

Integrated Science
Laboratory Report format/ Guidelines
2015-2016

**A GUIDE CREATED TO EFFECTIVELY PREPARE STUDENTS TO COMPLETE THE INTEGRATED SCIENCE
SCHOOL BASED ASSESSMENT WHILE MEETING ALL CRITERIA SET BY CXC.**

List of experiments to be completed:

YEAR 01		
Topic	Experiment Number	Skills
Production and growth	1. Investigating which direction young shoots grow.	ORR, MM
Food and Nutrition	Food tests: 2. To test samples of food for the presence of Fats, Starch, Reducing sugar and Non-Reducing Sugar.	ORR, AI
Circulation	3. To investigate osmosis in potatoes. 4. To observe diffusion in a solution.	ORR,AI
Respiration and Excretion.	5. To draw and label the external features of a fish's gill. 6. To draw and label the external features of a sheep's kidney.	Dr Dr
Coordination.	7. To draw and label the external features of the cow's eye	Dr
Temperature Control.	8. To investigate conduction, convection and radiation in matter	ORR, MM
Aquatic Environment.	9. To investigate whether sea water contains salt.	-
Sanitation.	10. To determine rate of mould growth on bread in different environment.	
Generated Energy.	11. To effectively wired a three pin plug	MM
Materials, Chemicals	12. To investigate the pH of common household chemicals using universal indicator 13. To investigate paper chromatography of black ink.	MM
YEAR 02		
Terrestrial Environment.	14. To calculate the population of various organisms in the school's garden using a quadrant. 15. To draw a soil profile	AI Dr.
Sports	16. To determine the effects of exercise on pulse rate.	AI
Energy, Forces	17. To determine the location of the center of gravity an irregular shaped lamina.	-
Audio and Visual Activities.	18. To observe the colour spectrum through a glass prism	
Earth Movements	19. To construct a simple seismograph to record earth movement.	
Planning and Designing	20. Students were given large bean seeds and small bean seeds. They were asked which, of the two kinds, would produce healthier seedlings.	PD

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Planning and Designing	21. Integrated Science students were introduced to the topic of digestion and in relation, the enzymes present. Properties of enzymes were also discussed. Amylase was among the enzymes mentioned and students were asked whether this enzyme would be most efficient, in the breakdown of starch, at a pH that is acidic or one that is basic.	PD
Planning and Designing	22. Grade 10 students were asked, out of synthetic fiber and natural fiber, which will dry faster on addition of water.	PD

FORMAT OF EXPERIMENTAL WRITE UP:

1. Title
2. Aim
3. Background
4. Materials/Apparatus
5. Diagram
6. Method (Past tense always except for Planning and Design experiments)
7. Observations/results.
8. Discussion
9. Sources of Error
10. Precautions (MUST BE PRESENT FOR ALL AI SKILLS)
11. Conclusion.

FORMAT OF PLAN & DESIGN EXPERIMENTAL WRITE UP:

1. Title
2. Aim
3. Background
4. Materials/Apparatus
5. Diagram
6. Variables –
 - a) **Controlled** - The control variable is something that is constant and unchanged in an experiment.
 - b) **Manipulating**- An independent variable that is manipulated to achieve a particular effect or tested to determine if it is the cause of the effect.
 - c) **Responding** - A responding **variable** is a value of measure that came from the manipulated and controlled **variables**, more so the results of the experiment.
7. Method (Past tense always except for Planning and Design experiments)
8. Observations/results.
9. Discussion
10. Precaution
11. Sources of Error
12. Limitations - something that limits a quality or achievement.
13. Conclusion.

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Front cover should include the following:

Caribbean Examination Council
(CXC)

School Based Assessment
(SBA)

Year of Examination:

Name of candidate:

Centre number: 090019

Subject:

School:

Name of teacher:

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Experiment number: 1

Skills: ORR, MM

Title: Production and Growth

Aim: To measure the growth of a black eye bean plant over a three weeks period.

Background information: (to be done by student)

Apparatus/Materials: a healthy young black eye bean plant (or any other young healthy plant), a ruler.

Diagram:

Procedure:

1. Create a suitable table to record all measurements.
2. Measure the height of the plant in centimetres (cm) now. Record your measurement as 'Day 0'.
3. Measure the height of the plant every day for a two-week period. Ensure plant is watered every day.
4. Plot a line graph of your results.
5. Look carefully at your plant at the end of the three-week period. How is it different from the start of the period? Can you think why your measurements might not represent all of the plant growth over the three-week period?

Observations/Results.

Days of measurement	Height of plant (cm)
0	
1	
2	
3	
4	
Etc.	

Table showing observations of results.

Discussion:

1. What is growth?
2. (Follow marking scheme criteria)

Sources of errors:

Conclusion: (related to aim)

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Marking Scheme for Experiment number 01.

Title: Production and Growth

Aim: To measure the growth of a black eye bean plant over a three weeks period.

Skill: ORR, MM

ORR		
Criteria	Marks allotted	Marks attained
Presentation of aim, apparatus, materials, procedure, method, observation, discussion and conclusion in a logical sequence.	2	
Explain what your observation tells you about the behavior of plant growth.	2	
Discuss how the plant growth is different from the start of the period.	2	
Why was it important to water the plant regularly?	2	
Appropriate conclusion.	2	
TOTAL	10	

MM		
Criteria	Marks allotted	Marks attained
A healthy young plant was used.	2	
Growth was observed diligently for a two week period.	2	
Observations were appropriately recorded in a table.	2	
Plant was watered regularly.	2	
Carry out all steps outlined.	2	
TOTAL	10	

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Experiment number: 02

Skills: ORR, AI

Title: Food and Nutrition

Aim: To test samples of food for the presence of Fats, Starch, Reducing sugar, Non-Reducing Sugar and protein.

Background information: (to be done by student)

Apparatus/Materials:

(For the presence of fats) – Alcohol, distilled water, test tubes, and samples of food to be tested.

(For the presence of starch)- Iodine, pipette, petri dishes, samples of food to be tested.

(For the presence of reducing sugars) – Benedict solution, samples of food to be tested.

(For the presence of non- reducing sugar)- Hydrochloric acid, hydrogen carbonate, benedict solution, heat source, samples of food to be tested.

(For the presence of protein) – Sodium hydroxide, copper sulphate solution, samples of food to be tested.

Diagram:

Procedure:

For the presence of fats:

1. Chop up small amounts of food to be tested, and put some into a clean test tube. Add some alcohol. Shake it thoroughly.
2. Put some distilled water into another test tube.
3. Pour some of the liquid part, but not any solid, from the first tube into the water. (A milky appearance shows that there is fat in the food).

Observation/Results

Food samples	Milky appearance	No observable change noted	Notes

Table showing observations of results.

Discussion: (Check marking scheme for guide).

(Must include names of food samples that contain fat and those that does not)

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For the presence of starch:

1. Put a small piece of food onto a white tile.
2. Add a drop or two of iodine solution. (Iodine solution is brown, but it turns bluish black if there is starch in the food).

Observation/Results

Food samples	Bluish- black colour change observed.	No observable change noted	Notes

Table showing observations of results

Discussion: (Check marking scheme for guide).

(Must include names of food samples that contain starch and those that does not)

For the presence of reducing sugar (Simple sugar):

1. Cut or grind food sample into small pieces. Put these into a test tube. Add some water, and shake it up to try to dissolve it.
2. Add some benedict solution. (Benedict solution is blue, because it contains copper salts).
3. Boil the solution. (If there is any reduced sugar in the food, the benedict's solution will turn orange-red)

Observation/Results

Food samples	Orange-red colour change observed.	No observable change noted	Notes

Table showing observations of results

Discussion: (Check marking scheme for guide).

(Must include names of food samples that contain reducing sugars and those that does not)

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For the presence of non-reducing sugar (complex sugar):

Complex sugars, such as sucrose, are not reducing sugars, so they will not turn Benedict's solution red. To test for them, you first have to break them down to simple sugars. Then you must do the Benedict's test.

1. Make a solution of the food to be tested.
2. Do the simple sugar test, to check that there is no reducing sugar in the food.
3. Boil a fresh tube of food solution with hydrochloric acid. (This breaks apart each complex sugar molecule into two simple sugar molecules)
4. Add sodium hydrogen carbonate solution until the contents stop fizzing to neutralize any left – over hydrochloric acid in the tube.
5. Now add Benedict's solution and boil. A red colour shows that there is now reducing sugar in the food which was produced from non-reducing sugar.

Observation/Results

Food samples	Colour change after doing simple sugar test.	Colour change after boiling food solution with hydrochloric acid, neutralizing it with sodium hydrogen carbonate, and then adding Benedict's solution.	Notes

Table showing observations of results

Discussion: (Check marking scheme for guide).

(Must include names of food samples that non-reducing sugars and those that does not)

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For the presence of protein (The Biuret Test):

1. Put food sample into a test tube, and add a little water.
2. Add some sodium hydroxide solution.
3. Add two drops of copper sulphate solution.
4. Shake the tube gently. (If a purple colour change appears, then there is protein present).

Observation/Results

Food samples	Purple colour change observed.	No observable change noted	Notes

Table showing observations of results

Discussion: (Check marking scheme for guide).

(Must include names of food samples that contain protein and those that does not)

Sources of errors: (-e.g. human reaction time)

Precaution

Conclusion: (related to all aims)

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Marking Scheme for Experiment number 02.

Title: Food and Nutrition

Aim: To test samples of food for the presence of Fats, Starch, Reducing sugar, Non-Reducing Sugar and protein.

Skill: ORR, AI

ORR		
Criteria	Marks allotted	Marks attained
Presentation of aim, apparatus, materials, procedure, method, observation, discussion and conclusion in a logical sequence.	2	
Explain what your observation tells you about the colour change seen in each food test.	2	
Sections accurately named according to various food tests.	2	
Correct terminology and expression	2	
Appropriate conclusion for all food tests.	2	
TOTAL	10	

AI		
Criteria	Marks allotted	Marks attained
Accurately identifies function of the various food nutrients being tested in the body.	2	
At least one source of error and at least one precaution.	2	
Discuss why food solution was boiled with hydrochloric acid while testing for non- reducing sugar	2	
Why sodium hydrogen carbonate was added to the solution after the food solution was boiled with hydrochloric acid.	2	
Carry out all steps outlined.	2	
TOTAL	10	

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Experiment number: 03

Skills: ORR, AI

Title: Circulation

Aim: To investigate osmosis in potatoes.

Background information: (to be done by student)

Apparatus/Materials: a piece of potato, a scalpel, a white tile, two test tubes, a strong salt solution, distilled water, access to a balance.

Diagram:

Procedure:

1. Label one test tube 'salt solution' and the other 'distilled water'
2. Half-filled each with the correct liquid.
3. On the white tile, trim two pieces of potatoes to the same size (about 5cm x 1cm x 1cm). Roll them on paper towels to dry the surface.
4. Weigh each and make a note of the mass in a table like the one shown.

	Salt solution	Distilled water
Mass at start (g)		
Mass at end (g)		
Change in mass (g)		

5. Place one piece of potato in each test tube.
6. Leave for overnight.
7. Remove the pieces of potato and roll them on a paper towel to dry the surface.
8. Re-weigh the pieces of potato and make a note of their masses.
9. Calculate the changes in mass.
10. Explain your results using the ideas of water gain or water loss by osmosis.

Observation:

	Salt solution	Distilled water
Mass at start (g)		
Mass at end (g)		
Change in mass (g)		

Discussion: (definition for osmosis)

(Check marking scheme for guide).

Sources of errors: (-e.g. human reaction time)

Precaution

Conclusion: (related to aim)

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Marking Scheme for Experiment number 03.

Title: Circulation

Aim: To investigate osmosis in potatoes.

Skill: ORR, AI

ORR		
Criteria	Marks allotted	Marks attained
Presentation of aim, apparatus, materials, procedure, method, observation, discussion and conclusion in a logical sequence.	2	
Explain what your observation tells you about the concept of osmosis	2	
Test tubes labelled accurately.	2	
Correct terminology and expression	2	
Appropriate conclusion.	2	
TOTAL	10	

AI		
Criteria	Marks allotted	Marks attained
Accurately measure mass of potato in salt solution.	2	
Accurately measure mass of potato in distilled water.	2	
Accurately calculate change in mass of both strips of potatoes.	2	
Discuss the changes of masses between the potatoes.	2	
Carry out all steps outlined.	2	
TOTAL	10	

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Experiment number: 04

Title: Circulation

Aim: To show diffusion in a solution.

Background information: (to be done by student)

Apparatus/Materials: gas jar, distilled water, potassium permanganate.

Diagram:

Procedure:

1. Fill a gas jar with water. Leave for several hours to let it become completely still.
2. Drop a small crystal of potassium permanganate into the water.
3. Make a labelled diagram of the gas jar to show how the colour is distributed.
4. Leave the gas jar completely undisturbed for 3 hours.
5. Make all observations and make a second drawing to show how the colour is distributed.

Observations.

Discussion:

- What is diffusion?
- Why is it important to leave the water to become completely still before the crystal was put in?
- Why had the colour spread through the water at the end of your experiment?
- (Check marking scheme for guide).

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Experiment number: 05

Skill: DR

Title: Respiration & Excretion

Aim: To draw and label the external features of a fish's gill.

Background information: (to be done by student)

Apparatus/Materials: fish's gill, white tile, paper, pencil, sharpener.

Diagram:

Procedure:

1. Obtain a fish's gill
2. Place gill on white tile.
3. Observe the fish's gill closely.
4. Draw fish's gill.
5. State view and magnification.

Discussion:

- Features of the gill
- How gaseous exchange occurs

Conclusion: (related to aim)

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Marking Scheme for Experiment number 05.

Title: Respiration & Excretion

Aim: To draw and label the external features of a fish's gill.

Skill: Dr

Dr		
Criteria	Marks allotted	Marks attained
Drawing of fish's gill and must be large.	2	
Use clear lines, no sketching, no double lines.	2	
Title adequately stated for drawing.	1	
Drawings are two dimensional.	1	
Appropriate annotations on each drawing.	1	
Magnification of drawing stated correctly.	2	
View of each drawing stated correctly.	1	
TOTAL	10	

Experiment number: 06

Skill: DR

Title: Respiration & Excretion

Aim: To draw and label the external features of a sheep's kidney.

Background information: (to be done by student)

Apparatus/Materials: sheep's kidney, white tile, paper, pencil, sharpener.

Diagram:

Procedure:

1. Obtain a sheep's kidney
2. Place sheep's kidney on white tile.
3. Observe the sheep's kidney closely.
4. Draw sheep's kidney.
5. State view and magnification.

Discussion:

- Features of the sheep's kidney
- How sheep's kidney aid in filtering the blood

Conclusion: (related to aim)

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Marking Scheme for Experiment number 06.

Title: Respiration & Excretion

Aim: To draw and label the external features of a sheep's kidney.

Skill: Dr

Dr		
Criteria	Marks allotted	Marks attained
Drawing of sheep's kidney must be large.	2	
Use clear lines, no sketching, no double lines.	2	
Title adequately stated for drawing.	1	
Drawings are two dimensional.	1	
Appropriate annotations on each drawing.	1	
Magnification of drawing stated correctly.	2	
View of each drawing stated correctly.	1	
TOTAL	10	

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Experiment number: 07

Skill: DR

Title: Coordination

Aim: To draw and label the external features of cow's eye.

Background information: (to be done by student)

Apparatus/Materials: cow's eye, white tile, paper, pencil, sharpener.

Diagram:

Procedure:

1. Obtain a cow's eye
2. Place cow's eye on white tile.
3. Observe the cow's eye closely.
4. Draw cow's eye.
5. State view and magnification.

Discussion:

- Features of the cow's eye
- How cow's eye aid in coordination.

Conclusion: (related to aim)

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Marking Scheme for Experiment number 07.

Title: Coordination

Aim: To draw and label the external features of cow's eye.

Skill: Dr

Dr		
Criteria	Marks allotted	Marks attained
Drawing of cow's eye must be large.	2	
Use clear lines, no sketching, no double lines.	2	
Title adequately stated for drawing.	1	
Drawings are two dimensional.	1	
Appropriate annotations on each drawing.	1	
Magnification of drawing stated correctly.	2	
View of each drawing stated correctly.	1	
TOTAL	10	

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LAB # 8

Title: Temperature Control

Skills: ORR, MM

Aim: To investigate conduction, convection and radiation in matter

Materials: Bunsen burner, Tripod stand, Beaker, Water, Clamp and stand, Candle wax, Match stick, Potassium permanganate (KMnO_4), Microwave, Stopwatch, Food sample, Metal rod

Diagrams (To be based on laboratory setup of apparatus)

Method

1. Gather materials
2. Setup apparatus as shown in diagram
3. Put water to boil
4. When water is almost boiling, drop two dipper of potassium permanganate into water and start stopwatch.
5. Record your observation
6. Setup apparatus to carry out conduction experiment
7. Stick four matchsticks on to metal rod, 4 cm apart from each other with at least a distance of 15 cm away from flame
8. Light Bunsen burner directly under one end of metal rod.
9. Start stop watch
10. Record your observation
11. Connect microwave to power outlet
12. Put food sample in microwave and observe what happens through class window.

Observations/ Results

(Should include table with results. Record of observations)

Discussion

1. What is conduction, convection and radiation
2. Explain the difference between the three named above at 1.
3. Discuss why the potassium permanganate forms a circular motion in the water.
4. Discuss why the matchsticks falls off after certain time.
5. Discuss what makes the food sample in the microwave to cook.

Variables

- Responding Variable
- Manipulating Variable
- Control Variable

Conclusion: Should reflect **results** supporting **aim** in the process.

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Marking Scheme for Experiment number 08.

Title: Temperature Control

Aim: To investigate conduction, convection and radiation in matter

Skill: ORR, MM

MM		
Criteria	Marks allotted	Marks attained
Set up apparatus as shown in the diagram.	2	
Carry out all steps as outlined.	2	
Handle Bunsen burner carefully.	2	
Cautiously attach drawing pins.	2	
Utilize all materials throughout experiment.	2	
TOTAL	10	

ORR		
Criteria	Marks allotted	Marks attained
Presentation of aim, apparatus, materials, procedure, method, observation, discussion and conclusion in a logical sequence.	2	
Tabulate results in an appropriate table.	2	
Use of correct terminology in discussion.	2	
Use of correct practices in carrying out lab	2	
Table appropriately labelled.	2	
TOTAL	10	

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LAB # 9

Title: Aquatic Environment

Aim: To investigate whether seawater contains salt.

Materials: beaker, a watch-glass, sea water and tap water, Bunsen burner, tripod and gauze

Diagram: (Base on experimental set up?)

Procedure:

1. Arrange the equipment as shown in the diagram.
2. Place some sea water in the watch glass.
3. Boil the water in the beaker. The steam will heat the watch-glass and evaporate the water from the seawater.
4. When only a little water is left in the watch-glass, turn off the Bunsen burner.
5. Make all observations. (white rings of salt will appear on watch glass)

Observations/ results:

Discussion:

1. Explain the term evaporation.
2. Discuss how the salt affect the density of the sea water.
3. Explain, giving reasons for observation.

Variables

- Responding Variables
- Manipulating Variables
- Control Variables

Conclusion: (related to the aim)

LAB # 10

Title: Sanitation

Aim: To determine rate of mould growth on bread in different environment.

Materials:

- Three slices of bread
- Zip lock bags
- Fridge
- Open environment (counter top)
- Dark environment (cupboard)
- Magnifying glass

Diagram

Should at least reflect anyone of the setting in an environment

Method

1. Gather material
2. Place a slice of bread in each zip lock bag
3. Put one slice in the fridge, one on top of the counter and one in a dark cupboard.
4. Pierce at least five holes on one side of the bag to facilitate air to enter.
5. Leave slices for 72 hours.
6. Observe any mould growth with magnifying glass
7. Record all observation

Observation/Results

1. Should reflect observation in all three environment
2. Report of any mould growth
3. Appearance of bread slice before and after experiment.

Discussion

1. Explain what is sanitation
2. Define what is mould
3. Discuss the effect of environment on mould growth
4. Explain the presence of any mould growth and why is it in that particular environment(s).

Variables

- Responding Variables
- Manipulating Variables
- Control Variables

Conclusion: Should summarize which environment was mould growth more prevalent and in the process supporting the aim.

Lab # 11

Skill: MM

Title: Generated Energy

Aim: To effectively wired a three pin plug

Material:

- Wire strippers
- A small screwdriver
- A ruler
- Three pin plug and fuse correctly wired for reference

Diagram:

Diagram should display a typical three pin plug that was wired in the laboratory.

Method:

1. Gather all materials
2. Open the plug and make sure you know which colour goes where; now loosen the wires and remove them.
3. Check the lengths of the wire and how much copper metal is showing at the ends.
4. Put the plug back together and ask for it to be checked
5. Remove the wires again; prepare a new flex using the wire strippers
6. Put the plug together, but do not push it in the power socket.
7. Determine if the plug is wired correctly

Observation/Results:

Should highlight colour of wire and where they were connected to.

Discussion:

1. Explain the usage or presence of the different colour of wire/flex

Conclusion

Should reflex aim of the experiment

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Marking Scheme for Experiment number 11.

Title: Generated Energy

Aim: To effectively wired a three pin plug

Skill: MM

MM		
Criteria	Marks allotted	Marks attained
Set up apparatus as shown in the diagram.	2	
Carry out all steps as outlined.	2	
Wired plug effectively	2	
Use theoretical skills effectively	2	
Placing flex in correct order	2	
TOTAL	10	

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Lab # 12

Skill: MM

Title: Materials and Chemicals

Aim: to investigate the pH of common household chemicals using universal indicator

Materials: Test tube, Test tube racks, Droppers, Universal indicator solution or paper strips, Baking soda, Salt, Lemon juice, Toothpaste, Black coffee, Cabbage juice, Rain water

Diagram:

Diagram should reflect set up of apparatus/materials in laboratory.

Method:

1. Gather material
2. Measure out about 5 ml of one chemical into a test tube.
3. Add one or two drops of universal indicator to chemical and observe any colour change.
4. Repeat steps 1-2 for the remaining chemicals
5. Tabulate results on the following table
6. Record any other observations

Common Name	Chemical Name	Indicator Colour	pH number
Baking soda	Sodium hydrogen carbonate		
Salt	Sodium chloride		
Lemon juice	Citric acid		
Toothpaste	Mixture		
Black coffee	Mixture		
Cabbage juice	Mixture		
Rain water	Mixture		

Results/ Observation:

1. Completion of the above table
2. Colour changes observed
3. Description of chemicals used.

Discussion

1. What are acid, bases and salts
2. Define pH.
3. Discuss what the various colour changes indicates
4. Highlight the pH scale

Variables

(Responding Variables, Manipulating Variables, Controlled Variables)

Conclusion

Should reflect aim and result obtained from experiment.

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Marking Scheme for Experiment number 12.

Title: Materials and Chemicals

Aim: To investigate the pH of common household chemicals using universal indicator

Skill: MM

MM		
Criteria	Marks allotted	Marks attained
Set up apparatus as shown in the diagram.	2	
Carry out all steps as outlined.	2	
Dissolve food sample carefully in water.	2	
Use indicator with competency	2	
All food materials were utilized throughout experiment.	2	
TOTAL	10	

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Lab # 13

Title: Materials and Chemicals

Aim: To investigate paper chromatography of black ink.

Materials: Black ink, Clamp and stand, Filter paper, Water, Petri dish

Diagram:

Set up of apparatus/materials should be highlighted

Method

1. Gather all materials
2. Set up materials to carry out experiment
3. On filter paper mark two line with pencil-one indicating level of water paper submerged in and one indicating where ink drop will be located.
4. Submerged paper in water up to line one.
5. Record all observations in the following table

Colour(s) observed	Height colour travelled up paper (cm)	remarks

Results/Observation

1. Completed table
2. Any other observation

Discussion

1. Define what is paper chromatography
2. Explain what is meant by separating techniques
3. Explain the composition of the different colour in black ink.

Variables

- Manipulating Variables
- Controlled Variables
- Responding Variables

Conclusion

Should support aim in correlation with results

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Lab # 14

Skill: AI

Title: Terrestrial Environment

Aim: To calculate the population of various organisms in the school's garden using a quadrant.

Material: Quadrant, Magnifying glass, Observation sheet

Diagram: (Depicting quadrant layout in environment investigated).

Method

1. Gather all materials
2. Place quadrant in any random area in the environment investigated
3. Identify and count the number of organisms found in the enclosed quadrant.
4. Measure the total area of the area investigated
5. Calculate using the data obtained from the quadrant to calculate the total number of organisms in the area.
6. Record all observations on the following table

Name of organism	Number of organism	Total area of the environment investigated	Total number of organism in area investigated	Description of organism

Observations/ Results

1. Complete the above table
2. Show all calculations
3. Compare the population of each organisms on a bar chart.
4. Any other observation

Discussion

1. Define the following terms: Population, Ecosystem, Community, Quadrant
2. Explain the trend in the graph
3. Explain observable characteristics that can affect the population of the organisms in an environment.

Sources of Errors: (To be completed by students)

Variables: Manipulating Variables, Controlled Variables, Responding Variables

Conclusion

To reflect aim of experiment and results obtained

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Marking Scheme for Experiment number 14.

Title: Terrestrial Environment

Aim: To calculate the population of various organisms in the school's garden using a quadrant.

Skill: AI

AI		
Criteria	Marks allotted	Marks attained
Accurately record # of organisms.	2	
Accurately calculate total area investigated.	2	
Correctly describe organisms.	2	
Appropriate use of the quadrat.	2	
Carry out all steps outlined.	2	
TOTAL	10	

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Lab # 15

Skill: Dr.

Title: Terrestrial Environment

Aim: To draw a soil profile

Material:

- Representation of a soil profile

Diagram

Should depict soil profile observed in lab **and no other representation.**

Method

1. Collect a typical representation of a soil profile
2. Carefully observe all the features of the soil profile and draw same

Results/Observation

Highlighting observable characteristics of the soil profile

Discussion

1. What is a soil profile
2. Identify the various components in a soil profile
3. Clearly state the horizons in a soil profile

Conclusion

Reflection of aim in correlation of observation should be stated.

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Marking Scheme for Experiment number 15.

Title: Terrestrial Environment

Aim: To draw a soil profile

Skill: DR

DR		
Criteria	Marks allotted	Marks Obtained
Drawing of soil profile must be large.	2	
Use clear lines, no sketching, no double lines.	2	
Title adequately stated for drawing.	1	
Drawings are two dimensional.	1	
Appropriate annotations on drawing.	1	
Magnification of drawing stated correctly.	2	
View of drawing stated correctly.	1	
TOTAL	10	

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Lab # 16

Skill: AI.

Title: Sports

Aim: To determine the effect of exercise on pulse rate

Background information: (to be done by student)

Apparatus/Materials: paper, pen and stopwatch

Procedure:

- 1) Take the pulse rate for an individual for one minute while relaxing.
- 2) Engage in physical exercise for two minutes and take the pulse rate again for one minute.
- 3) Take the pulse rate for five more individuals before and after exercise.
- 4) Make and record your observations.

Observations:

Table of results

<u>Name of student</u>	<u>Pulse rate per minute</u>	
	<u>Before exercise</u>	<u>After exercise</u>

Discussion

-Define physical exercise

-define pulse rate

-give at least 5 benefits of exercise

-Interpretation of graph: explanation as to why pulse rate increase after exercise and comparison of pulse rates

Sources of errors

-e.g. human reaction time

Conclusion (related to aim)

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Marking Scheme for Experiment number for Lab # 16

Skill: AI.

Title: Sports

Aim: To determine the effect of exercise on pulse rate

Criteria	Marks	Marks awarded
Comparison of pulse rate before and after exercise	2	
Having more than 4 test person	2	
At least 5 benefits of exercise	2	
Explanation as to why pulse rate increases after exercise.	4	
Total	10	

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Lab # 17

Title: Energy, Forces

Aim: To determine the location of the center of gravity of an irregular shaped lamina

Background Information:

Materials and apparatus: plumb line, rubber bung, cardboard, retort stand, pencil, ruler, perforator and nail.

Procedure

- 1) Cut an irregularly shaped lamina using a cardboard.
- 2) Make three dots on the circumference of the lamina with a pencil
- 3) Use a perforator to perforate where the dots are located.
- 4) Place the head of the nail in the clamp of the retort stand. Tighten the clamp and make sure the nail is horizontal. There should be at least 1cm of the nail protruding from the clamp.
- 5) Hang the lamina on the nail, using one of the three holes and allow it to swing freely until it comes to rest.
- 6) Make a loop at the free end of the pendulum and slip the loop over the projecting end of the nail so that the pendulum almost touches the lamina.
- 7) Make a pencil mark on the lamina just behind the string, as far as possible away from the hole.
- 8) Remove the lamina from its support. Join the hole just used to the pencil mark just made.
- 9) Repeat steps 5-8 for the second and the third hole, respectively.

Diagram:

Observation

1. Lamina should be attached for reference

Discussion

1. Define what is Centre of gravity
2. Explain the relationship between Centre of gravity and forces.
3. Discuss the effect of a body Centre of gravity on it.

Conclusion

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Lab # 18

Title: Audio and Visual Activities

Aim: To observe the colour spectrum through a glass prism

Background Information:

Apparatus and materials: glass prism with angles 60 degree, opaque screen with a small narrow slit, strong distant light source and a white screen.

Procedure

- 1) Allow light from the source to pass through the slit in the opaque sheet onto the prism.
- 2) Place the screen in position and adjust it so that it is roughly perpendicular to the emergent rays.
- 3) Make observations.

Diagram

Observations

1. Highlighting colours observed

Discussion

1. Define what is dispersion
2. Explain what is meant by refraction
3. Identify the seven colours dispersed from the prism

Conclusion

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Lab # 19

Title: Earth Movements

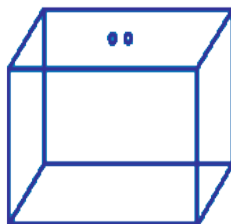
Aim: To construct a simple seismograph to record earth movement.

Background Information: Do you know what a seismometer is? It's a machine that shows earthquakes or other movement.

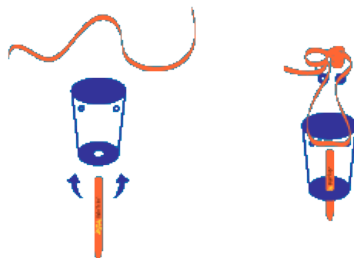
Apparatus and materials: cardboard box with the flaps cut off, plastic cup, felt tip marker, string, cup of small rocks, marbles, or bolts, clay, paper, scissors.

Procedure

1. First, take a box and open the top. Cut off the flaps and turn the box so the open side faces you.
2. Using scissors, poke two holes next to each other in the center of the top of the box. You may want to ask an adult to help with the scissors.

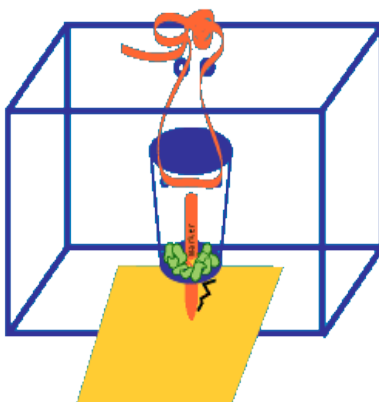


5. Poke one hole in the center of the bottom of the plastic cup, one hole along the rim of the cup, and another hole exactly opposite that hole.
6. Put the marker through the hole in the center of the bottom of the cup. The writing end should be sticking out of the bottom of the cup.
7. Put some clay around the hole so that the marker won't move.
8. Cut a 45cm piece of string (although if you have a bigger box, you may need a longer piece) and thread it through the two holes along the rim of the cup.



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9. Then, thread the string through the holes in the box, so that both ends of the string are equally in the box. Tie the ends on top of the box.
10. Fill the cup 3/4 of the way with something that'll weigh the cup down. You can put anything in the cup to weigh it down-marbles, bolts, rocks, anything heavy will work.
11. Cut a strip of paper that's as long as the box and approximately 5 inches wide.
12. Put one end of the paper under the marker. Take the cap off the marker and make sure that it sticks out of the cup far enough so it touches the paper.
13. Now have someone shake the box right and left while someone pulls the paper forward. If you do this right, you should get a squiggly line on the paper.



The more you shake the box, the wider the lines will be. Try pounding on the table and see what kind of lines it makes. Try making some changes to it so that it can detect really small movements, like singing or talking softly. You could also try making the holes in the box closer together or adding more weight to the cup.

Diagram

Observations

Copy of reading taken from make shift seismograph and other observations

Discussion

1. What is meant by earth movement
2. What is a seismograph
3. Discuss what is an earthquake

Conclusion

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Lab # 20

Skill: PD.

Date:

Problem of statement: Students were given large bean seeds and small bean seeds. They were asked which, of the two kinds, would produce healthier seedlings.

Hypothesis:

Aim:

Apparatus and materials:

Method:

Variables:

Table of results:

Expected results:

Treatment of results:

Principle:

Sources of Error(s):

Limitation(s):

Assumption(s):

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Lab # 20

Skill: PD.

Marking Criteria:

<u>Criteria</u>	<u>Marks</u>	<u>Marks Awarded</u>
Formulates hypothesis	1	
Aim coincides with hypothesis	1	
Selects appropriate materials and apparatus	1	
Uses correct tense	1	
States variables	1	
States expected results	1	
Appropriate treatment of results	1	
Principle	1	
Assumption	1	
Limitation	1	
Total	10	

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Lab # 21

Skill: PD.

Date:

Problem of statement: Integrated Science students were introduced to the topic of digestion and in relation, the enzymes present. Properties of enzymes were also discussed. Amylase was among the enzymes mentioned and students were asked whether this enzyme would be most efficient, in the breakdown of starch, at a pH that is acidic or one that is basic.

Hypothesis:

Aim:

Apparatus and materials:

Method:

Variables:

Table of results:

Expected results:

Treatment of results:

Principle:

Sources of Error(s):

Limitation(s):

Assumption(s):

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Lab # 21

Skill: PD.

Marking Criteria:

<u>Criteria</u>	<u>Marks</u>	<u>Marks Awarded</u>
Formulates hypothesis	1	
Aim coincides with hypothesis	1	
Selects appropriate materials and apparatus	1	
Uses correct tense	1	
States variables	1	
States expected results	1	
Appropriate treatment of results	1	
Principle	1	
Precautions	1	
Limitation(s)	1	
Total	10	

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Lab # 22

Skill: PD.

Date:

Problem of statement: Grade 10 students were asked, out of synthetic fiber and natural fiber, which will dry faster on addition of water.

Hypothesis:

Aim:

Apparatus and materials:

Method:

Variables:

Table of results:

Expected results:

Treatment of results:

Principle:

Sources of Error(s):

Limitation(s):

Assumption(s):

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Lab # 22

Skill: PD

Marking Criteria:

<u>Criteria</u>	<u>Marks</u>	<u>Marks Awarded</u>
Formulates hypothesis	1	
Aim coincides with hypothesis	1	
Selects appropriate materials and apparatus	1	
Uses correct tense	1	
States variables	1	
States expected results	1	
Appropriate treatment of results	1	
Principle	1	
Assumption	1	
Limitation(s)	1	
Total	10	

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