the Geiger Counter unit
		c) operate the controls as per instructions in the
		accompanying user manual; the Geiger Counter unit
		should respond as expected
		d) operate the Geiger counter so that you can obtain
		background radiation level in CPM (see manual);
		record at least 3 readings; you will be using this data
		in the next activities that follow
		2. Radioisotopes
		a) set the Geiger Counter unit to CPM function
		b) place the alpha sample at 1 cm distance from the
		Geiger Counter sensor
		c) switch ON the Geiger Counter unit; monitor the CPM
		and record the reading; the reading should be higher
		than any of the background radiation level reading
		registered in 2d above
		d) place a piece of paper between the Geiger Counter
		sensor and the alpha source
		e) the CPM should revert to the background radiation

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		level
		f) switch OFF the Geiger Counter unit
		g) replace the alpha source with the beta source
		h) switch ON the Geiger Counter; monitor the CPM
		reading; the CPM reading should be higher than the
		CPM of the alpha source in 3c above
		i) place a piece of paper between the Geiger counter
		sensor and the beta source; the CPM count should not
		be affected (steady)
		j) this time replace the sheet of paper by a thin aluminum
		sheet
		k) the CPM should revert background radiation level
		l) switch OFF the unit and remove the beta source and
		the aluminum sheet away from the sensor
		m) now replace the beta source with the gamma source
		n) switch ON the Geiger Counter unit
		o) the gamma source will result in very high CPM reading
		registered by the Geiger Counter as compared to the
		alpha and beta sources
		p) place the thin aluminum sheet between the gamma
		source and Geiger Counter sensor
		q) the high CPM should not be affected by the aluminum
		sheet blocking the path of the gamma radiation from
		the source to the sensor
		3. Accuracy check of the unit:
		a) one at a time do steps 2b to 2c above, then 2g to
		2h, then 2m to 2o
		b) refer to the accompanying user manual for unit
		conversion from CPM to milliRad per hour to
		microSievert per hour, in each of the reading
		obtained in step 3a (2b to 2c, 2g to 2h, 2m to 2o)
		c) information presented in the manual and the unit's
		actual measurement should complement each other
		otherwise the unit is defective
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. 1 sheet of paper ¼ A4
		4. 1 aluminum sheet approx. 10 cm x 10 cm
		5. calculator for unit conversion
15	**Dry Cell Holder (size D)**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. The dry cell holder shall go through at least 10
		replacement cycles by inserting, removing, re-
		inserting size D dry cell 10 times.
		2. The dry cell holder should not break nor show signs of
		cracks; all parts should be intact without sign of dislodge
		3. Mount 1 fresh dry cell size D into the dry cell holder
		4. Connect a miniature light bulb to the dry cell holder; the
		bulb should light
		5. Drop test: drop the dry cell holder with mounted dry cell from a height of at least 91 cm. The dry cell holder should not have cracks and no detached parts.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		3. 1 Miniature light bulb (mounted on bulb holder)
		4. 2-connecting wires
16	**Dry Cell, 1.5 volts, size D**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Set the BLR reference digital multimeter to 20VDC
		a) Insert the black test probe to the "COM" terminal
		of the digital multi meter and the red test probe to the
		"VΩHz" terminal of the digital multimeter
		b) Switch ON the digital multi meter
		Connect the black test lead of the BLR reference
		digital multimeter to the negative terminal of the dry
		cell and the red test lead to the positive terminal of
		the dry cell
		c) The BLR reference digital multi meter should register
		a reading of at least 1.5 volts DC
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 BLR reference digital multimeter
17	**Engine Model (Internal Combustion)**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. The engine model unit will be operated as per
		instructions in the operation manual.
		2. The engine model should function accurately as per
		theory of operation:
		3. INTAKE STROKE
		a) turn the hand wheel to bring the piston at the top
		most position
		b) continue turning the hand wheel slowly so that the
		piston goes down
		c) as the piston goes down the inlet valve should open
		d) continue turning the hand wheel until the piston
		reaches the bottom part of the cylinder
		4. COMPRESSION STROKE
		a) continue turning the hand wheel and observe the
		piston going up again
		5. POWER STROKE
		a) continue turning the hand wheel and shortly before
		the piston reaches the top, the bulb should light
		simulating spark from the spark plug
		b) continue turning the hand wheel and the piston goes
		down; this simulates the power stroke
		6. EXHAUST STROKE
		a) continue turning the hand wheel and the piston up
		again
		b) but at this time the exhaust valve opens simulating
		the expulsion of used gases and vapour
		7. Continue turning the hand wheel and you are back to
		the INTAKE STROKE
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
18	**Flask, Florence, glass, 500 mL**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Fill the Florence flask with water up to halfway on the
		neck.
		2. There should be no leakage.
		C. Materials Needed to Perform Inspection and Tests:

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. tap water
19	**Force Table**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Assemble the Force Table components as per
		instructions the accompanying user manual:
		2. The Force Table assembly including mounted
		components should be stable.
		3. Levelling and adjusting screws and moving parts should
		not jam nor show signs of loose threads (for the screws)
		during manipulation.
		4. Check the graduations and corresponding numbering;
		there should be no errors
		5. Check the accuracy of the accompanying masses using
		triple beam balance. Deviations should be within ±3%
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 triple beam balance
20	**Fuse Holder w/ Fuse**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. T or snail icon markings on fuse indicates slow blow. Marking(s) shall be found on the fuse.
		2. Connect the fuse directly to 3V power supply. The following shall be observed:
		a) The fuse shall glow, get brighter, and then completely burn out.
		3. Repeat the activity three times.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. 1 AC-DC variable power supply
		4. 1-black connecting wire
		5. 1-red connecting wire
21	**Galvanometer**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Insert the banana plug of the red connecting wire into
		the positive terminal of the galvanometer.
		2. Insert the banana plug of the black connecting wire into
		the negative terminal of the galvanometer.
		3. Mount each dry cell into their respective dry cell holder.
		4. Interconnect the two dry cell holders in series.
		5. Fasten the alligator clip of the black connecting wire that
		is connected to the negative terminal of the
		galvanometer, to the negative terminal of the battery (2
		dry cells in series).
		6. From the positive terminal of the battery use the yellow
		connecting wire to connect to one terminal of the 100
		k-Ohm resistor
		7. Connect the other terminal of the 100 k-Ohm resistor to
		the red connecting wire that is connected to the positive
		terminal of galvanometer.
		8. Record the reading of the galvanometer.
		9. Replace the galvanometer with the Standard
		digital multimeter.
		a) Pull out the banana plug of the black connecting
		wire from the negative terminal of the galvanometer
		and insert into the "COM" terminal of the Standard digital multimeter

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		b) Pull out the banana plug of the red connecting wire
		from the positive terminal of the galvanometer and
		insert into the "mA" terminal of the Standard
		digital multimeter
		c) Turn selector knob of the Standard digital
		multimeter to select 200 mA range
		10. Switch ON the Standard digital multimeter
		11. Record the reading on the Standard digital multi
		meter.
		12. Compare the reading you obtained in step 8 above to
		that of the Standard multimeter in step 11;
		galvanometer reading should be within 5% of the BLR
		reference digital multimeter reading.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. 1-100 kOhm resistor
		4. 2 size D dry cells
		5. 2 dry cell holders
		6. 1 red connecting wire
		7. 1 black connecting wire
		8. 1 yellow connecting wire
22	**Helical Spring**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Lay the helical spring on the floor.
		2. Fasten one end of the helical spring to a sturdy support
		like a heavy chair or table leg.
		3. Stretch out the helical spring on the floor to a length of
		10 meters.
		4. Repetitively jolt the other end perpendicular to the
		length of the helical spring.
		5. You should see continuous wave formation on the
		helical spring.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. Chair or table
23	**Iron Core Rod (non-corrugated)**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Iron Core rod and magnet wire
		i) test the steel rod using magnet
		ii) the steel rod shall attract the magnet
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. 3 meters magnet wire
		4. 1 dry cell
		5. 1 dry cell holder
		6. 1 sticky tape
		7. 1 pliers
24	**Laser Light**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Open the battery compartment and remove then insert
		the battery at least 5 times; the fixation should be
		stable.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		2. Switch ON the laser unit; CAUTION: never point the
		laser beam to anyone's eye.
		3. Aim the laser beam to a wall at 5 meters distance
		4. You should be able to see a bright red spot projected
		on the wall.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. white wall
25	**Long Nose Pliers, 6-inch, 1 pair/set**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		1. Long nose pliers:
		a) open and close the long nose pliers continuously at
		least 10 times
		b) the pliers should be firm and not loose
		c) get a piece of #20 magnet wire
		d) bend one end of the wire then form a loop
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
26	**Magnet Wire**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		Spool Magnet Wire:
		i) Uncoil the magnetic wire from the spool.
		ii) Weigh the magnetic wire. It shall weigh not less than 500g
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 Vernier caliper
		2. 1 dry cell size D, 1.5 volts
		3. 1 dry cell holder
		4. 2 connecting wires
		5. 1 roll sticky tape
27	**Manometer, Open U-tube with Nakamura-type Water Pressure Apparatus**	A. (Refer to General Inspection Protocol)
		B. Test
		1. Fill the U-tube manometer with water following
		instructions in the accompanying user manual.
		2. Insert the rifted tip of the U-tube manometer into one
		end of the supplied rubber tubing.
		3. Insert the L-shaped bent tubing mounted on the
		pressure sensor into the other end of the rubber tubing.
		4. Fasten the supplied diaphragm into each mouth of the
		pressure sensor following the instructions in the
		accompanying user manual.
		5. Apply slight pressure onto the diaphragm. The water
		inside the U-tube manometer should move up and
		down.
		6. Gradually dip the pressure sensor into the pitcher with
		water.
		7. The water inside the U-tube manometer shall
		respond.
		Pressure assembly leak test:
		1. Immerse the pressure assembly on water without connecting with the manometer for at least a minute. There shall be no water leaking in.
		2. Immerse the pressure assembly on water. Gently blow air through the tube. There shall be no bubbles coming out from the pressure sensor.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. 1 small plastic pail or wide-mouth container
		4. tap water
28	**Miniature Light Bulb**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Light bulb, socket and holder will be tested together.

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		2. Screw in the bulb into the socket mounted on the
		socket holder base. Do this at least 5 times. There
		shall be no sign of malfunction.
		3. Connect the 2 dry cells in series by way of the 2 dry cell
		holders.
		4. Fasten the respective alligator clip ends of the
		connecting wires into the positive and negative
		terminals of the dry cells.
		5. Insert the banana plugs of the connecting wires into
		each of the terminals of the bulb holder assembly.
		6. The bulb should light.
		7. Burn-in test the light bulb for 2 minutes continuous. The
		bulb should continue to light.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 Vernier caliper
		2. 2 dry cell size D, 1.5 volts
		3. 2 dry cell holder
		4. 2 connecting wires
29	**Miniature Light Bulb Holder**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Light bulb, socket and holder will be tested together.
		2. Screw in the bulb into the socket mounted on the
		socket holder base. Do this at least 5 times. There
		shall be no sign of malfunction.
		3. Connect the 2 dry cells in series by way of the 2 dry cell
		holders.
		4. Fasten the respective alligator clip ends of the
		connecting wires into the positive and negative
		terminals of the dry cells.
		5. Insert the banana plugs of the connecting wires into
		each of the terminals of the bulb holder assembly.
		6. The bulb should light.
		7. Burn-in test the light bulb for 5 minutes continuous. The
		bulb should continue to light.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 Vernier caliper
		2. 2 dry cell size D, 1.5 volts
		3. 2 dry cell holder
		4. 2 connecting wires
30	**Mirror Set, acrylic**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. The mirror will be tested for density using displacement
		method to verify the kind of material the mirror is made
		of.
		2. Using triple beam balance measure the mass of each
		mirror and record. There are 3 types of mirrors:
		plane mirror, convex mirror, concave mirror.
		3. Put the catch bucket directly below the spout of the
		overflow can
		4. Fill the overflow can with water past the spout.
		5. Collect the overflowing water into the catch bucket
		until the last drop.
		6. Pour the collected water into the utility vessel. Place
		the catch bucket back below the spout of the overflow
		can.
		7. Carefully submerge the 50 mm plane mirror into the
		water inside the overflow can.

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		8. Measure the volume of the collected water using the
		100 mL graduated cylinder.
		9. Divide mass of the plane mirror divided by the volume
		of collected water from the overflow can. This is your
		calculated density of the mirror sample.
		10. The standard accepted value for density of acrylic is
		1.18 grams/cm3; your calculated value should be
		within 10% of the standard value
		11. Do steps 4 to 10 above for the rest of the mirrors
		short cut method: combine the mirrors altogether and do steps 2 to 10 above
		C. Materials Needed to Perform Inspection and Tests:
		1. 1Vernier caliper
		2. 1 overflow can and catch bucket in the Archimedes
		Principle Apparatus
		3. 1-100 mL graduated cylinder
		4. 1 triple beam balance
		5. 1 utility water vessel
31	**Motor-Generator Model Experiment Set**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Motor Function (you will need the accompanying user
		manual for guide diagrams
		a) Position each of the contact brushes to their
		respective split ring commutator.
		b) Mount removable magnets onto the stator
		c) Position the core of the rotor vertically upright.
		d) Interconnect the 4 dry cells in series by way of the 4
		dry cell holders; this will provide 6 volts DC to power
		the motor
		e) Insert the banana plug of the red connecting wire
		into the positive terminal of the motor-generator
		model
		f) Fasten the alligator clip of the red connecting wire
		into the positive terminal of the battery (4 dry cells in
		series).
		g) Insert the banana plug of the black connecting wire
		into the negative terminal of the motor-generator
		model.
		h) Fasten the alligator clip of the black connecting wire
		into the negative terminal of the battery
		i) The rotor of the motor-generator should start
		spinning
		j) If the rotor doesn't spin prime the rotor by manually
		initiating a spin; you might do trial and error which
		way (clockwise or counterclockwise) to prime spin
		the rotor
		2. Generator Function
		a) Disconnect the dry cells from the motor-generator
		model and replace it with the bulb
		b) Mount the belt onto the hand wheel and onto the
		shaft of the rotor.
		c) Slowly turn the hand wheel; gradually increase the
		rotation; the bulb shall start to light, the faster the
		rotation of the hand wheel the brighter the bulb lights
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		3. 1-miniature light bulb with holder (2.5V)
		4. 4-dry cells size D, 1.5 volts
		5. 4-dry cell holders
		6. 1 set connecting wires (1 black, 1 red)
32	**Multimeter, digital**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. The functionality test for the basic electronics kit will be
		repeated but this time use the evaluated digital
		multimeter sample.
		2. All measurements obtained by the evaluated digital
		multimeter, should not exceed ±5% of the BLR
		reference multimeter measurements.
		I. Resistors
		1. Each resistor has value inscribe on individual casing;
		check the correctness of indicated values using the
		evaluated digital multimeter
		2. Turn the selector knob of the digital multimeter to
		200 Ω range
		3. insert the probes of the multimeter into the following
		terminals; the black probe goes into the "COM" terminal
		of the multimeter and the red probe goes into the red
		terminal marked "VΩHz"
		4. Switch ON the multimeter
		5. Connect the test leads of the multimeter probes to the
		terminals of the resistor; polarity does not matter
		6. The multimeter should register a reading within 10% of
		the resistor value inscribe into the casing
		7. Keep a record of the readings for each resistor
		II. Diodes
		1. The diodes will be checked for one-way conduction;
		the negative (-) and positive (+) terminals of the diode
		are inscribed in the casing
		2. Turn the selector knob of the digital multimeter to "diode
		range"
		3. Connect the black probe test lead of the multimeter to
		the negative terminal of the diode and the red probe
		test lead to the positive terminal of the diode; the
		multimeter should register a value of 100-1000 ohms;
		keep a record of the reading
		4. If the diode is shorted the meter reading approaches
		zero (0); the diode is defective
		5. If the diode is open the meter reading approaches
		infinity; the diode is defective
		6. Now reverse the connection of the test leads. The
		black probe test lead goes into the positive terminal of
		the diode and the red probe test lead goes into to the
		negative terminal of the diode
		7. The meter should register an infinite value otherwise the
		diode is shorted and therefore defective
		III. Capacitor
		1. The capacitor has an indicated value inscribe on the
		cylinder body and on the casing; negative and positive
		terminals are also indicated in the casing
		2. Turn the selector knob multi meter to capacitance
		function "1000 μF" (or greater) range
		3. Connect the black probe test lead to the negative
		4. Terminal of the capacitor and the red probe test lead to
		the positive terminal of the capacitor
		5. After 3 seconds the meter should register value;
		multimeter reading should be within ±5% of the

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		capacitance value
		IV. DC Voltage
		1. Measure the voltage of a fresh dry cell. The reading shall be at least 1.5V.
		V. AC Voltage
		1. Measure the voltage of the outlet. The reading shall be 220V to 240V.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. 1 set basic electronics kit
		4. 1 Standard digital multimeter
33	**Optical Bench Set**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Mount the meter stick on the stand; meter stick should
		be stable without sign of tipping off.
		2. Mount the different holders on the meter stick (see
		accompanying user manual); mounted holders should
		be stable without sign of tipping off.
		3. One at a time slide each holder along the meter stick
		back and forth.
		4. Each holder should slide smoothly without getting stuck
		5. Get 1-50 mm mirror from the plane mirror set and 1-50
		mm lens from the basic lens set.
		6. Mount the mirror and lens into the smaller holder; the
		holder should have firm grip on the lens and mirror.
		7. Get the 75 mm lens from the basic lens set and mount it
		into the larger lens holder; the holder should have firm
		grip on the lens.
		8. Mount the screen into the screen holder; grip should be
		firm.
		9. Mount the candle into the candle holder; grip should be
		firm.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. 1 mirror set
		4. 1 basic lens set
34	**Pair of Bar Magnets**	A. (Refer to General Inspection Protocol)

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		B. Functionality Test:
		a) check for labels and or color codes of each bar magnet: North or N for the north pole, South or S for the south pole and or red for north pole, blue for south pole.
		b) check if the north and south pole labels are correct:
		c) get a reference magnet without issue
		d) approach north pole of the reference bar magnet to the south pole of the bar magnet sample under evaluation; the two magnets should attract each other
		e) approach north pole of the reference bar magnet to the north pole of the bar magnet sample under evaluation; the two magnets should repel each other (you will feel the two bar magnets to be pushing against each other)
		f) Check the strength of each bar magnet:
		i) Join the north pole of one magnet to the south pole of the other magnet.
		ii) suspend the north or south pole of one magnet underneath a metal surface. The two connected magnets are vertically suspended underneath the metal surface
		iii) The magnets shall freely cling to the metal for at least a minute without falling.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. 1 reference bar magnet
		4. 1 triple beam balance
		5. 1 bar modeling clay
35	**Prism Set**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Look for a beam of sunlight that is passing thru
		openings and place the prism on the path of the sunlight
		beam.
		2. Adjust the angle of the prism relative to the path of the
		sunlight beam' you should see red, blue, green colors
		projected.
		3. The prism will be tested for density by dividing its mass
		by its volume
		a) using triple beam balance measure the mass of
		prism; record the measured mass
		b) calculate the volume of the prism by using the
		formula ½ base x height x thickness
		c) divide mass by volume; this is your calculated density
		of the prism sample
		d) standard density for acrylic is1.18 grams/cm3
		your calculated value should be within 10% of the
		standard value
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. 1 triple beam balance
		4. sunlight
36	**Resistance Board**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Measure resistance of each wire in the resistance board
		the BLR reference digital multimeter:
		Theoretical value of resistance is calculated using
		equation:
		$R=\rho L/A$ where R=resistance in ohms
		ρ=resistivity of wire material
		L=length of wire
		A=cross section area of wire

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ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		a) Insert the black black probe into the "COM" terminal
		and the red probe into the "VΩHz" terminal of the BLR
		reference digital multimeter
		b) turn selector knob of the digital multimeter to "200 Ω"
		range
		c) switch ON the digital multimeter
		d) you are going to connect each test lead of the BLR z
		reference digital multimeter on each end of the wire
		you are going to measure; record multimeter reading
		for each wire sample
		copper wire (diameter=0.5 mm, length 0.6 m):
		-Theoretical Resistance Value: 0.051 Ω
		stainless steel wire (diameter=0.5 mm, length 0.6 m):
		- Theoretical Resistance Value: 2.11 Ω
		nichrome wire(diameter=25mm, length 0.6 m):
		- Theoretical Resistance Value: 13.45 Ω
		nichrome wire (diameter=50 mm, length 0.6 m):
		- Theoretical Resistance Value: 3.36 Ω
		e) Your measured resistance value should be within
		±10% of the theoretical value
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		2. BLR reference digital multimeter
37	**Ring and Ball Apparatus**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Let the metal ball pass though the ring; it should go
		through it not its too large
		2. Heat the ball by open flame from an alcohol burner for
		about 5 minutes.
		3. Immediately thereafter let the metal ball pass through
		the ring as in step 2 above.
		4. The metal ball should be stuck and cannot pass through
		the ring.
		5. Wait for the metal ball to cool down for about 15
		minutes and then let it pass through the ring; it should
		go through.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 vernier caliper
		2. 1 alcohol burner with alcohol
		3. matches
38	**Ripple Tank Set**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Assemble the setup as describe in the accompanying
		user manual.
		2. Leak test. Fill the tank with water. The water inside
		the tank shall remain for at least 4 hours wherein during
		this period the functionality of other parts will be
		investigated.
		3. Mount the other components and accessories following
		the instructions in the accompanying user manual.
		4. Test the power supply, lamp, wave generator, strobe
		light if they are functioning. Refer to the accompanying
		user manual how to do this.

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		5. Perform the following activities:
		a) switch ON the power supply to activate the lamp and
		the wave generator; you should be able to see
		projection of wave patterns on the screen underneath
		the tank (see accompanying user manual).
		b) operate the synchronizing strobe as per instructions
		in the accompanying user manual
		c) you should be able to see slow motion, frozen motion
		of the wave patterns projected on the screen
		d) place the other accessories like straight barrier,
		circular etc. onto the tank; you should be able to see
		results as describe in the accompanying user
		manual.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. water
39	Slinky Coil, metal	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Make the slinky coil, "walk down" at least two levels (steps) on the stairs
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. a flight of stairs
40	Sound Resonance Set: Loud Speaker	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Operate the frequency generator kit to produce 326 Hz.
		2. Connect the loudspeaker to the speaker output
		terminals of the frequency generator kit.
		3. Listen to the tone coming out of the loudspeaker. It
		should closely resemble the note mi in the middle C
		diatonic scale.
		4. Measure the frequency of the sound using sound
		frequency meter (dedicated or smart phone based).
		5. The measured value should be 326 ±3% or in the range 316-336 Hz
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 Vernier caliper
		3. 1 Tone frequency generator kit
		4. 1 Sound frequency meter (dedicated or smart phone
		based)
41	Sound Resonance Set: Resonance Tube, close-ended	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. The resonance tube this will be tested together with the
		loudspeaker and frequency generator.
		2. Do this activity in a quite surrounding):
		a) set the frequency generator to 256 HZ setting; refer
		to the accompanying user manual of the frequency
		generator on how to do this
		b) connect the loudspeaker to the output terminals of
		the frequency generator; see accompanying user
		manual of the tone generator kit for wiring
		c) listen to the sound coming out of the loudspeaker
		d) the volume and the quality of the sound can be fine
		tuned; refer to the accompanying user manual on
		how to do this
		e) the resonance tube is composed of 2 tubes the

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
		thinner telescoping tube and the larger tube; the
		telescoping tube has a flat stopper on one end and
		open on the other end; the larger tube is open on
		both ends
		f) insert the telescoping tube, stopper first, into the
		larger tube until the stopper aligns with the rim of the
		forward opening of the larger tube
		g) bring the loudspeaker as close as possible in front of
		the forward opening of the larger tube
		h) listen to the sound
		i) now with the larger tube steadfast in place, slowly
		slide the telescoping tube away from the loudspeaker
		j) you should notice a varying intensity of the sound
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. 1 tone generator kit
		4. 1 loudspeaker
42	**Sound Resonance Set: Tone Generator**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. The frequency generator will be operated as per
		instructions in the accompanying user manual
		2. Set the frequency generator to produce 256 Hz tone.
		Refer to accompanying user manual how to do this.
		3. Measure frequency emitted using the BLR reference
		digital multimeter.
		a) Insert the black probe of the BLR reference digital
		multimeter into "COM" terminal and the red probe
		into the "VΩHz" terminal
		b) Turn the selector knob of the BLR reference multi
		meter to "Hz" function.
		c) Switch ON the frequency generator kit
		i) following the instructions in the accompanying user
		manual of the frequency generator kit, adjust the
		frequency output to 256 Hz
		ii) switch ON the BLR reference multimeter
		iii) connect the black probe test lead of the BLR
		reference digital multimeter into the negative
		terminal output of the frequency generator and the
		red probe test lead into the positive terminal output
		of the frequency generator kit.
		iv) Record the registered frequency reading on the BLR
		reference multi meter
		v) Compare the frequency setting on the frequency
		generator with the reading on the BLR reference
		multimeter; the difference should not exceed ± 3%
		Example at 256 Hz setting the measured aoutput is 248-264 Hz. Measured output should be constant value and not fluctuating
		vi) Do steps 3ci to 3cv above for the following
		frequency settings of the tone generator:
		288 Hz, 320 Hz, 341 Hz, 512 Hz and measure
		each output using the BLR reference multi meter
		vii) The difference between the frequency generator kit setting and the BLR reference multimeter reading in each of the frequencies measured should not exceed ±3 Hz.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. 1 BLR reference digital multimeter

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
43	**Strobe Light**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Operate the strobe light unit as per instructions in the
		accompanying user manual
		2. The accuracy of the strobe unit will be verified by:
		a) measure the rotational speed of a rotating fan using a BLR reference tachometer
		b) measure the speed of rotating fan using the strobe light as per instructions in the accompanying user manual
		c) compare the measurement obtained in a) to the measurement obtained in b) above; the measurement obtained using the strobe light should be within ±5%of the BLR reference tachometer
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		1. 1 vernier caliper
		3. 1 rotating fan
		3. 1 BLR reference tachometer
44	**Switch, Knife type, Single Pole Single Throw**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Operate the switch for 25 continuous; ON-OFF cycles;
		the switch should not malfunction
		2. Continuity test of the switch assembly:
		a) insert the black probe into the "COM" terminal and
		the red probe into the "VΩHz" terminal of the BLR
		reference digital multimeter
		b) turn selector knob of the digital multimeter to "200 Ω"
		range
		c) switch ON the digital multimeter
		d) connect the test lead of the black probe to one
		terminal of the switch assembly and the test lead of
		the red probe to the other terminal of the switch
		assembly
		e) the digital multimeter should display a value in the
		range from 0 to 5 ohms as the switch is closed
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. BLR reference digital multimeter
45	**Ticker Timer Set**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Assemble the component parts of the ticker timer
		following instructions of the accompanying user manual.
		2. Connect the ticker timer to the AC-DC power supply
		as per instructions in the accompanying user manual.
		3. Switch ON the power supply.
		4. The ticker timer should clearly print "ticks" on the
		supplied paper tape.
		5. Slowly pull the paper tape away from the ticker timer
		along the guides.
		6. You should see printed ticks on the paper tape at
		certain distance intervals.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		3. 1 AC-DC variable power supply

Detailed Test and Inspection Protocol

ITEM NO.	ITEM DESCRIPTION	INSPECTION and TEST PROCEDURES
46	**Toy Car, non-friction, non-battery**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Give the toy car a push and a pull ; it should run
		smoothly unimpeded
		2. Do 50 times push-pull cycle on the toy car; the toy car
		should not malfunction and stay wholly intact without
		loosened parts
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
47	**Tuning Fork Set**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Do the following activities in a quite surrounding:
		a) one at a time strike each fork with the included rubber mallet
		b) measure the frequency of tone produced using
		frequency meter, dedicated or smartphone based
		c) measurements should be within 1% of frequency rating stamped on the tuning fork. Example for the 256 Hz tuning fork, measured value is 253-259 Hz
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper
		2. 1 frequency meter (dedicated or PC/laptop or smart phone based application)
48	**Vacuum Tube and Manual Vacuum Pump**	A. (Refer to General Inspection Protocol)
		B. Functionality Test:
		1. Seal the vacuum tube using the provided rubber
		stoppers.
		2. Connect the vacuum tube and the vacuum pump using
		the provide rubber tubing
		3. Open the valve of the vacuum tube (refer to its
		accompanying user manual)
		4. Pump out air from the vacuum tube using the manual
		vacuum pump as per instructions in the accompanying
		user manual of the vacuum pump.
		5. You should notice that the pressure dial gauge pointer
		moves clockwise.
		6. You should also notice that the squeezing of the lever
		to pump out air gets harder.
		7. Stop pumping when the indicator has traversed about ¾
		of the scale.
		8. Close the valve of the vacuum tube.
		9. Detach the rubber tubing from the vacuum tube.
		10. Inside the vacuum tube you will see a feather and a
		coin.
		11. Position the vacuum tube vertically.
		14. Quickly invert the tube and observe the motion of the
		feather and the coin inside; they should fall about at
		the same time.
		15. Open the valve of the vacuum tube; you should hear
		sound of rushing air.
		16. Position tube vertically again as in step 12 above.
		17. Invert the tube quickly as in step 13; you will notice
		that the feather fall very much slower than the coin.
		C. Materials Needed to Perform Inspection and Tests:
		1. 1 steel rule/meter tape
		2. 1 vernier caliper

Republic of the Philippines
Department of Education

Bureau of Learning Resources

Proposed Sampling Plan

Project Title: **MASS PRODUCTION, SUPPLY AND DELIVERY OF SCIENCE AND MATHEMATICS EQUIPMENT PACKAGES TO PUBLIC ELEMENTARY FOR GRADES 1 TO 3 AND GRADES 4 TO 6, PUBLIC JUNIOR HIGH SCHOOL FOR GRADES 7 TO 10, AND PUBLIC SENIOR HIGH SCHOOLS FOR GRADES 11 TO 12 (CORE & STEM)**

Item Number	Description	Quantity in pieces	Unit of Issue	Sampling Technique (Reference: Quality Control 3rd Edition by Dale H. Besterfield)	Sample Size	AQL	Accept	Reject
I. MASS PRODUCTION ITEMS								
LOT 1: BLR-DEVELOPED BASIC SCIKIT								
1	BLR-developed Basic Scikit: Ø 9.5mm x 250mm long Stand Rod	84,370	pc	Normal	500	6.5%	21	22
2	BLR-developed Basic Scikit: Ø 9.5mm x 500mm long Stand Rod	168,740	pc	Normal	800	6.5%	21	22
3	BLR-developed Basic Scikit: Ø 12.7mm x 1000mm long Stand Rod	11,285	pc	Normal	315	6.5%	21	22
4	BLR-developed Basic Scikit: Rail	22,570	lh	Normal	315	6.5%	21	22
5	BLR-developed Basic Scikit: Ring with stem	42,185	pc	Normal	500	6.5%	21	22
6	BLR-developed Basic Scikit: Test Tube Rack	42,185	pc	Normal	500	6.5%	21	22
7	BLR-developed Basic Scikit: Wire Gauze	42,185	pc	Normal	500	6.5%	21	22
8	BLR-developed SCIKIT BASIC 001: Stand Base	84,370	assy	Normal	500	6.5%	21	22
9	BLR-developed SCIKIT BASIC 001: Stand Support	168,740	pcs	Normal	800	6.5%	21	22
10	BLR-developed SCIKIT BASIC 001: SCIKIT BASIC Storage Case 001 (With Cover and Base Sheathing)	8,437	pc	Normal	200	6.5%	21	22
11	BLR-developed SCIKIT BASIC 002: Multiclamp	210,925	assy	Normal	800	6.5%	21	22
12	BLR-developed SCIKIT BASIC 002: Test Tube Holder	42,185	pc	Normal	500	6.5%	21	22
13	BLR-developed SCIKIT BASIC 002: SCIKIT BASIC Storage Case 002 (With Cover and Base Sheathing)	8,437	pc	Normal	200	6.5%	21	22
14	BLR-developed SCIKIT BASIC 003: Universal Clamp	101,244	assy	Normal	500	6.5%	21	22
15	BLR-developed SCIKIT BASIC 003: Universal Bosshead	84,370	assy	Normal	500	6.5%	21	22
16	BLR-developed SCIKIT BASIC 003: SCIKIT BASIC Storage Case 003 (With Cover and Base Sheathing	8,437	pc	Normal	200	6.5%	21	22
17	BLR-developed Free Fall Apparatus (Mechanics 001): Ball Case (with Cover and foam)	13,630	pc	Normal	315	6.5%	21	22
18	BLR-developed Free Fall Apparatus (Mechanics 001): Digital Timer Assembly (Digital Stopwatch)	13,630	assy	Normal	315	6.5%	21	22
19	BLR-developed Free Fall Apparatus (Mechanics 001): Metertape with hooks and plastic pointer	13,630	assy	Normal	315	6.5%	21	22
20	BLR-developed Free Fall Apparatus (Mechanics 001): Ø 12.7mm Steel Spherical Ball	27,260	pc	Normal	315	6.5%	21	22

Item Number	Description	Quantity in pieces	Unit of Issue	Sampling Technique *(Reference: Quality Control 3rd Edition by Dale H. Besterfield)*	Sample Size	AQL	Accept	Reject
21	BLR-developed Free Fall Apparatus (Mechanics 001): Ø 25mm Plastic Spherical Ball with metal screw	27,260	pc	Normal	315	6.5%	21	22
22	BLR-developed Free Fall Apparatus (Mechanics 001): Ø 25mm Steel Spherical Ball	27,260	pc	Normal	315	6.5%	21	22
23	BLR-developed Free Fall Apparatus (Mechanics 001): Pad Switch Assembly	13,630	assy	Normal	315	6.5%	21	22
24	BLR-developed Free Fall Apparatus (Mechanics 001): Solenoid Assembly	13,630	assy	Normal	315	6.5%	21	22
25	BLR-developed Free Fall Apparatus (Mechanics 001): Synchro Box Assembly	13,630	assy	Normal	315	6.5%	21	22
26	BLR-developed Free Fall Apparatus (Mechanics 001): SCIKIT MECHANICS Storage Case 001 (With Cover and Base Sheathing)	13,630	pc	Normal	315	6.5%	21	22
27	BLR-developed Dynamics Carts-Rail System (Mechanics 002): Cart-spring loaded	11,285	unit	Normal	315	6.5%	21	22
28	BLR-developed Dynamics Carts-Rail System (Mechanics 002): Cart-with counterweight	11,285	unit	Normal	315	6.5%	21	22
29	BLR-developed Dynamics Carts-Rail System (Mechanics 002): Cylindrical Mass, 50-gram	56,425	pc	Normal	500	6.5%	21	22
30	BLR-developed Dynamics Carts-Rail System (Mechanics 002): Driving Mass, 3-gram	56,425	pc	Normal	500	6.5%	21	22
31	BLR-developed Dynamics Carts-Rail System (Mechanics 002): Leveling Pad Assembly	11,285	assy	Normal	315	6.5%	21	22
32	BLR-developed Dynamics Carts-Rail System (Mechanics 002): Plastic Hammer	11,285	pc	Normal	315	6.5%	21	22
33	BLR-developed Dynamics Carts-Rail System (Mechanics 002): Modelling Clay, 1 bar/set	11,285	bar	Normal	315	6.5%	21	22
34	BLR-developed Dynamics Carts-Rail System (Mechanics 002): Stopper-Fork Assembly	11,285	assy	Normal	315	6.5%	21	22
35	BLR-developed Dynamics Carts-Rail System (Mechanics 002): String (thin), 1 ball/set	11,285	ball	Normal	315	6.5%	21	22
36	BLR-developed Dynamics Carts-Rail System (Mechanics 002): SCIKIT MECHANICS Storage Case 002 (With Cover and Base Sheathing)	11,285	pc	Normal	315	6.5%	21	22
37	BLR-developed SCIKIT MECHANICS 003: 10-Newton Spring Balance	44,530	assy	Normal	500	6.5%	21	22
38	BLR-developed SCIKIT MECHANICS 003: Friction Block and Friction Board	35,210	set	Normal	500	6.5%	21	22
39	BLR-developed SCIKIT MECHANICS 003: Leveling Hose	13,630	lh	Normal	315	6.5%	21	22
40	BLR-developed: User's Manual (SCIKIT MECHANICS)	8,437	pc	Normal	200	6.5%	21	22
41	BLR-developed: Experiment Module (SCIKIT MECHANICS)	8,437	pc	Normal	200	6.5%	21	22
LOT 2: BLR-developed SCIENCE AND MATHEMATICS EQUIPMENT (Elem, JHS, & SHS)								
1	BLR-developed Blackboard Compass	6,180	pc	Normal	200	6.5%	21	22
2	BLR-developed Blackboard Protractor	16,545	pc	Normal	315	6.5%	21	22

Item Number	Description	Quantity in pieces	Unit of Issue	Sampling Technique *(Reference: Quality Control 3rd Edition by Dale H. Besterfield)*	Sample Size	AQL	Accept	Reject
3	BLR-developed Fresh Water Aquarium with Stand	6,180	pc	Normal	200	6.5%	21	22
4	BLR-developed Heat Conductivity Apparatus	44,530	pc	Normal	500	6.5%	21	22
5	BLR-developed Light Source (Single Slit)	11,285	pc	Normal	315	6.5%	21	22
6	BLR-developed Set of Coils (Transformer)	13,630	set	Normal	315	6.5%	21	22
7	BLR-developed Variable Power Supply with 5 pcs. Terminal Board	13,630	set	Tightened	500	0.65%	7	8
8	BLR-developed: Fraction Set	73,405	set	Normal	500	6.5%	21	22
9	BLR-developed: Linear Pair/Angle Demonstrator	40,220	pc	Normal	500	6.5%	21	22
10	BLR-developed: Number Blocks	42,505	set	Normal	500	6.5%	21	22
11	BLR-developed: Place Value Chart with decimal pockets	6,180	pc	Normal	200	6.5%	21	22
LOT 3: BLR-DEVELOPED STORAGE CABINETS								
1	BLR-developed Storage Cabinet	9,074	pc	Normal	200	6.5%	21	22
II. SCIENCE AND MATHEMATICS EQUIPMENT (MARKET ITEMS)								
LOT 4: CHEMICALS								
1	Benedict's Solution, 100 mL/bottle	3,050	bot	Normal	125	6.5%	14	15
2	Boric Acid, 100 grams/bottle	3,050	bot	Normal	125	6.5%	14	15
3	Bromothymol Blue	2,275	bottle	Normal	125	6.5%	14	15
4	Calcium Chloride, 100 grams / bottle	3,050	bot	Normal	125	6.5%	14	15
5	Chemicals Storage Box	3,050	pc	Normal	125	6.5%	14	15
6	Copper Sulfate, CuSO4, 100 grams/bottle	3,050	bot	Normal	125	6.5%	14	15
7	Gentian Violet, 100 ml / bottle	2,275	botte	Normal	125	6.5%	14	15
8	Iodine Solution, 100 ml / bottle	2,341	bottle	Normal	125	6.5%	14	15
9	Magnesium Ribbon, 25 grams, 1 roll	3,050	roll	Normal	125	6.5%	14	15
10	Manganese Dioxide, 50 grams / bottle	3,050	bottle	Normal	125	6.5%	14	15
11	Microscope's Immersion Oil, 100mL/bot	2,275	bottle	Normal	125	6.5%	14	15
12	Phenolphthalein, 100 grams/bottle	3,050	bottle	Normal	125	6.5%	14	15
13	Potassium Chloride, 100 grams / bottle	3,050	bottle	Normal	125	6.5%	14	15
14	Potassium Iodide, 100 grams / bottle	3,050	bottle	Normal	125	6.5%	14	15
15	Sodium Hydroxide (Lye), 250 grams/bottle	3,050	bottle	Normal	125	6.5%	14	15
16	Zinc Chloride, 100 grams / bottle	3,050	bottle	Normal	125	6.5%	14	15
17	Zinc metal, pellets/mossy, 100 grams / bottle	3,050	bottle	Normal	125	6.5%	14	15
LOT 5: GLASSWARES AND LAB TOOLS								
1	Beaker, borosilicate, 250 mL	178,000	pc	Normal	800	6.5%	21	22
2	Beaker, borosilicate, 50 mL	89,000	pc	Normal	500	6.5%	21	22
3	Burette, 10 mL capacity (acid)	13,630	pc	Normal	315	6.5%	21	22
4	Burette, 10 mL capacity (base)	13,630	pc	Normal	315	6.5%	21	22
5	Burner, Alcohol, glass, 150 mL Capacity	89,000	pc	Normal	500	6.5%	21	22
6	Burner, Bunsen	15,595	pc	Normal	315	6.5%	21	22
7	Cork Stopper # 5 (for Ø 16mm test tube)	15,595	pc	Normal	315	6.5%	21	22
8	Crucible with lid/cover	15,595	pc	Normal	315	6.5%	21	22
9	Dish, Evaporating, 75 mL	46,495	pc	Normal	500	6.5%	21	22
10	Distillation set-up: Condenser, Liebig-type	4,310	pc	Normal	200	6.5%	21	22
11	Distillation set-up: Distilling Flask, borosilicate, 250ml,	4,310	pc	Normal	200	6.5%	21	22
12	Double burette clamp/holder	4,310	pc	Normal	200	6.5%	21	22

Item Number	Description	Quantity in pieces	Unit of Issue	Sampling Technique (Reference: Quality Control 3rd Edition by Dale H. Besterfield)	Sample Size	AQL	Accept	Reject
13	Electrolysis Apparatus, student-type (Brownlee)	15,595	pc	Normal	315	6.5%	21	22
14	Flask, Erlenmeyer, borosilicate, narrow-mouth, 250 mL	173,690	pc	Normal	800	6.5%	21	22
15	Funnel, borosilicate, fluted	89,000	pc	Normal	500	6.5%	21	22
16	Glass Tubing, Ø 6 mm x Ø 4 mm x 1500 mm long	15,595	pc	Normal	315	6.5%	21	22
17	Manometer, Open U-tube	4,310	pc	Normal	200	6.5%	21	22
18	Mortar and Pestle, porcelain, 150 mL	46,495	pc	Normal	500	6.5%	21	22
19	Osmosis Apparatus	4,310	pc	Normal	200	6.5%	21	22
20	Reagent Bottle, narrow-mouth, amber, borosilicate, 250 mL	15,595	pc	Normal	315	6.5%	21	22
21	Reagent Bottle, wide-mouth, transparent, borosilicate, 250 mL	15,595	pc	Normal	315	6.5%	21	22
22	Rubber Stopper # 0 (for Ø 16mm test tube)	15,595	pc	Normal	315	6.5%	21	22
23	Spatula, spoon, porcelain and glazed	89,000	pc	Normal	500	6.5%	21	22
24	Stirring Rod, Ø 6 mm x 250 mm long	89,000	pc	Normal	500	6.5%	21	22
25	Test tube brush	89,000	pc	Normal	500	6.5%	21	22
26	Test Tube, borosilicate, Ø 16 mm x 150 mm long	399,175	pc	Normal	800	6.5%	21	22
27	Tong, Crucible	15,595	pc	Normal	315	6.5%	21	22
28	Vial, screw-neck, 25 ml. (with screw-type plastic cap)	359,990	pc	Normal	800	6.5%	21	22
29	Vial, screw-neck, 50 mL. (with screw-type plastic cap)	359,990	pc	Normal	800	6.5%	21	22
30	Watch Glass, Ø 90 mm	89,000	pc	Normal	500	6.5%	21	22
LOT 6: SCIENCE DEVICES, INSTRUMENTS, AND MEASURING TOOLS - MATTER								
1	Balance, Toploading, Electronic	15,595	pc	Tightened	500	0.65%	7	8
2	Balance, Triple Beam, with tare, 2610-gram	15,595	pc	Tightened	500	0.65%	7	8
3	Calorimeter	4,310	pc	Normal	200	6.5%	21	22
4	Centrifuge	862	pc	Tightened	125	0.65%	2	3
5	Electrical Conductivity (Conductivity of Solutions) Apparatus	13,630	pc	Tightened	500	0.65%	7	8
6	Filter Paper, crepe, 580mm x 580 mm sheet, Grade 0905	46,495	sheet	Normal	500	6.5%	21	22
7	Gloves, Hand, super nitrile	89,000	pair	Normal	500	6.5%	21	22
8	Graduated Cylinder, borosilicate, 10 mL	46,495	pc	Normal	500	6.5%	21	22
9	Graduated Cylinder, borosilicate, 100 mL	46,495	pc	Normal	500	6.5%	21	22
10	Graduated pipette with rubber pipettor, borosilicate, 10 mL	15,595	pc	Normal	315	6.5%	21	22
11	Hydrometer for heavy liquids	15,595	pc	Normal	315	6.5%	21	22
12	Hydrometer for light liquids	15,595	pc	Normal	315	6.5%	21	22
13	Laboratory Hot Plate with magnetic stirrer	3,119	pc	Tightened	200	0.65%	3	4
14	Safety Goggles, polycarbonate	89,000	pair	Normal	500	6.5%	21	22
15	Thermometer, Laboratory type, Alcohol, -20°C to 110°C	89,000	pc	Normal	500	6.5%	21	22
LOT 7: SCIENCE DEVICES, INSTRUMENTS, AND MEASURING TOOLS - EARTH & SPACE and LIVING THINGS								
1	Anemometer with Wind Vane, Cup type	29,362	unit	Normal	315	6.5%	21	22
2	Anemometer, Simple	14,681	set	Normal	315	6.5%	21	22
3	Aneroid Barometer Set (Demonstration Type)	82,725	unit	Normal	500	6.5%	21	22
4	Aneroid Barometer, wall-mount	16,545	unit	Normal	315	6.5%	21	22
5	Compass, Magnetic	40,220	pc	Normal	500	6.5%	21	22
6	Dissecting Set with pan	4,310	set	Normal	200	6.5%	21	22
7	Gloves, Surgical	8,620	pairs	Normal	200	6.5%	21	22

Item Number	Description	Quantity in pieces	Unit of Issue	Sampling Technique *(Reference: Quality Control 3rd Edition by Dale H. Besterfield)*	Sample Size	AQL	Accept	Reject
8	Hand Lens, 10x magnification	1,965	pc	Normal	125	6.5%	14	15
9	Hand Lens, 5x magnification	77,715	pcs	Normal	500	6.5%	21	22
10	Lens Paper, 50's/pack	9,320	packs	Normal	200	6.5%	21	22
11	Microscope, Compound with 4 Objectives	37,280	units	Tightened	800	0.65%	10	11
12	Microscope, Digital	862	unit	Tightened	125	0.65%	2	3
13	Pipette, Beral, 1 mL	136,300	pcs	Normal	500	6.5%	21	22
14	Prepared Slide Set, Microscope, 25 pieces	1,864	set	Normal	125	6.5%	14	15
15	Prepared Slide Set, Mitosis and Meiosis	1,864	set	Normal	125	6.5%	14	15
16	Reaction Plates with 6 Wells	11,285	pc	Normal	315	6.5%	21	22
17	Sedimentator Tube	1,965	pc	Normal	125	6.5%	14	15
18	Sling Psychrometer	30,900	unit	Normal	315	6.5%	21	22
19	Soil pH, Moisture, Sunlight Meter	1,965	unit	Normal	125	6.5%	14	15
20	Soil/Test Sieve*	6,180	set	Normal	200	6.5%	21	22
21	Thermometer, Classroom, wall-mount	6,180	pc	Normal	200	6.5%	21	22
22	Tong, Beaker	4,310	pcs	Normal	200	6.5%	21	22
23	Wash Bottle, plastic, 250 mL	13,630	pcs	Normal	315	6.5%	21	22
LOT 8: MATHEMATICAL MANIPULATIVES								
1	Algebra Tile Set, plastic	1,864	set	Normal	125	6.5%	14	15
2	Base Ten Blocks	73,405	set	Normal	500	6.5%	21	22
3	Beads, Ø16mm	8,501	set	Normal	200	6.5%	21	22
4	Circle Area Demonstrator	6,180	pcs	Normal	200	6.5%	21	22
5	Compass, Drawing, student type	247,200	pcs	Normal	800	6.5%	21	22
6	Cuisenaire Rods, 250 pcs/set	8,501	set	Normal	200	6.5%	21	22
7	Elapsed Time (Clock) Set	8,501	pcs	Normal	200	6.5%	21	22
8	Geoboard, 11 x 11	80,440	pcs	Normal	500	6.5%	21	22
9	Geoboard, 5 x 5	85,010	pcs	Normal	500	6.5%	21	22
10	Geostrips	73,405	set	Normal	500	6.5%	21	22
11	Ghost Grid Whiteboard, Mobile Magnetic, 72-inch x 40-inch	16,938	pcs	Normal	315	6.5%	21	22
12	Linking Cubes	73,405	set	Normal	500	6.5%	21	22
13	Model, Basic 3D Geometrical Collapsible	30,900	set	Normal	315	6.5%	21	22
14	Model, Basic 3D Geometrical Solids	8,044	set	Normal	200	6.5%	21	22
15	Pattern Blocks, 250 pcs/set	29,362	set	Normal	315	6.5%	21	22
16	Pentominoes	73,405	set	Normal	500	6.5%	21	22
17	Plastic Two-colored Counters, 1-inch diameter, 200 pcs/set	51,825	set	Normal	500	6.5%	21	22
18	Probability Kit	10,365	set	Normal	315	6.5%	21	22
19	Tangrams, set of 30	6,180	set	Normal	200	6.5%	21	22
LOT 9: MATHEMATICAL TOOLS & INSTRUMENT								
1	Balance, Double-pan, 500-gram	42,505	pcs	Tightened	800	0.65%	10	11
2	Blackboard Triangle, 30° x 60° and 45° x 45°	1,864	set	Normal	125	6.5%	14	15
3	Calculator, Graphing, non-projectable	11,285	pcs	Normal	315	6.5%	21	22
4	Calculator, Scientific	90,280	pcs	Normal	500	6.5%	21	22
5	Digital Clock, tabletop	6,180	pcs	Normal	200	6.5%	21	22
6	Measuring Kit (Volume)	8,501	set	Normal	200	6.5%	21	22
7	Meterstick, plastic	330,900	pcs	Normal	800	6.5%	21	22
8	Protractor (for student)	661,800	pcs	Normal	1,250	6.5%	21	22
9	Ruler, Plastic, 12 inches or 30 cm	661,800	pcs	Normal	1,250	6.5%	21	22
10	Scale, Spring, Hanging type	8,501	pcs	Normal	200	6.5%	21	22
11	Scale, Weighing, analog, 10 kg. capacity	8,501	pcs	Normal	200	6.5%	21	22
12	Scale, Weighing, bathroom-type	8,501	pcs	Normal	200	6.5%	21	22

Item Number	Description	Quantity in pieces	Unit of Issue	Sampling Technique *(Reference: Quality Control 3rd Edition by Dale H. Besterfield)*	Sample Size	AQL	Accept	Reject
13	Tape Measure, 1.5 meters	330,900	pcs	Normal	800	6.5%	21	22
14	Template, shapes	42,505	pcs	Normal	500	6.5%	21	22
LOT 10: MODELS: EARTH AND OTHER HEAVENLY BODIES								
1	Globe, Celestial	42,185	unit	Normal	500	6.5%	21	22
2	Globe, Terrestrial	40,220	unit	Normal	500	6.5%	21	22
3	Landform Demonstration Kit	11,285	kit	Normal	315	6.5%	21	22
4	Model, Earth Internal Structure, 1/4 part detachable	2,257	unit	Normal	125	6.5%	14	15
5	Model, Seismograph	9,320	unit	Normal	200	6.5%	21	22
6	Model, Solar System	393	unit	Normal	50	6.5%	7	8
7	Model, Sun-Earth-Moon	42,185	unit	Normal	500	6.5%	21	22
8	Model, Tectonics Demonstrator	2,257	kit	Normal	125	6.5%	14	15
9	Model, Volcano, cross section	11,285	unit	Normal	315	6.5%	21	22
10	Rock Samples, 24 pcs/set, (minerals of 3 rock types)	786	set	Normal	80	6.5%	10	11
11	Telescope, Astronomical (Reflecting)	393	unit	Tightened	80	0.65%	1	2
LOT 11: MODELS: THE HUMAN ANATOMY								
1	Model, Human Circulatory System	6,180	unit	Normal	200	6.5%	21	22
2	Model, Human Endocrine System	1,864	unit	Normal	125	6.5%	14	15
3	Model, Human Nervous System	1,864	unit	Normal	125	6.5%	14	15
4	Model, Human Nose (Nasal-Throat Anatomy)	8,501	unit	Normal	200	6.5%	21	22
5	Model, Human Skeleton	6,180	unit	Normal	200	6.5%	21	22
6	Model, Human Torso	6,573	unit	Normal	200	6.5%	21	22
7	Model, Lung Demonstration	6,180	unit	Normal	200	6.5%	21	22
8	Model, Pumping Heart	6,180	unit	Normal	200	6.5%	21	22
9	Model, Reproductive System, Female (Pelvic Anatomy)	6,180	unit	Normal	200	6.5%	21	22
10	Model, Reproductive System, Male	6,180	unit	Normal	200	6.5%	21	22
LOT 12: MODELS: OTHER BIOLOGICAL STRUCTURES AND SPECIES								
1	Model, Animal Cell	2,726	pc	Normal	125	6.5%	14	15
2	Model, Animal Meiosis	2,726	set	Normal	125	6.5%	14	15
3	Model, Animal Mitosis	2,726	set	Normal	125	6.5%	14	15
4	Model, Chloroplast	2,726	unit	Normal	125	6.5%	14	15
5	Model, DNA	1,864	unit	Normal	125	6.5%	14	15
6	Model, Invertebrates	6,180	set	Normal	200	6.5%	21	22
7	Model, Mitochondrion	2,726	unit	Normal	125	6.5%	14	15
8	Model, Plant Cell	2,726	unit	Normal	125	6.5%	14	15
9	Model, Vertebrates	6,180	set	Normal	200	6.5%	21	22
LOT 13: MODELS: MOLECULAR GEOMETRY								
1	Model, Atomic Orbital, 82-pc	15,595	set	Normal	315	6.5%	21	22
2	Model, Biochemistry Molecular, (262 atom parts)	15,595	set	Normal	315	6.5%	21	22
3	Model, Crystal Structures Set (Graphite, diamond, sodium chloride, carbon dioxide)	15,595	set	Normal	315	6.5%	21	22
4	Model, Molecular, Inorganic/Organic (307-pc)	15,595	pcs	Normal	315	6.5%	21	22
5	Model, Sublevel Orbitals of the Atom (Quantum)	15,595	pcs	Normal	315	6.5%	21	22
6	Model, VSEPR, 14 shapes (50-pc)	15,595	pcs	Normal	315	6.5%	21	22
LOT 14: FORCE, MOTION, AND ENERGY KITS								
1	Advanced Electromagnetism Kit	330	kit	Normal	50	6.5%	7	8
2	Air Blower	66	pc	Normal	13	6.5%	2	3
3	Archimedes Principle Set	330	set	Normal	50	6.5%	7	8
4	Basic Electronics Kit	330	kit	Normal	50	6.5%	7	8
5	Basic Lens Set, acrylic	13,630	pc	Normal	315	6.5%	21	22

Item Number	Description	Quantity in pieces	Unit of Issue	Sampling Technique (Reference: Quality Control 3rd Edition by Dale H. Besterfield)	Sample Size	AQL	Accept	Reject
6	Coefficient of Linear Expansion	4,310	pc	Normal	200	6.5%	21	22
7	Connector, Black (# 18 copper, AWG stranded) with alligator clip on one end and banana plug on the other end	91,350	pc	Normal	500	6.5%	21	22
8	Connector, Red (# 18 copper, AWG stranded) with alligator clip on one end and banana plug on the other end	91,350	pc	Normal	500	6.5%	21	22
9	Connector, Yellow (# 18 copper, AWG stranded) with alligator clip on one end and banana plug on the other end	46,820	pc	Normal	500	6.5%	21	22
10	DC Ammeter	11,705	unit	Normal	315	6.5%	21	22
11	DC String Vibrator, string included	3,545	pc	Normal	200	6.5%	21	22
12	DC Voltmeter	11,705	unit	Normal	315	6.5%	21	22
13	Diffraction slits & Diffraction grating Set	9,320	set	Normal	200	6.5%	21	22
14	Digital Geiger-Muller Counter with radioisotopes samples	66	pc	Tightened	20	0.65%	0	1
15	Dry Cell Holder (size D)	121,800	pc	Normal	500	6.5%	21	22
16	Dry Cell, 1.5 volts, size D	121,800	pc	Normal	500	6.5%	21	22
17	Engine Model (Internal Combustion)	4,310	pc	Normal	200	6.5%	21	22
18	Flask, Florence, glass, 500 mL	4,310	pc	Normal	200	6.5%	21	22
19	Force Table	4,310	pc	Normal	200	6.5%	21	22
20	Fuse Holder w/ Fuse	11,705	pc	Normal	315	6.5%	21	22
21	Galvanometer	11,705	unit	Normal	315	6.5%	21	22
22	Helical Spring	13,630	pc	Normal	315	6.5%	21	22
23	Iron Core Rod (non-corrugated)	9,415	pc	Normal	200	6.5%	21	22
24	Laser Light	11,285	pc	Normal	315	6.5%	21	22
25	Long Nose Pliers, 6-inch, 1 pair/set	6,180	pc	Normal	200	6.5%	21	22
26	Magnet Wire	4,158	spool	Normal	200	6.5%	21	22
27	Manometer, Open U-tube with Nakamura-type Water Pressure Apparatus	4,310	pc	Normal	200	6.5%	21	22
28	Miniature Light Bulb	91,350	pc	Normal	500	6.5%	21	22
29	Miniature Light Bulb Holder	91,350	assy	Normal	500	6.5%	21	22
30	Mirror Set, acrylic	13,630	set	Normal	315	6.5%	21	22
31	Motor-Generator Model Experiment Set	11,705	set	Normal	315	6.5%	21	22
32	Multimeter, digital	660	pc	Normal	80	6.5%	10	11
33	Optical Bench Set	13,630	set	Normal	315	6.5%	21	22
34	Pair of Bar Magnets	12,048	pair	Normal	315	6.5%	21	22
35	Prism Set	11,285	set	Normal	315	6.5%	21	22
36	Resistance Board	4,310	pc	Normal	200	6.5%	21	22
37	Ring and Ball Apparatus	330	unit	Normal	50	6.5%	7	8
38	Ripple Tank Set	330	set	Normal	50	6.5%	7	8
39	Slinky Coil, metal	13,630	unit	Normal	315	6.5%	21	22
40	Sound Resonance Set: Loud Speaker	330	pc	Normal	50	6.5%	7	8
41	Sound Resonance Set: Resonance Tube, close-ended	330	pc	Normal	50	6.5%	7	8
42	Sound Resonance Set: Tone Generator	330	pc	Normal	50	6.5%	7	8
43	Strobe Light	1,965	pc	Normal	125	6.5%	14	15
44	Switch, Knife type, Single Pole Single Throw	30,450	pc	Normal	315	6.5%	21	22
45	Ticker Timer Set	9,320	set	Normal	200	6.5%	21	22
46	Toy Car, non-friction, non-battery	42,505	pc	Normal	500	6.5%	21	22
47	Tuning Fork Set	330	pc	Normal	50	6.5%	7	8

Item Number	Description	Quantity in pieces	Unit of Issue	Sampling Technique *(Reference: Quality Control 3rd Edition by Dale H. Besterfield)*	Sample Size	AQL	Accept	Reject
48	Vacuum Tube and Manual Vacuum Pump	1,965	set	Normal	125	6.5%	14	15
255	TOTAL	9,791,448						

Notes:

a) The samples shall be randomly selected from the lot.

b) AQL - Acceptable Quality Level

c) Inspection shall be based on the Inspection and Test Protocol of every item prepared by BLR Cebu.

d) If the rejection rate is high, the Inspectorate Team may opt for a 100% inspection of the goods.

e) Recommend to divide the total quantity available for inspection into several lots. Reducing the lot size will make the sorting effective and faster. The resizing of the lot is necessary to reduce the risk of delivering a defective item due to a very alarming rejection tolerance.

f) In case a sample is found to be defective and still within the AQL, the inspectors shall have final decision to accept or reject the lot based on the gravity of the defect/s discovered.

g) The rejected lot shall be returned to the Supplier for sorting and re-submit the sorted lot for re-inspection.

h) Inform the supplier of the defect/s discovered as basis during sorting of the rejected lot.

i) Reference: Quality Control 3rd Edition by Dale H. Besterfield / Department Order no. 41, s. 2021

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Quality Assurance Procedures During Sample Evaluation

General Requirements:

- Domestic Preference for mass-produced goods for easier monitoring
- Require the manufacturer of the mass-produced and market goods Manufacturing Quality Assurance Certification issued by international or local certifying body such as but not limited to ISO, CI, ASTM, PS (for locally manufactured products), etc.
- The supplier shall submit certification under oath that the tools and equipment supplied is non-toxic, lead free, and mercury free.
- All cost of material test that will be conducted for the samples of the mass-produced goods shall be charged to the supplier.
- To ensure compliance to the material specifications, the procuring entity may conduct a random material test during contract implementation. The PIU will randomly select the specimen. The Supplier will shoulder the cost of material testing at any government accredited testing facilities. If the test result is not compliant to the technical specifications, the affected goods will be rejected. The supplier is required to replace the rejected goods of the same brand and compliant to the technical specifications. However, the material of the replacement goods shall be tested at the government accredited testing facilities and the cost will be charged to the supplier.
- The Inspection and Test Protocols shall serve as guide during sample evaluation.

I) Science and Mathematics Equipment (Mass Production)

The supplier shall submit the samples of Mass Production goods, except for the cabinets, to BLR-Cebu and the BLR-Cebu inspectors/evaluators will evaluate the sample base on the Technical Specifications.

The samples of the cabinets shall be submitted to DepEd BLR Manila office in coordination with the BLR Cebu office.

Submission and Evaluation of Sample of the Mass-Produce Goods

For Goods categorized as Mass Production, no sample submission is required before the issuance of the Notice To Proceed (NTP), however, submission of samples for evaluation shall take effect after the receipt of the NTP by the Manufacturer / Supplier.

The schedules of the submission of samples are as follow:

For Mass Production Items

1. The evaluation/inspection will be based on the technical specification and the Inspection and Test Protocol for science and math equipment.
2. Submit ten (10) unassembled units for visual and dimensional inspection and ten (10) assembled units for visual inspection and functionality testing.
3. Evaluation Process
    a. The ten (10) unassembled units shall be subjected to visual and dimensional inspection.
    b. The ten (10) assembled units shall be subjected to visual and functionality testing.
    c. At least two (2) assembled unit that passed the functionality testing shall be disassembled, and each part shall be subjected to visual and dimensional inspection.
4. Grounds for acceptance
    a. Each part of the ten (10) unassembled units should pass the visual and dimensional inspection; and
    b. All ten (10) assembled units should pass the visual and functionality testing.
    c. All parts of the disassembled units should pass the dimensional inspection.
5. Grounds for rejection
    a. If anyone (1) part of the unassembled is not compliant to the technical specification, reject all the ten (10) unassembled units and the ten (10) assembled units is automatically rejected.
    b. If one (1) assembled unit failed the functionality testing, reject all the ten (10) assembled units.
    c. If any part of the disassembled unit is not compliant to the technical specification, reject the ten (10) assembled units.
6. Grounds for re-evaluation
    a. For unassembled unit, submit another batch of 10 pieces of the rejected part(s) and subjected to evaluation process.
    b. For assembled unit, submit another batch of 10 assembled units and subjected to evaluation process.
    c. All the processes will be repeated until such time that all the units will be compliant to the technical specification and functionality testing.

II) Cabinets

Collapsible Cabinets

Submission of Samples

Submit one (1) unit of unassembled (collapsed) cabinet to DepEd Bureau of Learning Resources Manila after the receipt of the NTP.

Sample Evaluation

1. The evaluation/inspection shall be based on the technical specification and the Inspection and Test Protocol for science and math equipment cabinets.

2. Conduct thorough evaluation of the unassembled (collapsed) one (1) unit cabinet based on the technical specifications.
3. Conduct visual evaluation. The material must conform to the technical specifications. There must be no deformities, dents, breakage, sharp edges, cracks, and other deficiencies/defects.
4. Do dimensional evaluation through linear measurement of length, width, height, thickness, etc.
5. The paint applied to the cabinet should be evaluated to determine compliance to the technical specifications, which is powder coating.
6. If the unassembled part(s) of the cabinet will pass the visual and dimensional inspection, the supplier shall assemble the parts for further evaluation.
7. If a part or parts of the unassembled cabinet will not conform to the technical specification, the set will be rejected, and the supplier shall submit another one (1) set of unassembled cabinet for re-evaluation. The DepEd Inspectors will discuss the cause of rejection.
8. The assembled cabinet will be subjected to stress test by moving it sideways, forward, and backward and tilt 30 degrees both ways from the vertical position. During stress test, if the assembled cabinet is found not sturdy and defects will be noted, it will be ground for rejection.
9. If the cabinet will be rejected, the DepEd Inspectors will discuss with Supplier to identify the areas that needs improvement and those that are not compliant to the technical specifications.
10. The approved samples will be stored at DepEd Central Office, Bureau of Learning Resources for the duration of the project/contract since it will be used as reference during the conduct of the pre-delivery inspection.

Mass Production will start after the sample of the Goods to be mass-produced is officially approved by the PIU. Corresponding documents officially approving the Goods and authorizing mass production will be issued by the PIU.

III. MARKET ITEMS

The supplier shall submit the samples of Market (Items) goods, to the place set by the BAC Secretariat and the BLR-Cebu inspectors/evaluators will evaluate the sample base on the Technical Specifications.

Submission and Evaluation of Sample of the Market (Item) Goods

For Goods categorized as Market Items, submission is required during the post-qualification period (sample evaluation)

The schedules of the submission of samples are as follow:

For Market Items

1. The evaluation/inspection will be based on the technical specification and the Inspection and Test Protocol for science and math equipment.
2. The DepEd inspector assigned during the samples' evaluation shall be guided by the Inspection and Test Protocol for step-by-step conduct of the evaluation for each Science and Mathematics Equipment.
3. The item shall be accepted if it complies with the technical specifications, otherwise it will be rejected.
4. If item/s will be rejected, the DepEd Inspectors will discuss with Supplier to identify the areas that needs improvement and those that are not compliant to the technical specifications.
5. The approved samples will be stored at DepEd Central Office, Bureau of Learning Resources for the duration of the project/contract since it will be used as reference during the conduct of the pre-delivery inspection.

Quality Assurance Procedures During Contract Implementation

Quality Assurance Procedures During Contract Implementation
(Pursuant to DepEd Order 41, series 2021)

Pre-Delivery Inspection:

General Instructions:

(a) The Supplier shall send request for inspection stating the goods to be inspected and the quantity to DepEd Contract Management Division (CMD). The Supplier shall ensure that the goods for inspection are available in their warehouse in the Philippines.

(b) The Supplier in coordination with the DepEd Central Office (CO) Inspectors shall prepare the inspection area, to ensure smooth inspection flow. The inspection area shall have enough space and well ventilated.

(c) The technical specifications in the Contract and the approved sample shall be used as reference during inspections. In case of deviations of the approved sample/s from the technical specifications, the approved sample/s shall be used as final reference; Change of approved sample is not allowed.

(d) The Inspection and Test Protocol shall guide the conduct of the inspections.

(e) Inspection shall be based on the sampling plan prepared by the Project Implementing Unit (PIU), while all electrical items shall be subjected to 100% functionality testing, if needed.

(f) The conduct of the Pre-Delivery Inspection shall be properly documented by the DepEd CO Inspectorate Team including the taking of pictures to the goods inspected and the execution of the actual inspection.

(g) DepEd CO Inspectors shall prepare an inspection report and the Supplier or his/her authorize representative must sign the Inspection Report.

(h) The goods shall pass the international or local quality control standard such as ISO, CI, ASTM, etc. for imported goods and PS mark for locally produced goods. A sticker shall be found in the goods or submit documents that the manufacturer not the supplier is ISO, CI, ASTM certified on quality process only. The Procuring Entity shall conduct validation of the submitted documents.

Collapsible Cabinets:

Preparation by the Supplier:

To fast track the inspection especially that the cabinets are heavy, lifting equipment and personnel shall be available and ready to assist the DepEd CO Inspectors.

Conduct of the Pre-Delivery Inspection by the DepEd CO Inspectors:

1. Inspection of the goods shall be based on the random sampling inspection plan prepared by the Procuring Entity. The Sampling Plan for collapsible cabinets that shall be subjected to thorough quality control inspection based on the technical specifications and the approved samples is as follows:

   Lot size: 200 units of collapse or not assembled cabinets.
   Sample Size: Randomly select and inspect each part of the 32 samples still collapse or not assembled cabinets.
   Acceptance Quality Level (normal inspection):
   Accept the lot of 200 units if the 32 samples size have zero non-conformance.
   Reject the lot size of 200 units if one of the 32 samples of still collapse cabinet did not conform with the technical specification.

   The DepEd inspector shall inform the supplier on the non-conformance.

   The supplier shall sort the rejected lot and submit for re-inspection the sorted lot of 200 units of not assembled cabinets.

   Reference: Quality Control, Third Edition by Dale H. Besterfield, Ph. D., PE
   Juran's Quality Control Handbook, Fourth Edition

2. Conduct visual inspection. There must be no deformities, breakage, sharp edges, dents, cracks, and other deficiencies/defects.

3. Do dimensional inspection through linear measurement of the length, width, height, thickness, etc.

4. Conduct powder-coating test to ensure that surface coating is powder coat not liquid paint and to validate the quality of the powder coat.

5. Assemble three (3) units collapse cabinets taken from the 32 units samples that passed the dimensional inspection and another three (3) units of collapse cabinet from the remaining 168 units from the same lot.

6. The six (6) assembled cabinets shall be subjected to visual inspection, dimensional inspection, and stress test by moving it sideways, forward, and backward and tilt 30 degrees both ways from the vertical position. During stress test, if at least one assembled cabinet from one lot is found not sturdy and defects shall be noted, the defective collapse cabinet(s) shall be rejected and turn-over to the supplier for rectification. The rectified cabinet(s) shall

be submitted for re-inspection following the same inspection procedures until such time that it shall pass the evaluation.

The Supplier shall properly assemble the cabinets at the recipient school. The Procuring Entity shall make no payment to the Supplier if the cabinets are found to be a) not assembled; b) assembly is defective as confirmed by the School Head; and c) not place in the proper location as recommended by the school head or his/her authorized representative/s such as Science Laboratories or any other locations.

GUIDELINES ON INSPECTION, DELIVERY, ACCEPTANCE, AND DOCUMENTATION OF THE SCIENCE AND MATHEMATICS EQUIPMENT

SUPPLIER'S RESPONSIBITIES

- Provide the DepEd Contract Management Division (CMD) and BLR Cebu with the final schedule of the Pre-Delivery Inspection to be conducted at the Supplier's warehouse in the Philippines.
- Immediately coordinates with CMD and BLR Cebu on changes in the Pre-Delivery Inspection due to unavoidable circumstances (i.e., natural calamities, peace, and order condition, etc.).
- Provide CMD and BLR Cebu with the Request for Pre-Delivery Inspection indicating the quantity and goods for inspection two weeks (14 Calendar Days) prior to actual inspection, attaching the internal Quality Control inspection report.
- Quantities reflected in the Request for Pre-Delivery Inspection shall be the result of the actual inventory of the supplier after they have conducted their internal Quality Control procedures.
- Provides assistance to the Procuring Entity's Quality Control Inspection Team during the conduct of the Pre-Delivery Inspection at the Supplier's warehouse in the Philippines.
- The Goods that passed the pre-delivery Quality Control Inspection conducted shall be packed in a sturdy package that can withstand and be protected from rough and bad condition during delivery including exposure to rain, sea breeze, extreme temperature, and precipitation pursuant to Section V. Special Conditions of Contract (GCC) on Packaging.
- Make sure that the delivery box is properly packed, and the seal, signed by the DepEd Inspector is not broken or pealed-off until it reaches the recipient school.
- Make sure that the Goods to be delivered to the recipient schools conform to the requirements of the contract and passed the DepEd's Quality Control Inspection.
- The approved sample submitted during the Sample Evaluation shall be the same item to be delivered to the schools.
- The supplier shall guarantee DepEd that the approved sample has enough quantity to supply the requirement of the agency.
- The approved sample is not for phase-out for the next 5 years and not end of life.
- Change of samples during the Pre-Delivery Inspection is not allowed.
- Shall make sure that complete set of delivery documents (Master Packing List (MPL), Delivery Receipt (DR), Inspection and Acceptance Report (IAR), Quality Receiver and Test Questionnaire (QRTQ), and Property Transfer Receipt (PTR)) is packed in a tightly sealed plastic pouch and placed inside in (1) one of the delivery boxes or hand carried by the forwarder/supplier's representative.
- Shall pick-up the PIU Delivery Documents (IAR and QRTQ) from BLR Cebu Office while the PTR from DepEd Central Office – Asset Management Division that shall be distributed in one (1) complete set of Delivery Documents to:
  a) Recipient School – (IAR, QRTQ, and PTR)
  b) Third-Party – (IAR)
  c) Schools Division Office – (IAR)
  d) Regional Office – (IAR)
  e) DepEd Central Office Accounting/COA – (IAR, and PTR)
  f) DepEd Central Office Asset Management Division – (IAR, and PTR)
  g) BLR Cebu – (IAR, QRTQ)
  h) One copy to be retained by the Supplier – (MPL, DR, IAR, QRTQ)

- Make sure that all the Delivery Documents for each receiving office are properly and duly signed by the authorized signatories.
- Prepares (6) copies each of the Delivery Receipt and Master Packing List with corresponding Contract Number and distributes accordingly:

  a) Recipient School – (MPL, DR)

  b) Schools Division Office – (MPL, DR)

  c) DepEd Central Office Accounting/COA (original) – (MPL, DR)

  d) DepEd Central Office Asset Management Division – (MPL, DR)

  e) BLR Cebu – (MPL, DR)

  f) One copy to be retained by the Supplier – (MPL, DR)
- Make sure that the Goods to be delivered to the recipient schools conform to the requirements of the contract and passed the DepEd's Quality Control Inspection

DEPED's RESPONSIBILITIES:
PROCUREMENT MANAGEMENT SERVICE (ProcMS) and CONTRACT MANAGEMENT DIVISION (CMD)

- The Office of the Procurement Management Service through Contract Management Division shall form an Inspectorate Team from the CO Pool of Inspectors.
- The Office, through the Contract Management Division (CMD) shall issue an Inspection Order directing the team to conduct an inspection for a specific project and providing, among others, the date and time of inspection, inspection site, brief description, and quantity of goods to be inspected and special instructions, if any.
- CMD and BLR Cebu, coordinates with the Supplier in implementing the final schedule of the Pre-Delivery Inspection and delivery.
- The Contract Management Division (CMD) and Asset Management Division (AMD) deploys the DepEd Quality Control Inspectors who shall conduct the Pre-Delivery Inspection at the Supplier's warehouse in the Philippines at most two weeks (14 days) after the receipt of the Request for Pre-Delivery Inspection.
- Send a Notice of Delivery to the RO/SDO/School. The detailed technical specifications of the items, as appearing or indicated in the IAR, shall be attached to the said notice.

PROJECT IMPLEMENTING UNIT (PIU) and CO INISPECTOR

- Evaluates and approves submitted sample training video by the supplier.
- The DepEd CO Inspector shall only inspect the goods as indicated in the Supplier's Request for Pre-Delivery Inspection.
- DepEd CO Inspector shall seal the package for delivery by affixing their signatures on the packaging/sealing tapes.
- The DepEd CO Inspectors shall monitor that no rejected Goods shall be included in the packages that shall be delivered to the schools.
- Provide Recipient Schools with the tentative schedule of the delivery, copies of the Technical Specification and Test & Inspection Protocol and the Google Form link(s) for uploading of the signed delivery documents and digital pictures.

- BLR Cebu Office prepares Delivery Documents (IAR and QRTQ) while DepEd Central Office – Asset Management Division prepares the PTR to be picked up by the supplier

DELIVERY:
SUPPLIER

- The Supplier/Forwarder shall make sure that the packages of the procured Goods and the corresponding delivery documents, as per contract of this project that passed the Pre-Distribution Inspection, shall be delivered to the recipient schools. No payment shall be made for incomplete delivery and/or wrong delivery to non-recipient schools.
- Delivery shall be done on weekdays (Monday – Friday) only during office hours.
- Delivery to recipient schools must observe the submitted delivery schedule by the Supplier to the PIU.
- Informs the School Head of the recipient school or his/her authorized representative three (3) calendar days before the arrival of the Goods at the school to ensure the presence of the authorized receiving personnel and the Third-Party Monitor.
- If delays shall occur due to the natural calamities or man-made interference, the incident shall be properly documented. The Supplier/Forwarder shall obtain certification from the concerned government entity attesting to the cited conditions that caused delay of the delivery, a copy of which shall be part of the set of delivery documents that shall be submitted to BLR Cebu and DepEd Central Office.
- Shall make sure that all the delivery documents are properly accomplished, accounted, and signed by the authorized receiving personnel of recipient schools and the third-party monitors.
- Shall give copy of the duly accomplished one (1) complete set of Delivery Documents to:
  a) Recipient School – (MPL, DR, IAR, QRTQ, and PTR)
  b) Third-Party – (IAR)
  c) Schools Division Office – (MPL, DR, IAR)
  d) Regional Office – (IAR)
  e) DepEd Central Office Accounting/COA (original) – (MPL, DR, IAR, and PTR)
  f) DepEd Central Office Asset Management Division – (MPL, DR, IAR, and PTR)
  g) BLR Cebu – (MPL, DR, IAR, QRTQ)
  h) One copy to be retained by the Supplier – (MPL, DR, IAR, QRTQ)

RECEIVING: INVENTORY/INSPECTION/ACCEPTANCE:

RECIPIENT SCHOOL

- The Inspection and Acceptance Team of the recipient school of which the members are designated by the school head, together with the Third-Party Monitors (Barangay Officials, PTCA, NGOs, etc.), shall conduct inventory.
- Pursuant to DepEd Order No. 42 series of 2018, the members of the Inspectorate Team shall conduct inspection of the Goods and properly and legibly accomplish and sign the inspection portion of the IAR while the Property Custodian shall accomplish and sign the acceptance portion of the IAR only after the Inspectorate Team have signed the inspection portion.

- The Property Custodian/Supply Officer shall retain the accomplished and signed School Copy of the MPL, DR, IAR, QRTQ, and PTR.
- The Property Custodian/Supply Officer shall give back the remaining copies to the Supplier/Forwarder who shall distributed them to the concerned offices.
- School Head shall ensure that the Property Custodian and the members of the Inspectorate Team shall be available during the delivery.
- To ensure the quality and correctness of the delivered Goods, the School Inspectorate and Acceptance Team shall reject/not accept delivery with broken seal or open package.

PROJECT IMPLEMENTING UNIT (PIU)

- Shall monitor the actual delivery of the Goods to the Recipient Schools.

TO BE ACCOMPLISHED BY SCHOOL INSPECTION TEAM
Government Forms/Documents:

a) Inspection and Acceptance Report (IAR) **eight (8) copies** – Copy distribution: Recipient School and Third-Party Monitor, Schools Division Office, Regional Office, DepEd Central Office: Asset Management Division and Accounting / COA (original copy), BLR Cebu, Supplier. The Inspection and Acceptance Report (IAR) shall be signed by the School Inspectorate Team and the Property Custodian pursuant to DepEd Order No. 42 series of 2018. The Third-Party Monitor shall sign the IAR as witness to the delivery.

b) Quality Receiver Test Questionnaire (QRTQ) **three (3) copies** Copy distribution: DepEd Central Office Asset Management Division, BLR-Cebu (original copy) and Supplier. This document shall manifest any damage and breakage on the Goods delivered. It shall serve as basis for any claim to repair or replace the broken, damaged, defective or missing goods during delivery.

c) Property Transfer Report (PTR) **two (2) copies** - it shall document the transfer of property from DepEd Central Office to the Recipient School. To be signed by the School Head or his/her authorized representative, as the Procuring Entity's representative at the Project Site or Drop-off Point. Copy distribution: DepEd Central Office Asset Management Division (original copy) and the Recipient School.

The signatories of the IAR are the members of the School Inspection and Acceptance Team designated by the School Head composed of the following:

School Inspection Acceptance Team (SIT)
Inspection Aspect:
a. Team Leader who is at least 2nd ranking official of the recipient school
b. Two inspectors, a science and/or mathematics teachers who are knowledgeable of the delivered goods.
Acceptance Aspect:
c. School Property Custodian/Supply Officer or Authorized Representative
Third Party Monitors:
d. Civil Society Organization/NGO/PTCA/Barangay Official, etc

(Note: The School Head shall facilitate the invitation of the Third-Party Monitors and ensure their presence on the delivery schedule)

For further instruction and implementation of the Inspection and Acceptance of Goods, refer to the Department Order 41, series of 2021 entitled **"Inspection and Acceptance Protocols for the Procurement of Goods in the Department of Education".**

Minimum Equipment and Tools Requirements

Minimum Equipment and Tools requirements for mass production shall be inspected during post-qualification. Compliance is one of the requirements in awarding the Mass Production contract.

A. For the production of Science and Math Equipment

No.	Particulars	Capacity	Quantity
1A	CNC Lathe Machine	Max Swing Over Bed: 500mm; Max Length of Workpiece: 1,500mm	1 unit
2A	CNC Universal Milling Machine	X-Axis Travel: 700mmY- Axis Travel: 300mm Z-Axis Travel: 300mm	1 unit
3A	Metal Stamping Machine	60 Tons	2 units
4A	Die Casting Machine		1 unit
5A	Resistance (Spot) Welding Machine	Welds up to 3mm thick	1 unit
6A	Drilling Machine: Bench or Pillar Type Portable Electric Drill		 2 units 3 units
7A	Angle or Straight Portable Grinder		3 units
8A	Power Hacksaw	175mm maximum cut	1 unit
9A	Welding Machine (SMAW)	200 Amperes	2 units
10A	Power Press	50 Tons	1 unit
11A	Assorted Hand Tools		1 lot
	Measuring Instruments		
12A	Outside Micrometer	0-25mm 25-50mm	2 units 2 units
13A	Vernier Caliper	150mm	4 pcs
14A	Thread Gage Metric		2 units
15A	Precision Square	200mm x 130mm	2 units
16A	Torque Wrench	0 - 75 in-lb	1unit
17A	Force Gauge	0 - 10 Newton	1 unit

B. For the Manufacturing of Steel Cabinet

No.	Particulars	Capacity	Quantity

1B	Metal Stamping Machine	60 tons	2 units
2B	Metal Sheet Bending Machine (Folding Machine)	Bending Capacity: 3mm thick x 2,250mm long	1 unit
3B	Plate Shearing Machine	Shearing Length: 2,500mm	1 unit
4B	Drilling Machines: Bench or Pillar Type Portable		2 units 3 units
3B	Resistance Welding Machine	Welds up to 3mm thick	3 units
4B	Portable Angle or Straight Grinder		3 units
5B	Submerge Arc Welding Machine	200 Amperes	2 units
6B	Gas Welding (Oxygen and Acetylene) Machine with Accessories		2 units
7B	Tungsten Inert Gas (TIG) Welding Machine		1 unit
8B	Powder Coating Complete Facilities (Painting) includes preparation, cleaning to finishing facilities		1 lot
9B	Assorted Hand Tools such as Hammers,Screw Driver Set, etc		1 lot
	Measuring Instruments:		
10B	Steel Tape Roll	6 meters	3 pcs
11B	Tri-square		2 pcs

C. For the Manufacturing of Plastic Parts

No.	Particulars	Capacity	Quantity
1C	Plastic Injection Machine (Big)	500 tons	1 unit
2C	Plastic Injection Machine (Small)	100 tons	1 unit
	Measuring Instruments:		
3C	Vernier Caliper	150 mm	2 units
4C	Steel Tape Roll	3 meters	

D. For the Manufacturing of Power Supply and Set of Coil

No.	Particulars	Capacity	Quantity
1E	Rewinding Machine with Counter		10 units.
2E	Bench Vise		5 pcs
3E	Soldering Iron / Gun		10 units
4E	Universal Milling Machine		1 unit
5E	Plastic Injection Machine	100 tons	1 unit
6E	Portable Electric Grinder		3 units
7E	Bench Grinder		1 unit
8E	Metal Stamping Machine	60 tons	1 unit
9E	Metal Sheet Bending Machine (Folding Machine)	Bending Capacity: 3mm thick x 1,500mm long	1 unit
10E	Plate Shearing Machine	Shearing Length: 1,500	1 unit

		mm	
	Hand Tools		
11E	Diagonal Cutter Pliers		5 pcs
12E	Long Bose Pliers		10 pcs
13E	Flat Screw Driver		10 sets
14E	Philip Screw Driver		10 sets
15E	Ball pen Hammer		10 pcs
16E	Side Cutter Pliers		10 pcs
17E	Round File		5 pcs
18E	Flat File		5 pcs.
19E	Knife		5 pcs
20E	Extension Cord with 5 gangs Universal Outlet		4 sets
	Measuring /Testing Instruments		
20E	Vernier Caliper	150 mm	5 pcs
21E	Steel tape Roll	3 meters	2 pcs
22E	Tri-Square		5 pcs
23E	Analog Multi-Tester		5 pcs
24E	Halogen Bulb with Socket and wire and banana plug	50 watts, 12 volts	20 pcs
25E	Dial-Type Thermometer		10 pcs.
26E	Digital C-clamp Meter		2 units