Proposal For
Mobile Science Laboratory™
Intermediate Phase
Grade (4-6)

Pfunzo Ye Sive™

Suppliers Of Educational Kits

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Mobile Science Laboratory™ (MSL)

Introduction

The Pfunzo Ye Sive **Mobile Science Laboratory™** has been specifically designed and structured to address the **purpose** and **principles** as set out in the Curriculum and Assessment Policy Statement (CAPS).

As a **purpose** CAPS speaks about: *"equipping learners, irrespective of their socio-economic background, race, gender, physical ability, intellectual ability, with the knowledge, skills and values necessary for self-fulfilment and meaningful participation in society as citizens of a free country*" (CAPS Page 4 paragraph 1.3a)

As a **principal** CAPS speaks about" "*Active and critical learning; encouraging an active and critical approach to learning, rather than rote and uncritical learning of given truths*"
(CAPS Page 4 paragraph 1.3b)

The Pfunzo Ye Sive **Mobile Science Laboratory™** also addressed the cognitive thinking outlined in CAPS about how practical work must be approached namely: "Practical *work must be integrated with theory to strengthen the concepts being taught. These may take the form of simple practical demonstrations or even experiment or practical investigations*." (CAPS page 11 paragraph 2.5)

Pfunzo Ye Sive **Mobile Science Laboratory™** has firmly and successfully establish the central methods of natural and physical sciences, whereby inference from experience guides formulation of hypotheses, whose predictions are validated by experiment.

Laboratory activities in school natural and physical sciences provides experience with phenomena, a starting place for the systematic development of learners' ideas, and a testing ground for the predictive power of their reasoning. It enables learners to have the mental picture of what has been taught and to retain the message in their memory for a long time. That is what we call improvisation of learning sciences in the classroom.

Advantages of Mobile Science Laboratory™ in our school

The **MSL** is set up in such a way that the lab has: -

- adequate and convenient storage for equipment;
- each piece of equipment in the lab has a unique space so that missing items can be detected at a glance;
- a large workspace that allows for group work (4 learners);
- the included lab manuals allow for activities to happen immediately;
- it enables the learners to develop functional and manipulating skills; and
- it enables the learner to develop problem solving skill and encourages scientific attitude.

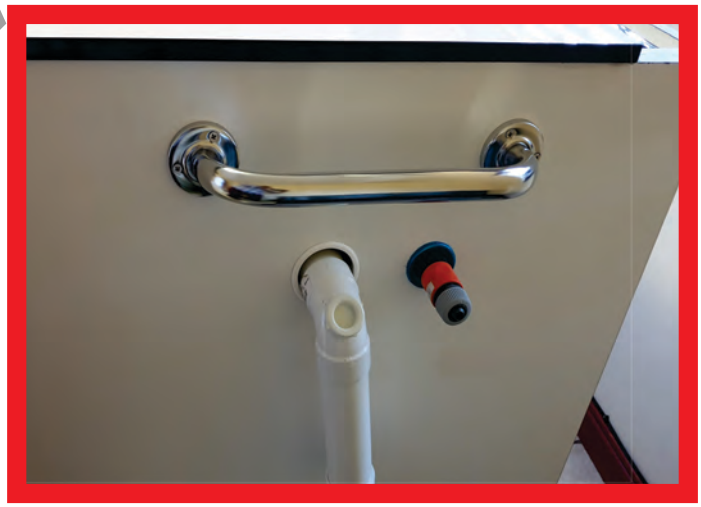
What Mobile Science Laboratory™ do for our learners

Activities are designed to engage learners' minds, so that learners acquire skill and confidence in their:

- measurement of physical quantities with appropriate accuracy;
- recognition of factors that could affect the reliability of their measurements;
- Manipulations of materials, apparatus, tools, and measuring instruments;
- Clear descriptions of their observations and measurements;
- Representation of information in appropriate verbal, pictorial, graphical, and mathematical terms;
- Inference and reasoning from their observations;
- Ability to rationally defend their conclusions and predictions;
- Effective and valued participation with their peers and the teacher in a cooperative intellectual enterprise; and
- Articulate reporting of observations, conclusions, and predictions in formats ranging from:
    - ⇒ informal discussion to a formal laboratory report; and
    - ⇒ ability to recognize those questions that can be investigated through experiment and to plan, carry out, evaluate, and report on such experiments.

Mobile Science Laboratory™ (MSL) Unit Structure

- The Solid wood and acid proof unit is ideal for mobility, long lasting, durability.
- Solid industrial fitted wheels to go on any surface with ease.
- Two stainless steel handles to pull or push around an area.
- Five pull out drawers that store all glassware and other smaller items.
- Two pull out cooling drawers that store the chemicals for experiments.
- Pigeon hold spaces for box and bigger item storage.
- Long flat space to store maps, charts and longer instruments.
- There is a pull up rear board set on ball bearing rails for easy usage by any average adult, which is made to write with white board makers and can be used as a projector screen.
- Two lock up and closed doors makes it ideal for safety and concealment of items.
- Dimensions of the unit are 1200 x 900 x 1100:
    - ⇒ 2 White Melamine Board
    - ⇒ 1 White Iceberg Gloss Board
    - ⇒ 1 White Masonite
    - ⇒ 4 Ball-Bearing Runners and 4 Rubber Wheels
    - ⇒ 4mm Edging Strip and 2mm Edging Strip Potty Hinges
    - ⇒ Chip Board Screws and Door Handles Steel Bar and 2 Side Heavy Duty Handles
    - ⇒ White Self-Stick Screw Cap
    - ⇒ Bolt sand Nuts
    - ⇒ Drawer lock n Shooter
    - ⇒ Side Boards - 1200 × 610 and 830 × 690
    - ⇒ Top Surface - 1162 × 705
    - ⇒ Floor Panel - 1168 × 580
    - ⇒ Pull Up Board - 624 × 580
    - ⇒ Pigeon Holes - 178 × 580
    - ⇒ Long Panel - 678 × 70
    - ⇒ Chemical Drawers - 95 × 1168
    - ⇒ Drawers - 70 ×1168
    - ⇒ Doors - 834 × 598
    - ⇒ Side Panels - 840 × 1174
- The handles made of stainless steel with ball bearing running rails which are used to pull out and made to last for a longer life span.



Mobile Science Laboratory™
Unit Content – Intermediate Phase

Chemicals

- ⇒ Bean seeds
- ⇒ Flower seeds
- ⇒ Yeast
- ⇒ Tea bags
- ⇒ Jelly Powder
- ⇒ Cake Flour
- ⇒ Glucose powder
- ⇒ Maize Flour
- ⇒ Iron Fillings
- ⇒ Potassium Permanganate
- ⇒ Cooking oil
- ⇒ Clay
- ⇒ Candles
- ⇒ Lemon juice
- ⇒ Methylated spirit
- ⇒ Fizzy drinks
- ⇒ Food colouring
- ⇒ sugar
- ⇒ Salt (course) and (fine)
- ⇒ Bicarbonate of soda
- ⇒ Curry Powder
- ⇒ vinegar
- ⇒ Liquid soap
- ⇒ Tartaric acid
- ⇒ shampoo
- ⇒ Milk powder
- ⇒ Universal indicator
- ⇒ Bromothymol blue

General Lab and Glassware

- ⇒ Beakers
- ⇒ Measuring cylinder
- ⇒ Syringes
- ⇒ Droppers
- ⇒ Test tubes and Test-tube holder
- ⇒ Conical flask
- ⇒ Deflagrating spoon
- ⇒ Test-tube rack
- ⇒ Pippete
- ⇒ Petri-dish
- ⇒ Evaporating dish
- ⇒ Watch glass

- ⇒ Funnel
- ⇒ Wash bottle
- ⇒ Delivery tube
- ⇒ Spoons
- ⇒ Filter paper
- ⇒ Glass jars
- ⇒ Gloves- latex
- ⇒ Litmus paper
- ⇒ Litmus paper
- ⇒ Brush
- ⇒ Spirit lamp
- ⇒ Stone
- ⇒ Tripod
- ⇒ Gauze
- ⇒ Retort stand
- ⇒ Boss-head + Clamp

Science

- ⇒ Torch
- ⇒ Musical instrument
- ⇒ Ceramics
- ⇒ Wooden dowel
- ⇒ batteries
- ⇒ buzzers
- ⇒ Stop watch
- ⇒ Kitchen scale
- ⇒ Beads
- ⇒ Solar energy
- ⇒ Solar
- ⇒ Circuit board
- ⇒ LED
- ⇒ Magnets
- ⇒ Horse-Shoe
- ⇒ Compass

Miscellaneous

- ⇒ Paper fasteners
- ⇒ Ice cream and Tooth pick sticks
- ⇒ Drinking straws
- ⇒ Balloons
- ⇒ Fishing line
- ⇒ Masking tape
- ⇒ Scissors
- ⇒ Plastic bag
- ⇒ Water trough
- ⇒ Paper
- ⇒ Steel wool

- ⇒ Glue
- ⇒ sponge
- ⇒ Garden gloves
- ⇒ Koki colours
- ⇒ Colouring pens
- ⇒ Slinky spring
- ⇒ Liebig condenser
- ⇒ Rubber eraser
- ⇒ Bulbs and Bulb holder
- ⇒ Magnifying glass
- ⇒ Drawing pins
- ⇒ Aluminium dishes
- ⇒ Sieves
- ⇒ Steri-Tab
- ⇒ Fork and Knives
- ⇒ Plaster of Paris
- ⇒ Coal
- ⇒ Nuts and Bolts
- ⇒ Pulleys and Wheels
- ⇒ Cotton wool and Polyfilla
- ⇒ Safety Googles
- ⇒ Chalks
- ⇒ Paper Clips and Plastic Tubing

Astronomy

- ⇒ Rock and mineral set
- ⇒ Earth ball
- ⇒ Moon and Earth model
- ⇒ Orbitor model

Measuring Apparatus

- ⇒ Measuring tape
- ⇒ Rulers
- ⇒ Mathematical set of Instrument
- ⇒ Thermometer
- ⇒ Spatula

Learning and Support Material

- ⇒ Charts
  - o Different shapes of Leaves
  - o Telescope
  - o Electricity
  - o Acid/Base
  - o Water pollution

- ⇒ Teacher Manual
- ⇒ Learner Manual

Protractor

Cloth Tape Measure

Spring balance

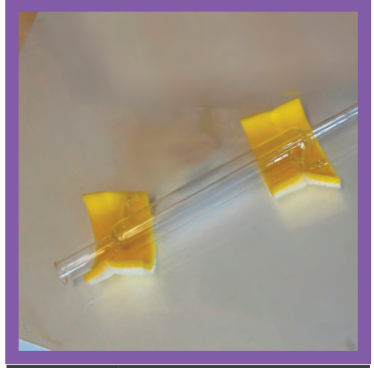
Kitchen Scale

Volt meter

Test tube rack

Cylinder brush

Liebig condenser



Glass Petri dish

Tripod

Measuring Cylinders (Plastic)

Tuning fork

Shampoo

Lemon juice

Sello tape

Marbles

Batteries

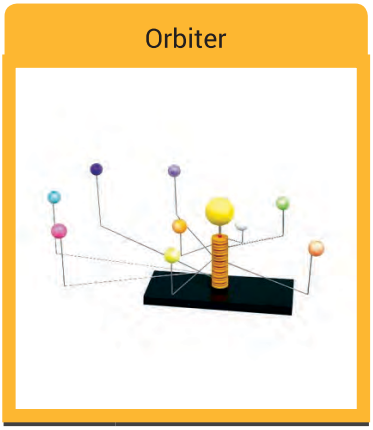
Lamp

Horseshoe magnet

Small compass

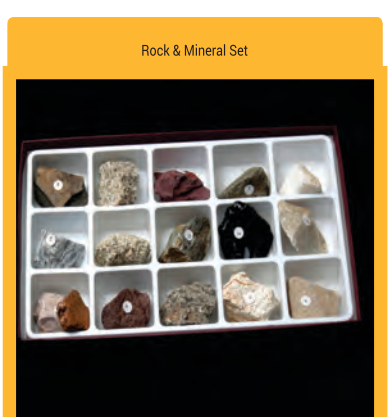
Earth globe inflatable

Orbiter

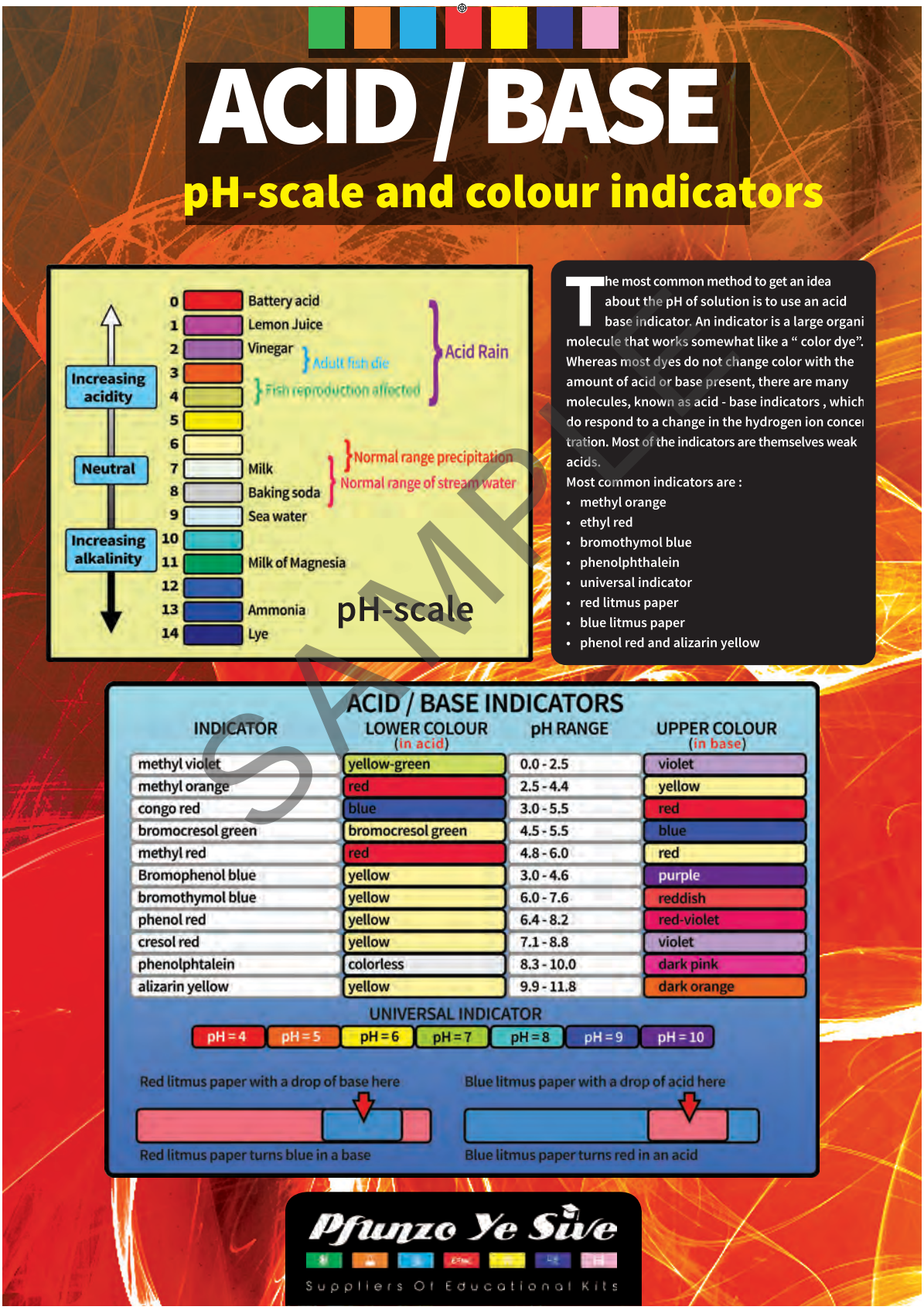


Vinegar

Rock & Mineral Set

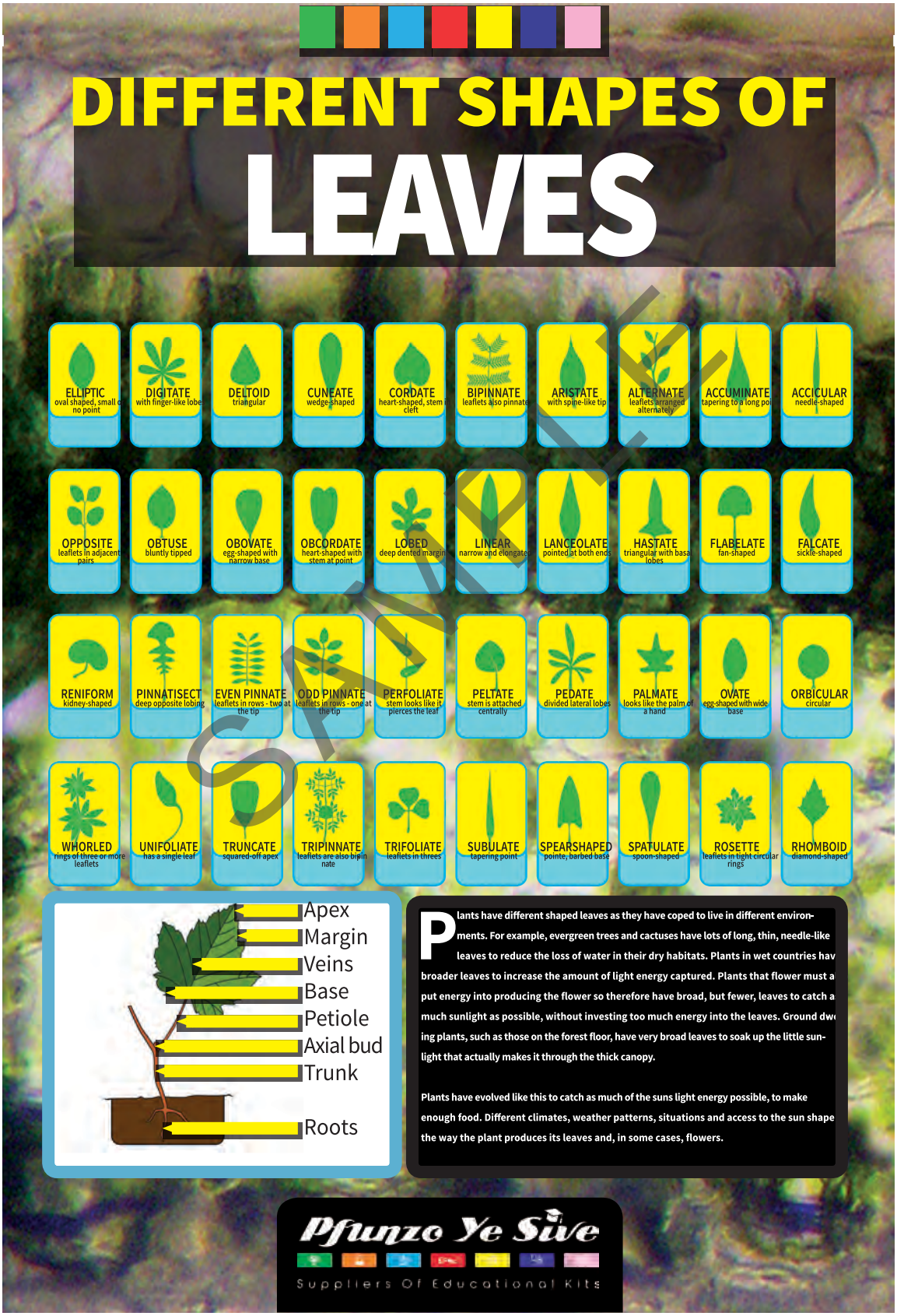


Acid / Base Chart

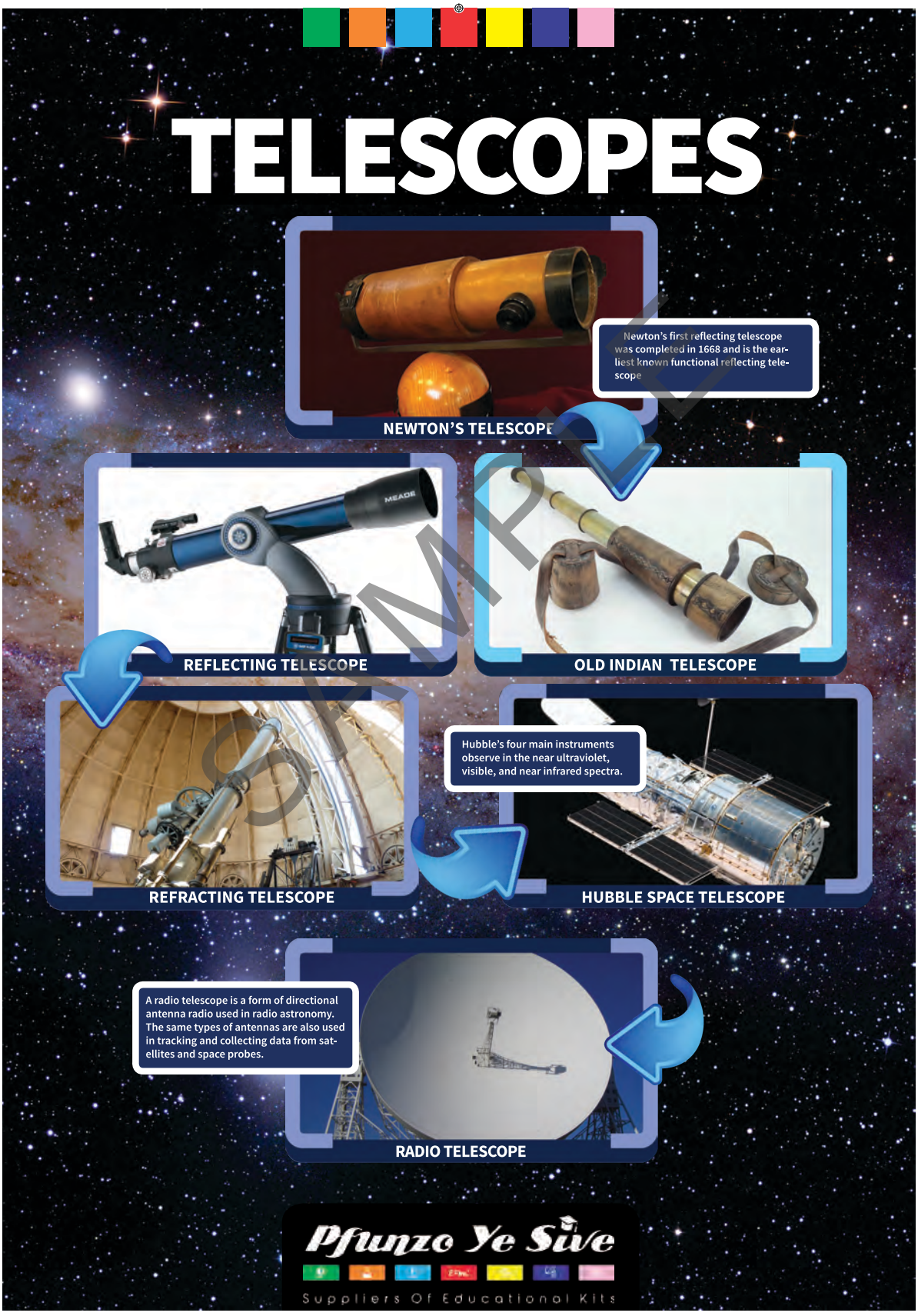


Electricity Chart

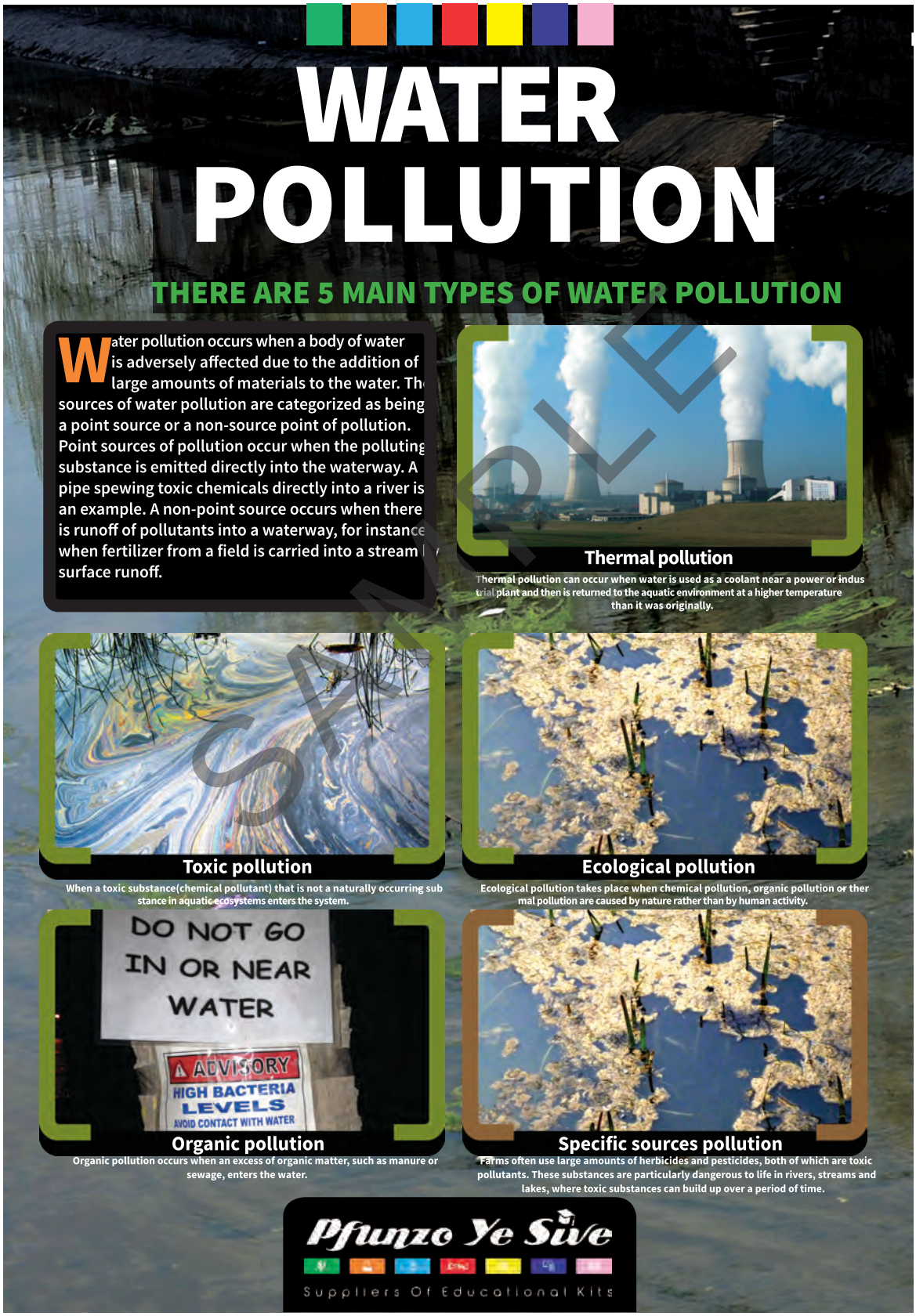
Leaves Chart



Telescopes Chart



Water Pollution Chart



Teacher Manual – Intermediate Phase

- The Teacher Manual was designed with CAPS specifications and experiments that are visible and practical for daily teaching.
- Each **Mobile Science Laboratory™** contains a CAPS aligned Teacher Manual to assist the teacher to provide a conducive learning experience to the class.
- The Teacher Manual has been developed to support the content (knowledge, concepts and skills) contained in the National Curriculum Statement (NCS), as organised in the new Curriculum and Assessment Policy Statement (CAPS).
- The Teacher Manual has been organised to support teaching and learning in the classroom by presenting the material to be taught and practised in the classroom in discrete lessons.
- 1 x Teacher – 297 x 210.

TEACHER'S MANUAL

Natural Science & Technology

Intermediate Phase

Pfunzo Ye Sive

Suppliers Of Educational Kits

NATURAL SCIENCE & TECHNOLOGY

GRADE: 4-6

EDUCATOR'S MANUAL

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Contents

To the teacher

The manual contains demonstrations, investigations and worksheets based on the following strands:

- **Life and Living**

All the activities are based on the CAPS documents for grades 4 – 6

Manner of teacher demonstration

The teacher is expected to mediate demonstrations through large groups such as the whole class and small groups of 4 – 6 learners, resources permitting.

Learner participation

According to the spirit of CAPS, learners are expected to learn through:

- **Observations**
- **Active involvement including doing the actual activities.**
- **Collaborative and cooperative learning through group work.**

The layout of the activities (demonstrations, experiment and worksheets) is meant to afford the learners varied learning contexts that recognise that learners have different learning styles and preferences.

It is expected that the teacher guides the learners through the work and avoids giving solutions before they have tried the work on their own.

Each strand has prescribed experiments, investigations and demonstrations as well as worksheets activities that may be done by learners as individuals or in small groups of 4 – 6 learners. All these activities should be assessed by the teacher, peer or learner.

About the equipment in the kit

- **Grouping of learners**

  For the grades 4 – 6 it is advisable for the teacher to use the whole-class demonstration strategy so that every learner is attentive as well as avoid accidents. As for grades 4 – 6, learners may be allowed to work in small groups.

- **Safe keeping of equipment**

  It is best to keep the equipment in the provided container in its original packaging. The equipment should be cleaned after each use and made ready for the next demonstration.

- **Planning of practical work.**

  The teacher should go through the activity and actually do it before hand. This should allow the teacher to create model answers and responses to activities that inform and guide the lesson roll out.

How to use the activity sheets

- **Photocopy rights**

  The teacher is allowed to copy the activities for his / her class only.

Controlling the kit

- **Storage**

  Safe storage of equipment is important due to its high cost and the need for reuse.

- **Stock control**

  After each activity, the teacher should check against inventory when collecting back apparatus from learners. Broken material should be recorded and disposed of properly. Liquids should be placed in containers- organics and aqueous solutions in separate containers and NEVER down the drain.

GRADE: 4

STRAND: **LIFE & LIVING**

TERM: 1

ACTIVITY 1: Germinating bean seed.

AIM: Investigate the growth of plants from seeds and cuttings by observing, measuring and recording growth over time.

NOTES

The learners have to grow the bean seeds and answer the questions on their experiment. You should also grow seeds that you will use to demonstrate to learners what to do. This activity will assess the Learner's observation and measuring skills.

PRIOR KNOWLEDGE

Learners should understand that seeds need water and warmth to germinate.

Answers to follow up Questions

1. Roots
2. 2 – 3 days
3. Within 10 days after the roots sprouted.
4. Demonstrate to the learners how to measure the stem accurately.

ACTIVITY 2: Growing yeast.

AIM: To investigate what make yeast grow best.

NOTES

Provide the learners with the apparatus for the experiment. Explain to the learners that yeast is alive but it is dried and cannot grow until you change the conditions for it to grow. In this experiment learners will investigate what makes yeast grow best.

PRIOR KNOWLEDGE
Some things appear not to be living (such as dried beans, dried yeast, a fertilised bird egg), but carry on 'living' given the right conditions.

Answers to follow up Questions

1. Sugar
2. In warm water
3. Is the gas called carbon dioxide, yeast form carbon dioxide when if feeds on sugar. The bubbles/ foam in the bag show that carbon dioxide is released.

GRADE: 4

STRAND: **MATTER & MATERIALS**

TERM: 2

ACTIVITY 1: CLASSIFICATION OF MATTER

AIM: To sort examples of common materials into solids, liquids and gases

YOU WILL NEED

- wood
- stone
- plastic
- fabric
- water
- juice
- tea
- air
- cooking oil
- cooking gas

METHOD

- Desribe the appearance of the material you are provided with.
- Classifiy them under solid, liquid or gases

Questions

1. Draw a table of results to show you classified the materials.
2. Draw three rectangles and inside show how the particles in a solid, liquid and gas are arranged.

Solutions

1. Depends on the results
2. Learners must show three boxes and arrange particles in three different ways to show differences between solids, liquids and

ACTIVITY 2:

AIM: Investigating change of state.

YOU WILL NEED

- ice
- beakers
- burner
- thermometer
- stop watch

SAFETY PRECAUTION
1. Ensure that the burner is stable so as to avoid starting fire since spirit is highly volatile.

METHOD

- Place some ice in a beaker.
- Measure the temperature of the ice and record it.
- Heat the ice and after 1 minute measure the temperature again and record it.
- Repeat every minute, until at least 10 minutes after the ice has melted.
- Conrinue heating the water unitl the water is now boiling.
- Place a cool bottle on top of the steam.
- Cool down the water in a fridge and observe after 2 hours.

Questions

1. Identify the stages where melting, boiling, condensation and freezing are taking place.

Solutions

1. Learners must identify at what stage are such processes taking place.

ACTIVITY 3: Strength of different shaped pillars in supporting weights.

AIM: To investigate how the shape of a pillar affects its ability to support weights.

YOU WILL NEED

- thin card-boxes
- weights
- stop watch

SAFETY PRECAUTION
1. Make sure learners don't get fingers hurt by falling weights.

METHOD

- Use cardboard box to make pillars of different cross sectional shapes eg triangular ,circular, rectangular ,square.
- Place a weight on top pf the pillar and start a stop watch.
- Record the time that the pillar survives before it is damaged under the force of the object placed on top.

Questions.

1. record your results in a table.
2. draw a bar graph of time (yaxis) vs shape (x-axis)

Solutions

1. Depends on results

ACTIVITY 4:

AIM: To design a simple rocket and investigate the effect of air pressure on the height reached by the balloon rocket non-metal objects, ability to be attracted by magnets and ability to rust in water

YOU WILL NEED

- Balloons
- fishing line

SAFETY PRECAUTION
1. Make sure learners don't over-inflate the balloons

METHOD

- Fully inflate five different sizes of balloons and attach to each a finish line
- Release them a=one after the other and establish how high the ballon went up

Questions

1.record your results in a table.
2. draw a bargraph of time (yaxis) vs shape (x-axis)

Solutions

1. Depends on results
2. Allocate marks adequately for effort on the bargraph

ACTIVITY 5: CLASSIFICATION OF MATTER

AIM: To sort materials according to compare the properties of some metal and some non-metal objects, ability to be attracted by magnets and ability to rust in water

YOU WILL NEED

- wood
- stone
- plastic
- fabric
- water
- juice
- tea
- air
- cooking oil
- cooking gas
- zinc
- copper
- aluminium
- sulphur
- wood
- cotton
- glass

METHOD

- Describe the appearance of the material you are provided with.
- Classify them according to the specified properties.

Questions

Draw a table to show your results.

Solutions

Table should show various column headings

GRADE: 4

STRAND: **ENERGY& CHANGE**

TERM: 3

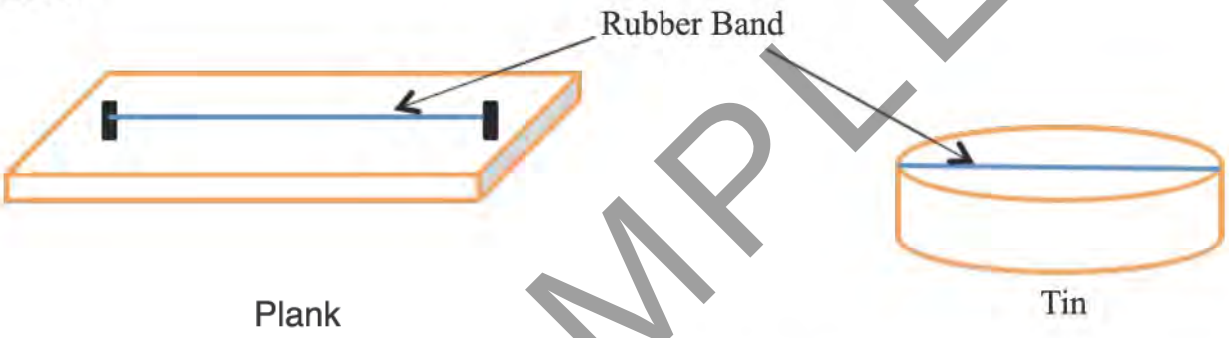
ACTIVITY 1: SOUND

AIM: To create a musical instrument

YOU WILL NEED:

- Plank with a nail at each end/a container with an open end.
- Rubber band

Method



- Pass the rubber band over the 2 nails and ensure that it is taut.
- Strike the rubber band at the centre and release.
- Make an observation

Observation

The rubber band produces a sound note

Conclusion

Musical notes can be made by various instruments

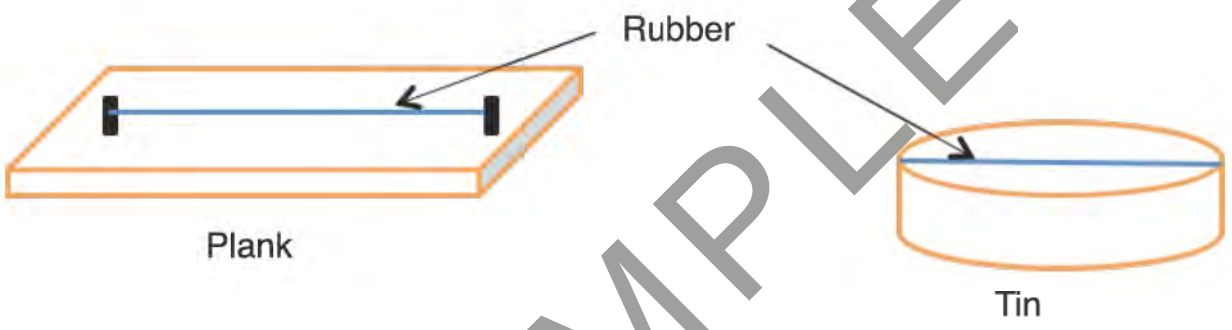
ACTIVITY 2: SOUND

AIM: To create sound notes

YOU WILL NEED

- Musical instrument from experiment

Method



- Strike the rubber band at one quarter its length
- Make an observation of the sound note produced
- Repeat steps 1 and 2 at half and three quarter position.

Observation

The tone of the sound changes as the point struck is changed

Conclusion

Different points on a musical instrument produce different sound notes

GRADE: 4

STRAND: **PLANET EARTH & BEYOND**

TERM: 4

ACTIVITY 1: Rotation and Revolution of the Earth.

AIM: Demonstrating the movements (rotation and revolution) and of the Earth using models and body movements.

YOU WILL NEED

- Group of learners

SAFETY PRECAUTION
1. Ensure that the spinning learner doesn't lose balance.

METHOD

- One learner stands at the centre and nine are standing around one as if they are planets around the sun, the learner at the centre who acts as the sun.
- The learner who is on the Earth`s position has to move around the 'sun@ in a fixed circular path however he/she needs to be spinning in a counter-clockwise sense.

QUESTIONS

1. The sun takes how long to spin on its own axis?
2. How long does the sun take to rotate around the sun?

SOLUTIONS

1. 24HRS
2. 365 ¼ days

ACTIVITY 2: Day and Night.

AIM: To demonstrate the concept of Day and Night.

YOU WILL NEED

- Earth`s model
- torch

METHOD

- One learner holds a lit torch horizontally.
- Another learner brings now stands along the line of the light so that the globe is illuminated.
- The learner now spins the globe on this own axis in a clockwise direction.

Questions

1. Explain what causes day and night.

Solutions

1. When the sun is illuminating on part of the earth when its spinning on itw own axis

GRADE:5

STRAND: **LIFE & LIVING**

TERM:1

ACTIVITY 1: Making a model of a vertebrate skeleton

AIM: To make a model of a vertebrate skeleton.

NOTES

The practical task of making a simple model is an application of the Design Process. After designing and making the model, it is important that learners compare their model with the skeletons of real animals.

PRIOR KNOWLEDGE
A vertebrate skeleton consists of bones and joints, and is inside the body
• Bones are hard and form a strong frame structure
• A skeleton provides support for an animal's body and protection for its organs;

ASSESSMENT RUBRIC:

Descriptor	Assessment rubric	Marks
Design drawing	Learners attempted to draw a model but not all parts are shown	2
	Learners drew all parts and gave measurements	4
	Learners drew all parts and gave measurements and the drawing was neat	5
Design specification	The list of material was inadequate to produce the parts of the model	2
	learners produced a list of major materials needed but did not list the parts used for attaching the parts of the model	4
	Learners had a complete list of materials and could explain why the material is more suitable for the purpose than another.	6

Making the model	learners made no real attempt to make a model	0
	learners attempted to make a model but did not complete it	2
	learners made a model that was complete, but the model could not be used to explain the functioning of an animal body	4
	Learners made a model that was complete, and could be used to demonstrate the functioning of at least some parts of an animal body.	6
Learner's self evaluation	Learners correctly evaluated how well the model met each of the requirements in the evaluation table. (1 mark is rewarded for each requirement that is accurately evaluated.	1 x 6 =6

GRADE: 5

STRAND: **MATTER & MATERIALS**

TERM: 2

ACTIVITY 1: Fuels

AIM: To compare various fuels including candle (wax), paraffin and a biscuit

YOU WILL NEED

- Beakers
- Thermometers
- crucible
- candle (wax)
- Biscuits

SAFETY PRECAUTION
1. Do not huge volumes of paraffin

METHOD

- Use 100g of paraffin to fill a burner.
- Place 100cm^3 of water in a beaker.
- Measure the initial temperature of the water and keep the thermometer in the beaker.
- Heat the water using the paraffin to 5mins and record the final temperature of the water.
- Repeat the same procedure but burning wax and biscuits in open containers.

Questions

1. Draw a table to represent your results.
2. Which fuel caused the highest increase in temperature.
3. Which fuel required the highest input energy needed to make them burn

Solutions

Depend on experiment

ACTIVITY 2: Matter and Materials

AIM: To represent the layers of sedimentary rocks

YOU WILL NEED

- Play Dough
- Clay
- Plaster Of Paris,
- And Remains Of Living Things Such As Leaves
- Shells And Bones

METHOD

- making a model to show the layers of sedimentary rocks with fossils embedded in them (using a medium such as play dough, clay, plaster of Paris, and remains of living things such as leaves, shells and bones

Questions

1. Explain how sedimentary rocks are formed.

Solutions

1. Where formed due to years of sedimentation of fossils and they form Layers after compression

ACTIVITY 3: Classification of soils

AIM: To sort soils found in the community according to about the colour, smell and texture of the soil

YOU WILL NEED

- Different soil types

METHOD

- Collect soil samples in beakers from the surrounding environment.
- Describe the appearance of the soils you have obtained.
- Classify them according to the specified properties.

Questions

1. Draw a table to show your results.

Solution

1. Depend on the results

ACTIVITY 4: Classification of soils.

AIM: To investigate how plants grow in different soil types found in the community

YOU WILL NEED

- Different soil types
- plastic containers
- bean seeds metre rule

METHOD

- Collect soil samples in beakers from the surrounding environment.
- Plant some bean seeds in the different soil types and measure the height of the plant after every day.

Questions

1. Draw a table to show your results.
2. Represent your results by way of a graph

Solutions

1. Depends on results

ACTIVITY 5: Classification of soils.

AIM: To investigate how plants grow in different soil types found in the comunity

YOU WILL NEED

- Different soil types
- beakers
- measuring cylinder
- mass meter

METHOD

- Collect soil samples in beakers from the surrounding environment.
- Measure the initial masses of the beakers including the sand
- Pour an equal amount of water in the beakers to make measurements of the mass of the sand and water.
- Leave the beakers outside for a week whilst you measure the mass of each beaker every morning.

Questions

1. Draw a table to show your results.
2. Represent your results by way of a graph

Solutions

1. Depends on results

ACTIVITY 6: Classification of Matter

AIM: To sort materials according to compare the properties of some metal and some non-metal objects, ability to be attracted by magnets and ability to rust in water, appearance (shiny/dull)

YOU WILL NEED

- some metal objects (such as copper wire, coins, nails,
- cooking pots, knives and forks)
- some non-metal objects (such as a piece of chalk, a stone, a pile of sand, a piece of coal

METHOD

- Test and compare the electrical conductivity of the given materials
- Classify the material according to shiny/dull appearance
- Classify the materials according to their ability to produce sound when knocked on a surface and which can be able to easily break/bent into shapes.

Questions

1. Draw a table to show your results.
2. Draw suitable graphs.

Solutions

1. Depends on results

GRADE: 5

STRAND: **ENERGY & CHANGE**

TERM: 3

ACTIVITY 1: ENERGY

AIM: To investigate how long a candle burning candle in different size containers

YOU WILL NEED:

- Candle
- Different sizes of clear glass container (Marked A, B, C, D etc)
- Matches

Method:

- Light a candle
- Enclose the candle in a glass container A.
- Record the time it takes to go out
- Repeat steps 2 and 3 with other glass sizes.

Observation

CONTAINER	TIME
A	
B	
C	
D	

Conclusion

The bigger the container the longer the candle burns.

ACTIVITY 2: FUELS

AIM: To investigate different fuel types

YOU WILL NEED

- Candle
- Different sizes of clear glass container (Marked A, B, C, D etc)
- Matches

Method:

- Light a candle
- Enclose the candle in a glass container A.
- Record the time it takes to go out
- Repeat steps 2 and 3 with other glass sizes.

Observation

CONTAINER	TIME
A	
B	
C	
D	

Conclusion

The bigger the container the longer the candle burns

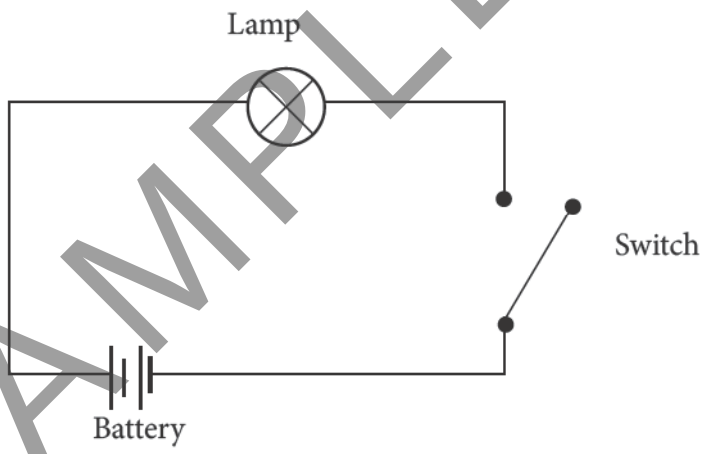
ACTIVITY 3: ELECTRIC CIRCUITS

AIM: To create simple electric circuits

YOU WILL NEED

- Torch bulb + holder
- Wire leads
- Battery + holder
- Switch

Method



- Assemble the apparatus as shown above.
- Put the switch to ON position and record your observation.

Results

Switch position	Bulb lights up(Yes / No)
Off	
On	

Conclusion

A complete circuit allows electricity to flow.

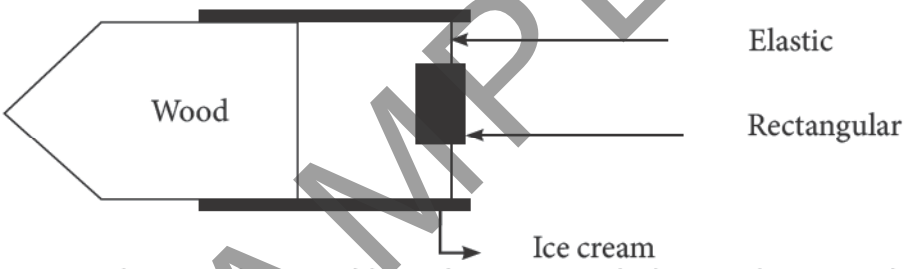
ACTIVITY 4: ENERGY IN ELASTIC OR SPRINGS

AIM: To convert energy stored in an elastic band to pedal power

YOU WILL NEED

- 2 x ice cream sticks
- Wood board
- Elastic band
- 1 x Small rectangular plastic board with a hole on each short side.
- Wood glue.
- Wide water trough

Method



- Attach the ice cream sticks onto the wood board using wood glue as shown in diagram.
- Let the assembly dry.
- Cut the rubber band at one point to create a long piece.
- Pass the rubber through the 2 holes of the plastic board.
- Tie the loose ends together.
- Pass the rubber band over the sticks as shown on the diagram
- Wind the rubber band using the rectangular plastic board.
- Place the assembly on water and release the rectangular board.
- Record your observation.

Observation

The assemble is propelled across the surface of the water.

Conclusion

Elastic bands store energy

GRADE: 5

STRAND: **ENERGY& CHANGE**

TERM: 4

ACTIVITY 1: SEDIMENTARY ROCKS

AIM: To represent the layers of sedimentary rocks.

YOU WILL NEED

- play dough
- clay
- plaster of Paris
- and remains of living things such as leaves
- shells and bones

METHOD

- making a model to show the layers of sedimentary rocks with fossils embedded in them (using a medium such as play dough, clay, plaster of Paris, and remains of living things such as leaves, shells and bones

Questions

1. Explain how sedimentary rocks are formed.

Solutions

1. Where formed due to years of sedimentation of fossils and they form layers after compression

ACTIVITY 2: CLASSIFICATION OF SOILS.

AIM: To sort soils found in the community according to about the colour, smell and texture of the soil

YOU WILL NEED

Different soil types

METHOD

- Collect soil samples in beakers from the surrounding environment.
- Describe the appearance of the soils you have obtained.
- Classify them according to the specified properties.

Questions

1. Draw a table to show your results.

Solution

1. Depend on the results

ACTIVITY 3: CLASSIFICATION OF SOILS.

AIM: To investigate how plants grow in different soil types found in the community.

YOU WILL NEED

- Different soil types
- plastic containers
- bean seeds metre rule

METHOD

- Collect soil samples in beakers from the surrounding environment.
- Plant some bean seeds in the different soil types and measure the height of the plant after every day.

Questions

- Draw a table to show your results.
- Represent your results by way of a graph

Solutions

1. Depends on results

ACTIVITY 4: CLASSIFICATION OF SOILS.

AIM: To investigate how plants grow in different soil types found in the community.

YOU WILL NEED

- Different soil types
- beakers
- measuring cylinder and a digital balance

METHOD

- Collect soil samples in beakers from the surrounding environment.
- Measure the initial lasses of the beakers including the sand
- Pour an equal amount of water in the beakers to make measurements of the mass of the sand and water.
- Leave the beakers outside for a week whilst you measure the mass of each beaker every morning.

Questions

1. Draw a table to show your results.
2. Represent your results by way of a graph

Solutions

1. Depends on results

GRADE: 6

STRAND: **LIFE & LIVING**

TERM: 1

ACTIVITY 1: Comparing the taste of glucose sugar and starch

AIM: Comparing glucose sugar and starch according to their taste and colour

NOTES:

Arrange learners in groups depending on the number of learners in your class. Provide each group with the apparatus for the investigation. Each learner must get a chance to taste glucose and starch. Warn the learners about the dangers of tasting chemicals when conducting investigation. They can only taste substances when told by the educator.

PRIOR KNOWLEDGE
Plants make their own food (glucose sugar) by a process called photosynthesis. During photosynthesis the plant uses sunlight energy, carbon dioxide (from the air) and water to make glucose sugar.
Plants change some of the glucose sugar into starch which they store in their leaves, stems and roots, flowers, fruits and seeds

1. **OBSERVATION:** complete the table below:

Test	Glucose Powder	Starch (Maize Flour)
Colour	whitish	whitish
Taste	sweet taste	does not have a sweet taste
How easily it dissolves	dissolves in water	does not dissolve in water

ACTIVITY 2: Testing the presence of starch

AIM: To test starch with iodine solution to show colour changes.

NOTES

This activity is meant to obtain the colour change that would be expected with iodine solution if starch were present. This information will be used in the next activity to find out which foods contain starch.

PRIOR KNOWLEDGE
We use iodine solution to test the presence of starch. It changes colour in the presence of starch. No heat is needed when testing substances with iodine.

Answers to follow up Questions

a) Yes

b) No

c) Iodine solution changes colour from brown to blue-black in the substance that contains starch.

ACTIVITY 3: Find out which foods contain starch.

AIM: To test food for starch

NOTES

This activity requires learners to conduct a test for starch. You need to ensure that the apparatus listed in the in the learner's guide are available for each group. You can ask learners to bring the different foods from home for extra marks, but make sure you have the food available in case learners do not bring the food.

OBSERVATIONS AND RESULTS

Food sample	Colour before testing	Colour after testing	Contains starch: yes / no
Cooked rice	White	Iodine changed to blue-black	Yes
Potato	White	Iodine changed to blue-black	Yes
Apple	White	Iodine changed to blue-black	Yes
Boiled egg	White/ yellow	Iodine solution did not change colour	No
Bread	White	Iodine changed to blue-black	Yes
Flour	White	Iodine changed to blue-black	Yes
Sugar	White	Iodine solution did not change colour	Yes
Cheese	Yellow	Iodine solution did not change colour	No

GRADE: 6

STRAND: **MATTER & MATERIALS**

TERM: 2

ACTIVITY 1: Separating mixtures.

AIM: To Investigate different solids to see if they dissolve in water

YOU WILL NEED

- salt
- sugar (soluble substances)
- sand
- mealie meal
- flour
- maize flour
- samp
- curry powder
- custard powder (insoluble substances)
- beaker

METHOD

- Measure 50cm^3 of water in a measuring cylinder and transfer it into a beaker.
- Add a spatula of salt and make observations.
- Repeat the process but using different substances given in the instructions.
- Make observations

Questions

1. Classify the substances as in a table.

ACTIVITY 2: Separating mixtures.

AIM: To Investigate different solids to see if they dissolve in water

YOU WILL NEED

- Salt solutions
- mealie meal suspension in water
- beaker

METHOD

- For the salt solution, heat it strongly until all the water has evaporated and then salt particles remain at the bottom of the beaker.
- For the mealie meal ,allow the mealie meal to be suspended under water after an hour and then pour out the water.
- For sand in water, use filtration set up to allow the water to be collected as the filtrate.

Questions

1. Would you classify the dissolving of substances in water as physical or chemical change.
2. Give a reason for your answer.

solutions

1. Physical
2. No new substance is formed /easily reversible

ACTIVITY 3: Solubility.

AIM: To Investigate the relationship between the time taken to dissolve and the temperature of the water.

YOU WILL NEED

- Fine salt
- spatula
- beaker
- water
- sand
- filter paper
- filter funnel
- distillation kit
- burner

SAFETY PRECAUTION
1.Ensure that the spirit burner is handled with care since spirit is highly flammable.

METHOD

- Measure the temperature of 50cm3 of water, and add a spatula of salt.
- Add two spatulas of sand and thoroughly mix.
- Setup a filter funnel and a filter paper.
- Pour the mixture into the filter funnel and wait for all the water to pass through as the filtrate.
- Collect the filtrate and carry out distillation to collect the distillate.

Questions

1. Sand and water can be separated by filtration because sand is _____in water.
2. Creation of a mixture is a physical/chemical change?

Solutions

1. Insoluble
2. Physical

GRADE: 6

STRAND: **ENERGY & CHANGE**

TERM: 3

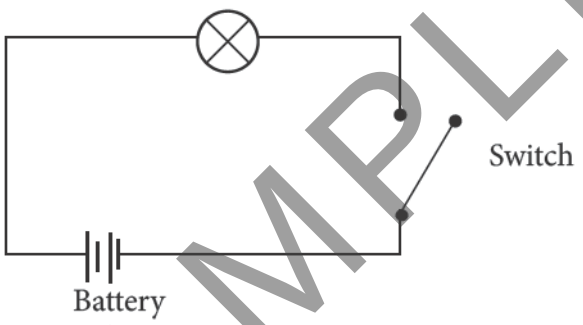
ACTIVITY 1: ELECTRIC CIRCUITS

AIM: To investigate how to make a simple electric circuit

YOU WILL NEED

- Torch bulb + holder
- Wire leads
- Battery + holder
- Switch

Method



- Connect the positive end of the battery to the bulb holder.
- Connected the other end of bulb holder to one end of the switch
- Connect the other end of the switch to the negative pole of the battery
- Put the switch to ON position and record your observation.

Results

Switch position	Bulb lights up(Yes / No)
Off	No
On	Yes

Conclusion

When switch is off there is no flow of electricity.

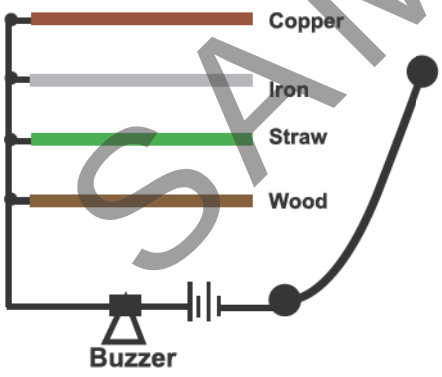
ACTIVITY 2: CONDUCTORS AND NON CONDUCTORS

AIM: To determine which materials conduct electricity

YOU WILL NEED:

- Iron rod
- Copper rod
- Plastic Straw
- Wooden rod
- Wire leads
- Battery
- Buzzer

Method



- Assemble the apparatus as shown in diagram.
- Connect the terminal T to the wood and observe.
- Repeat step 2 with straw, iron and coppe

Results

Material	Buzz (Yes / No)
Wood	No
Straw	No
Iron	Yes
Copper	Yes

Conclusion

Non-metals do not conduct electricity and metals conduct electricity.

GRADE:6

STRAND: **PLANET EARTH & BEYOND**

TERM:4

ACTIVITY 1: Rotation and Revolution of the Earth.

AIM: Demonstrating the movements (rotation and revolution) and of the Earth using models and body movements.

YOU WILL NEED

- Group of learners

SAFETY PRECAUTION
1. Ensure that the spinning learner doesn't lose balance.

METHOD

- One learner stands at the centre and nine are standing around one as if they are planets around the sun, the learner at the centre who acts as the sun.
- The learner who is on the Earth`s position has to move around the 'sun@ in a fixed circular path however he/she needs to be spinning in a counter-clockwise sense.

QUESTIONS

1. The sun takes how long to spin on its own axis?
2. How long does the sun take to rotate around the sun?

SOLUTIONS

1. 24HRS
2. 365 ¼ days

ADDITIONAL ACTIVITIES

Grade 4 Term 3

- Draw and write on how the energy of the sun is transferred through food made by plants to people (food chain).
- How does sound travel in the human ear?

Grade 5 Term 3

- Project: Write about fires in the communities and draw attention to causes,
- prevention as well as action to take in the event of a fire.
- What is the difference in energy contained in a biscuit and candle?
- How does electricity travel from the power station to the home?
- What is the source of energy in the power station?
- What is the source of energy in the battery?
- Draw and label the components of a circuit.

Grade 6 Term 3

- Draw a simple circuit diagram.
- Identify where electrical insulators are used.
- Make a system that produces sound
- Examine the labels on electrical appliances and determine which appliance uses most energy.

WORKSHEETS

BROKEN MATERIALS RECORD SHEET

MATERIAL	TYPE OF MATERIAL (liquid/glass/ chemical/etc)	QUANTITY	DATE	SIGNATURE

HOD SIGNATURE : ____________________________

PRINCIPAL SIGNATURE: ________________________

Science worksheet
Before the experiment

Name		**Date**	
Grade		**Term**	
Core knowledge			

Title of the investigation:

What I want to find out:

What must I do to find this:

What I need to use:

What you think will happen:

Leaner Manual – Intermediate Phase

- The **Mobile Science Laboratory™** provides for 10 CAPS aligned Learner Manuals due to the fact that science is a group activity, making it possible to teach the class in groups.
- The Learner Manual has been developed to support the content (knowledge, concepts and skills) contained in the National Curriculum Statement (NCS), as organised in the new Curriculum and Assessment Policy Statement (CAPS).
- The Learner Manual has been organised to support teaching and learning in the classroom by presenting the material to be taught and practised in the classroom in discrete lessons.
- The Learner Manual has been organised to support teaching and learning in the classroom by presenting the material to be taught and practised in the classroom in discrete lessons.
- In each lesson the learners will:
  - ⇒ Establish what they already know about a topic.
  - ⇒ Learn new facts about a topic.
  - ⇒ Practise using the new knowledge, concepts and skills they have acquired in the lesson.
- In addition, learners are provided with:
  - ⇒ Additional homework activities.
  - ⇒ Extra practice activities that cater for both learner support and enrichment.
  - ⇒ A summary of a cycle of work.
  - ⇒ A cycle may consist of one or more weeks' work.
- 10 x Learner – 297 x 210.

LEARNER'S MANUAL

Natural Science & Technology

Intermediate Phase

Pfunzo Ye Sive

Suppliers Of Educational Kits

NATURAL SCIENCE & TECHNOLOGY

GRADE: 4-6

LEARNER'S MANUAL

Pfunzo ye Sive

Suppliers Of Educational Kits

Contents

To the teacher

The manual contains demonstrations, investigations and worksheets based on the following strands:

- **Life and Living**
- **Matter and Materials**
- **Energy and Change**
- **Planet Earth and Beyond**

All the activities are based on the CAPS documents for grades 4 – 6

Manner of teacher demonstration

The teacher is expected to mediate demonstrations through large groups such as the whole class and small groups of 4 – 6 learners, resources permitting.

Learner participation

According to the spirit of CAPS, learners are expected to learn through:

- **Observations**
- **Active involvement including doing the actual activities.**
- **Collaborative and cooperative learning through group work.**

The layout of the activities (demonstrations, experiment and worksheets) is meant to afford the learners varied learning contexts that recognise that learners have different learning styles and preferences.

It is expected that the teacher guides the learners through the work and avoids giving solutions before they have tried the work on their own.

Each strand has prescribed experiments, investigations and demonstrations as well as worksheets activities that may be done by learners as individuals or in small groups of 4 – 6 learners. All these activities should be assessed by the teacher, peer or learner.

About the equipment in the kit

- **Grouping of learners**

  For the grades 4 – 6 it is advisable for the teacher to use the whole-class demonstration strategy so that every learner is attentive as well as avoid accidents. As for grades 4 – 6, learners may be allowed to work in small groups.

- **Safe keeping of equipment**

  It is best to keep the equipment in the provided container in its original packaging. The equipment should be cleaned after each use and made ready for the next demonstration.

- **Planning of practical work.**

  The teacher should go through the activity and actually do it before hand. This should allow the teacher to create model answers and responses to activities that inform and guide the lesson roll out.

How to use the activity sheets

- **Photocopy rights**

  The teacher is allowed to copy the activities for his / her class only.

Controlling the kit

- **Storage**

  Safe storage of equipment is important due to its high cost and the need for reuse.

- **Stock control**

  After each activity, the teacher should check against inventory when collecting back apparatus from learners. Broken material should be recorded and disposed of properly. Liquids should be placed in containers- organics and aqueous solutions in separate containers and NEVER down the drain.

Replacing of broken items and depleted chemicals

This can be done by ordering from kit supplier by naming the materials on the original kit.

Tips of managing lab activities in the classroom

General laboratory rules apply and include the following among many other rules:

1. No running or horse play is allowed in the lab
2. No eating, tasting of chemicals & pippetting using your mouth.
3. Safety apparel should be worn were applicable
4. LAB activities are supervised and no learner is allowed in the lab unsupervised.
5. Clean after the activities
6. Do not pour waste materials into the sink
7. Broken glass should be recycled
8. Read labels carefully.
9. Ti up, long hair and loose clothes.
10. Keep work area clear of all materials except those needed for your experiments.
11. Never smell a solvent.

GRADE: 4

STRAND: **LIFE & LIVING**

TERM: 1

ACTIVITY 1: Germinating bean seed

AIM: Investigate the growth of plants from seeds and cuttings by observing, measuring and recording growth over time.

YOU WILL NEED:

- 10 bean seeds
- 2 flat dishes
- 4 thick pieces of paper towel
- Water
- Ruler or measuring tape

METHOD:

- Cut the paper towel into a circle to fit into the bottom of the dishes.
- Put the thick pieces of paper into the bottom of the 2 dishes
- Put 5 bean seeds on top of each piece of paper towel
- Cover the seeds with another piece of paper towel
- In one dish, pour water onto the paper towel and the seeds to wet them completely. In the second dish do not pour the water.
- Put the dish with water onto the windowsill where they will get sunlight.
- Put the second dish, with no water on a dark cupboard.
- Each day check the seeds if they have started to germinate. (Make sure to cover them again).
- Keep the dish on the windowsill wet at all times.
- When bean seeds starts growing and germinating.
- Use a ruler to measure the stem from the seed to the first leaves in centimetres.

OBSERVATIONS

- Watch changes that happens as the seed germinate and the seedlings starts to grow and develop different parts.
- Record all the changes you see during your observation.

1. What was the first part that comes out of the bean seed?

2. How many days did it take for the first bean seed to start germinating (for the roots to first show)?

3. After how many days did the first leaves show?

4. How long is the of the bean plant from the seed to the first leaves?

ACTIVITY 2: Growing Yeast

AIM: To investigate what make yeast grow best.

YOU WILL NEED:

- Four zip lock plastic bags
- Yeast
- Salt
- Sugar
- Water
- Permanent marker

Method:

Label the four plastic bags as follows:

A. Sugar + warm water

B. Sugar + cold water

C Sugar +salt +warm water

D. No sugar + warm water

- Add 2 teaspoons (10ml) of yeast to each plastic bag.
- Add 2 teaspoon (10ml) of sugar to each of the bags that is labelled sugar.
- Add 1 teaspoon (5ml) of salt in the bag that is labelled salt.
- Carefully add ½ a cup of water in each plastic bag. (warm water should be warm but not too hot, or it will kill the yeast)
- Seal the bags, squeeze as much extra air as possible and let them sit.
- Watch the plastic bags to see what happens.

Observations

- Which ingredients help the yeast grow best?
- Does yeast grow better in warm or cold water?
- What make the bag to puff up and how does this tell you that the yeast is growing?

Term 2

STRAND: **MATTER & MATERIALS**

ACTIVITY 1: Classification of Matter

AIM: To sort examples of common materials into solids, liquids and gases

YOU WILL NEED

- wood
- stone
- plastic
- fabric
- water
- juice
- tea
- air
- cooking oil
- cooking gas

METHOD

- Desribe the appearance of the material you are provided with.
- Classifiy them under solid, liquid or gases

Questions

1. Draw a table of results to show you classified the materials.
2. Draw three rectangles and inside show how the particles in a solid, liquid and gas are arranged.

ACTIVITY 2:

AIM: Investigating change of state.

YOU WILL NEED

- ice
- beakers
- burner
- thermometer
- stop watch

SAFETY PRECAUTION
1. Ensure that the burner is stable so as to avoid starting fire since spirit is highly volatile.

METHOD

- Place some ice in a beaker.
- Measure the temperature of the ice and record it.
- Heat the ice and after 1 minute measure the temperature again and record it.
- Repeat every minute, until at least 10 minutes after the ice has melted.
- Conrinue heating the water unitl the water is now boiling.
- Place a cool bottle on top of the steam.• Cool down the water in a fridge and observe after 2 hours.

Questions

1. Identify the stages where melting, boiling, condensation and freezing are taking place.

ACTIVITY 3: Strength of different shaped pillars in supporting weights

AIM: To investigate how the shape of a pillar affects its ability to support

YOU WILL NEED

- Thin card-boxes
- weights
- stop watch

SAFETY PRECAUTION
1.Make sure learners don't get fingers hurt by falling weights.

METHOD

- Use cardboard box to make pillars of different cross sectional shapes eg triangular, circular, rectangular, square.
- Place a weight gap on top of the pillar and start a stop watch.
- Record the time that the pillar survives before it is damaged under the force of the object placed on top.

Questions.

1. Record your results in a table.
2. Draw a bargraph of time (y-axis) vs shape (x-axis)

ACTIVITY 4:

AIM: To design a simple rocket and investigate the effect of air pressure on the height

YOU WILL NEED

- Balloons
- fishing line

SAFETY PRECAUTION
1.Make sure learners don't over-inflate the balloons

METHOD

- Fully inflate five different sizes of balloons and attach to each a finish line
- Release them a=one after the other and establish how high the ballon went up

Questions.

1. Record your results in a table.

2. Draw a bargraph of time (y-axis) vs shape (x-axis)

ACTIVITY 5: Classification of Matter

AIM: To sort materials according to compare the properties of some metal and some non-metal objects, ability to be attracted by magnets and ability to rust in water

YOU WILL NEED

- wood
- stone
- plastic
- fabric
- water
- juice
- tea
- air
- cooking oil
- cooking gas
- zinc
- copper
- aluminium
- sulphur
- cotton
- glass

METHOD

- Describe the appearance of the material you are provided with.
- Classify them according to the specified properties.

Questions

- Draw a table to show your results.

Term 3

STRAND: **MATTER & MATERIALS**

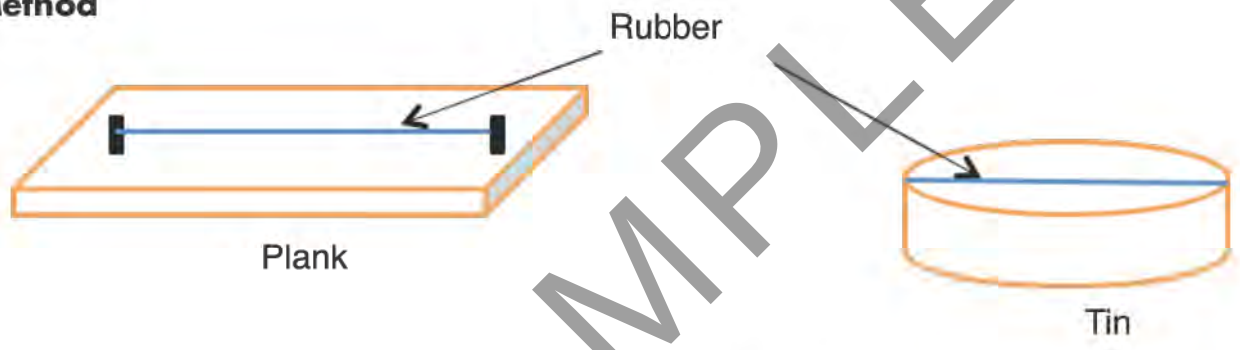
ACTIVITY 1: SOUND

AIM: To create a musical instrument

YOU WILL NEED:

- Plank with a nail at each end / a container with an open end.
- Rubber band

Method



- Pass the rubber band over the 2 nails and ensure that it is taut.
- Strike the rubber band at the centre and release.
- Make an observation

Observation

The rubber band produces a sound note

Conclusion

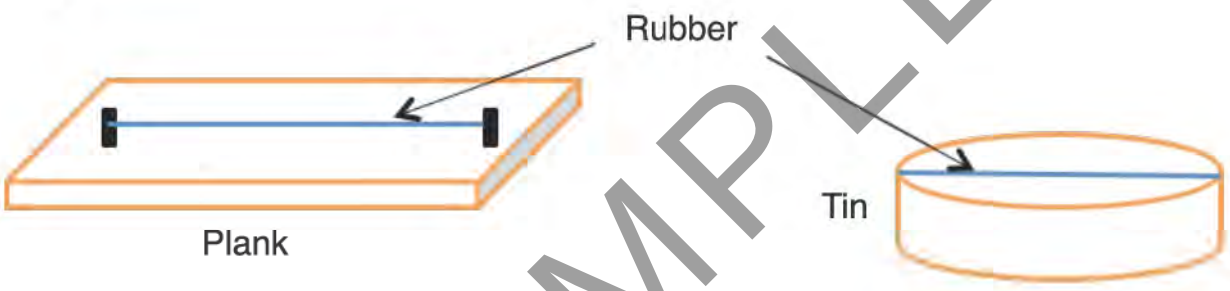
ACTIVITY 2: To create a musical instrument

AIM: To create sound notes

YOU WILL NEED

- Musical instrument from experiment

Method



- Strike the rubber band at one quarter its length
- Make an observation of the sound note produced
- Repeat steps 1 and 2 at half and three quarter position.

Observation

Conclusion

Term 4

STRAND: **PLANET EARTH & BEYOND**

ACTIVITY 1: Day and Night

AIM: To demonstrate the concept of Day and Night.

YOU WILL NEED

- Earth`s model
- Torch

METHOD

- One learner holds a lit torch horizontally.
- Another learner brings now stands along the line of the light so that the globe is illuminated.
- The learner now spins the globe on this own axis in a clockwise direction.

Questions

1. Explain what causes day and night.

GRADE: 5

STRAND: **LIFE & LIVING**

TERM 1

ACTIVITY 1: Making a model of a vertebrate skeleton

AIM: To make a model of a vertebrate skeleton

YOU WILL NEED

- Drinking straws
- metal paper fasteners,
- ruler
- scissors
- sticky tape
- a hole puncher.

1. Plan and conduct your investigation

- Look back through the vertebrate you have learned and choose what kind of vertebrate skeleton you will make.
- Research the vertebrate you decided to make a model of.
- Find information about the structure and the function of the animal's skeleton.
- Make struts using drinking straws and sticky tape
- Draw a picture of your vertebrate skeleton on an A4 paper.
- To start building the skeleton, place a strut on top of the paper, on the spine of your drawing.
- Place your struts to match the skeleton struts in your diagram
- Lay each strut down on your drawing as you work.
- Once you have all the struts you need, cut each one to 4cm bigger than you need.
- Punch holes 2cm from each end and lay each strut back in place on the drawing
- Now connect 2 struts at a time using paper fasteners to model your diagram.

2. Evaluate your model

Evaluate your model of a vertebrate skeleton	Yes	No
Is the model similar to the drawing?		
Did you make use of triangle shapes?		
Can your model stand without help?		
Does your frame model stay in shape?		
Did you finish in time?		
Next time I will:		

Term 2

STRAND: **MATTER & MATERIALS**

ACTIVITY 1: Fuels

AIM: To compare various fuels including candle (wax), paraffin and a biscuit

YOU WILL NEED

- Beakers
- Thermometers
- crucible
- candle (wax)
- Biscuits

SAFETY PRECAUTION
1. Do not huge volumes of paraffin

METHOD

- Use 100g of paraffin to fill a burner.
- Place 100cm^3 of water in a beaker.
- Measure the initial temperature of the water and keep the thermometer in the beaker.
- Heat the water using the paraffin to 5mins and record the final temperature of the water.
- Repeat the same procedure but burning wax and biscuits in open containers.

Questions

1. Draw a table to represent your results.
2. Which fuel caused the highest increase in temperature.
3. Which fuel required the highest input energy needed to make them burn

ACTIVITY 2: Matter and Materials

AIM: To represent the layers of sedimentary rocks

YOU WILL NEED

- Play Dough
- Clay
- Plaster Of Paris,
- And Remains Of Living Things Such As Leaves
- Shells And Bones

METHOD

• making a model to show the layers of sedimentary rocks with fossils embedded in them (using a medium such as play dough, clay, plaster of Paris, and remains of living things such as leaves, shells and bones

Questions

1. Explain how sedimentary rocks are formed.

ACTIVITY 3: Classification of soils

AIM: To sort soils found in the community according to about the colour, smell and texture of the soil

YOU WILL NEED

- Different soil types

METHOD

- Collect soil samples in beakers from the surrounding environment.
- Describe the appearance of the soils you have obtained.
- Classify them according to the specified properties.

Questions

1. Draw a table to show your results.

ACTIVITY 4: Classification of soils.

AIM: To investigate how plants grow in different soil types found in the community

YOU WILL NEED

- Different soil types
- plastic containers
- bean seeds metre rule

METHOD

- Collect soil samples in beakers from the surrounding environment.
- Plant some bean seeds in the different soil types and measure the height of the plant after every day.

Questions

1. Draw a table to show your results.
2. Represent your results by way of a graph

ACTIVITY 5: Classification of soils.

AIM: To investigate how plants grow in different soil types found in the comunity

YOU WILL NEED

- Different soil types
- beakers
- measuring cylinder
- mass meter

METHOD

- Collect soil samples in beakers from the surrounding environment.
- Measure the initial masses of the beakers including the sand
- Pour an equal amount of water in the beakers to make measurements of the mass of the sand and water.
- Leave the beakers outside for a week whilst you measure the mass of each beaker every morning.

Questions

1. Draw a table to show your results.
2. Represent your results by way of a graph

ACTIVITY 6: Classification of Matter

AIM: To sort materials according to compare the properties of some metal and some non-metal objects, ability to be attracted by magnets and ability to rust in water, appearance (shiny/dull)

YOU WILL NEED

- some metal objects (such as copper wire, coins, nails,
- cooking pots, knives and forks)
- some non-metal objects (such as a piece of chalk, a stone, a pile of sand, a piece of coal

METHOD

- Test and compare the electrical conductivity of the given materials
- Classify the material according to shiny/dull appearance
- Classify the materials according to their ability to produce sound when knocked on a surface and which can be able to easily break/bent into shapes._

Questions

1. Draw a table to show your results.
2. Draw suitable graphs.

Term 3

STRAND: **ENERGY & CHANGE**

ACTIVITY 1: ENERGY

AIM: To investigate how long a candle burning candle in different size containers

YOU WILL NEED:

- Candle
- Different sizes of clear glass container (Marked A, B, C, D etc)
- Matches

Method:

- Light a candle
- Enclose the candle in a glass container A.
- Record the time it takes to go out
- Repeat steps 2 and 3 with other glass sizes.

Observation

CONTAINER	TIME
A	
B	
C	

Conclusion

ACTIVITY 2: FUELS

AIM: To investigate different fuel types

YOU WILL NEED

- Wood splinter
- Coal
- Candle
- Paraffin
- Peanut
- Biscuit
- Matches

(You will need a well-ventilated area to carry this experiment)

Method

- Light up a wood splinter and observe
- Repeat with other materials. (For paraffin, dip a rug in paraffin and light it up)

Observation

Conclusion

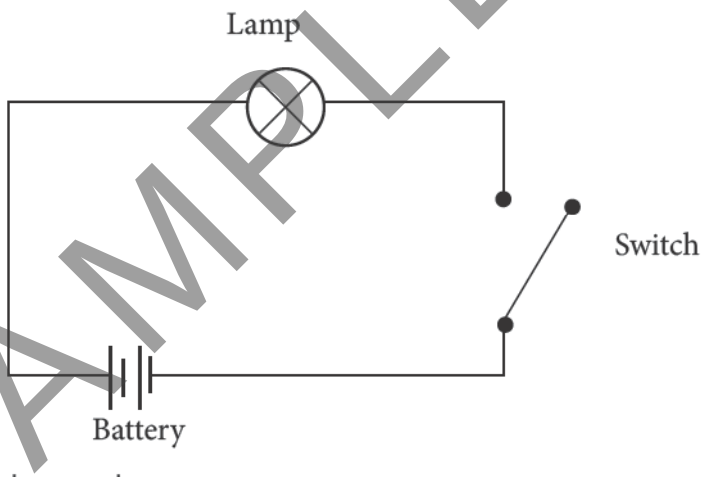
ACTIVITY 3: ELECTRIC CIRCUITS

AIM: To create simple electric circuits

YOU WILL NEED

- Torch bulb + holder
- Wire leads
- Battery + holder
- Switch

Method



- Assemble the apparatus as shown above.
- Put the switch to ON position and record your observation.

Results

Switch position	Bulb lights up(Yes / No)
Off	
On	

Conclusion

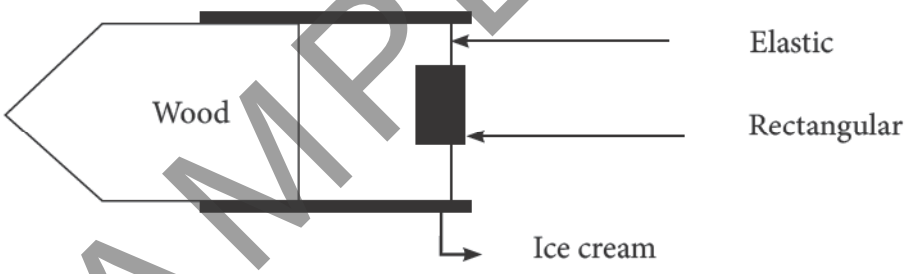
ACTIVITY 4: ENERGY IN ELASTIC OR SPRINGS

AIM: To convert energy stored in an elastic band to pedal power

YOU WILL NEED

- 2 x ice cream sticks
- Wood board
- Elastic band
- 1 x Small rectangular plastic board with a hole on each short side.
- Wood glue.
- Wide water trough

Method



- Attach the ice cream sticks onto the wood board using wood glue as shown in diagram.
- Let the assembly dry.
- Cut the rubber band at one point to create a long piece.
- Pass the rubber through the 2 holes of the plastic board.
- Tie the loose ends together.
- Pass the rubber band over the sticks as shown on the diagram
- Wind the rubber band using the rectangular plastic board.
- Place the assembly on water and release the rectangular board.
- Record your observation.

Observation

Conclusion

Term 4

STRAND: **PLANET EARTH & BEYOND**

ACTIVITY 1: The solar system

AIM: To investigate and interpret the solar system by using models, pictures and video clips making about the Earth and its orbit around the Sun

YOU WILL NEED

- Pictures and models of Earth
- Moon
- Sun and planets
- Light source such
- as torch
- Lamp
- or candle and video clips

METHOD

- Test and compare the electrical conductivity of the given materials
- Classify the material according to shiny/dull appearance
- Classify the materials according to their ability to produce sound when knocked on a surface and which can be able to easily break/bent into shapes.

Discuss

- The total number of planets known.
- Position of the SUN to the planets
- Position of Earth's Moon to the planet Earth.

GRADE: 6

STRAND: **LIFE & LIVING**

TERM 1

ACTIVITY 1: Comparing the taste of glucose sugar and starch

AIM: Comparing glucose sugar and starch according to their taste and colour ability to rust in water

YOU WILL NEED:

- glucose powder
- maize flour
- odine solution
- warm water
- 2 plastic beaker
- spoon.
- Starch

Method:

- Label the plastic beakers, 1st beaker as glucose and the 2nd beaker as starch
- Pour 3 spoons of sugar in 1st beaker
- Place 3 spoons of maize flour in the second beaker
- Observe the colour of the beaker and record on the table below
- Put a little of each on your tongue and record the taste on the table below
- Add 200ml of water and stir

Observation: complete the table below:

Test	Glucose Powder	Starch (Maize Flour)
Colour		
Taste		
How easily it dis-solves		

ACTIVITY 2: Testing the presence of starch

AIM: To test starch with iodine solution to show colour changes

YOU WILL NEED:

- starch/(maize flour)
- iodine solution
- plastic dropper
- 2 test tubes
- glucose powder

Method:

- Mark the test tubes A and B
- Add 3ml of maize flour/starch in test tube A
- Add 3ml of glucose in test tube B
- Add 2 drops of iodine solution in each test tube and note the colour changes.

Observations:

- Did the colour of iodine solution change colour when added to test tube A
- Did the colour of the iodine solution change colour when added to test tube B
- Therefore the iodine solution changes colour to _____ when added to starch.

ACTIVITY 3: Find out which foods contain starch

AIM: To test food for starch

YOU WILL NEED

- Cooked Rice
- Potato
- Apple
- Flour
- Boiled Egg
- Bread
- Sugar
- Cheese

Method:

- Add 2 drops of iodine solution on each small food sample
- Observe the colour change and complete the table below

Observations and results

Food sample	Colour before Testing	Colour after testing	Contains starch: yes / no
Cooked rice			
Potato			
Apple			
Boiled egg			
Bread			
Flour			
Sugar			
Cheese			

Term 2

STRAND: **MATTER & MATERIALS**

ACTIVITY 1: Separating mixtures

AIM: To Investigate different solids to see if they dissolve in water including: non-metal objects, ability to be attracted by magnets and ability to rust in water

YOU WILL NEED

- Salt
- Sugar (Soluble Substances)
- Sand
- Mealie Meal
- Flour
- Maize Flour
- Samp
- Curry Powder
- Custard Powder (Insoluble Substances)
- Beaker

METHOD

- Measure 50cm^3 of water in a measuring cylinder and transfer it into a beaker.
- Add a spatula of salt and make observations.
- Repeat the process but using different substances.
- Make observations

Questions

1. Classify the substances as in a table.

SUNSTANCE	DISSOLVE IN WATER	DOES'NT DISSOLVE IN WATER
salt		
custard powder		
sugar		
sand		
maize meal		
samp		
curry powder		

ACTIVITY 2: Separating mixtures

AIM: To Investigate different solids to see if they dissolve in water including:

YOU WILL NEED

- Salt Solutions
- Mealie Meal Suspension In Water
- Beaker

METHOD

- For the salt solution, heat it strongly until all the water has evaporated and then salt particles remain at the bottom of the beaker.
- For the maize flour, allow the maize to be suspended under water after an hour and then pour out the water.
- For sand in water, use filtration set up to allow the water to be collected as the filtrate.

Questions

1. Would you classify the dissolving of substances in water as physical or chemical change.
2. Give a reason for your answer.

ACTIVITY 3: Solubility

AIM: To Investigate the relationship between the time taken to dissolve and the temperature of the water.

MATERIALS

- fine salt
- spatula
- beaker
- water
- sand
- filter paper
- filter funnel
- distillation kit
- burner

SAFETY PRECAUTION
1. Ensure that the spirit burner is handled with care since spirit is highly flammable.

METHOD

- Measure the temperature of 50cm3 of water, and add a spatula of salt.
- Add two spatulas of sand and thoroughly mix.
- Setup a filter funnel and a filter paper.
- Pour the mixture into the filter funnel and wait for all the water to pass through as the filtrate.
- Collect the filtrate and carry out distillation to collect the distillate.

Questions

1. Sand and water can be separated by filtration because sand is _____in water.
2. Creation of a mixture is a physical/chemical change?

Term 3

STRAND: **ENERGY & CHANGE**

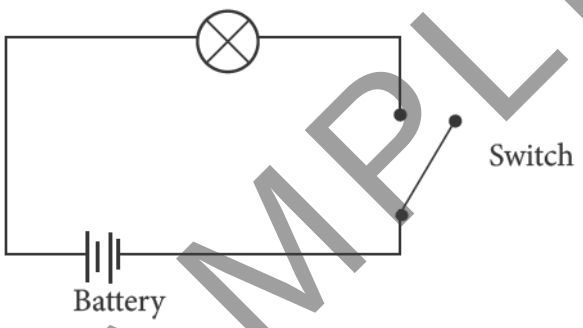
ACTIVITY 1: ELECTRIC CIRCUITS

AIM: To investigate how to make a simple electric circuit

YOU WILL NEED

- Torch bulb + holder
- Wire leads
- Battery + holder
- Switch

Method



- Connect the positive end of the battery to the bulb holder.
- Connected the other end of bulb holder to one end of the switch
- Connect the other end of the switch to the negative pole of the battery
- Put the switch to ON position and record your observation.

Results

Switch position	Bulb lights up(Yes / No)
Off	
On	

Conclusion

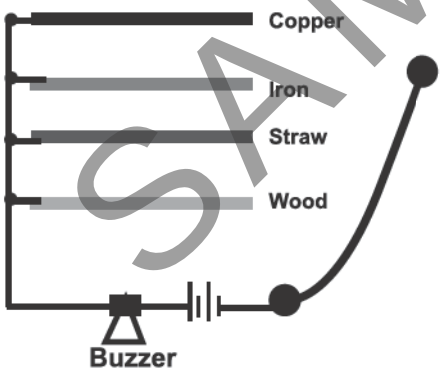
ACTIVITY 2: Conductors And Non Conductors

AIM: To determine which materials conduct electricity

YOU WILL NEED:

- Iron rod
- Copper rod
- Plastic Straw
- Wooden rod
- Wire leads
- Battery
- Buzzer

Method



- Assemble the apparatus as shown in diagram.
- Connect the terminal T to the wood and observe.
- Repeat step 2 with straw, iron and coppe

Results

Material	Buzz (Yes / No)
Wood	
Straw	
Iron	
Copper	

Conclusion

Term 4

STRAND: PLANET EARTH & BEYOND

ACTIVITY 1: Rotation and Revolution of the Earth

AIM: Demonstrating the movements (rotation and revolution) and of the Earth using models and body movements.

YOU WILL NEED

- Group of learners

SAFETY PRECAUTION
1. Ensure that the spinning learner doesn't lose balance.

METHOD

- One learner stands at the centre and nine are standing around one as if they are planets around the sun, the learner at the centre who acts as the sun.
- The learner who is on the Earth`s position has to move around the 'sun@ in a fixed circular path however he/she needs to be spinning in a counter-clockwise sense.

Questions

1. The sun takes how long to spin on its own axis?
2. How long does the sun take to rotate around the sun?

ACTIVITY 2: Day and Night

AIM: To demonstrate the concept of Day and Night

YOU WILL NEED

- Earth`s model
- Torch

METHOD

- One learner holds a lit torch horizontally.
- Another learner brings now stands along the line of the light so that the globe is illuminated.
- The learner now spins the globe on this own axis in a clockwise direction.

Questions

1. Explain what causes day and night.

ADDITIONAL ACTIVITIES

Grade 4 Term 3

- Draw and write on how the energy of the sun is transferred through food made by plants to people (food chain).
- How does sound travel in the human ear?

Grade 5 Term 3

- Project: Write about fires in the communities and draw attention to causes,
- prevention as well as action to take in the event of a fire.
- What is the difference in energy contained in a biscuit and candle?
- How does electricity travel from the power station to the home?
- What is the source of energy in the power station?
- What is the source of energy in the battery?
- Draw and label the components of a circuit.

Grade 6 Term 3

- Draw a simple circuit diagram.
- Identify where electrical insulators are used.
- Make a system that produces sound
- Examine the labels on electrical appliances and determine which appliance uses most energy.

BROKEN MATERIALS RECORD SHEET

MATERIAL	TYPE OF MATERIAL (liquid/glass/ chemical/etc)	QUANTITY	DATE	SIGNATURE

HOD SIGNATURE : ______________________

PRINCIPAL SIGNATURE: ___________________

Science worksheet
Before the experiment

Name		**Date**	
Grade		**Term**	
Core knowledge			

Title of the investigation:

What I want to find out:

What must I do to find this:

What I need to use:

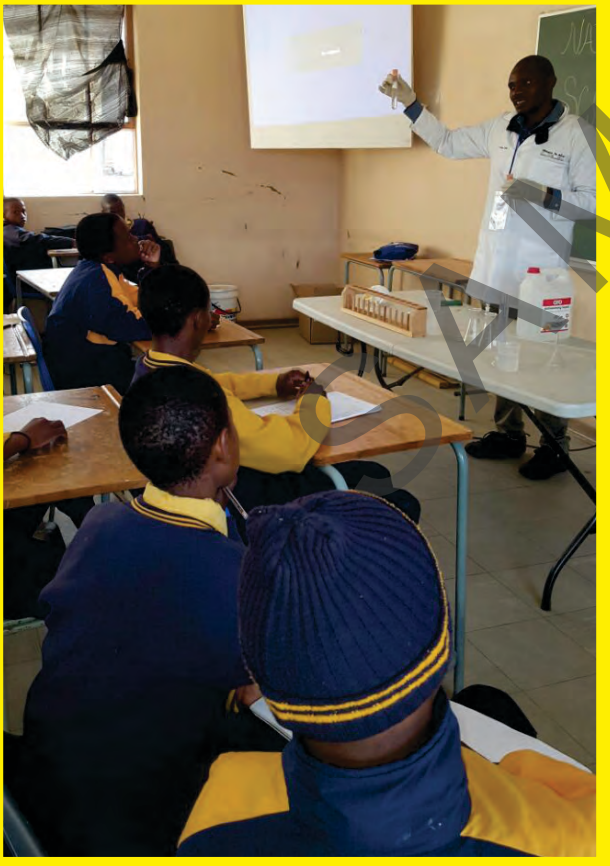
What you think will happen:

Training

- Educator training will be done for the **Mobile Science Laboratory™** upon delivery, describing content and usage of the Lab, for **FREE**.
- 5 days a week call center will also be available for further assistance from 8am to 5pm.

Additional Training

- Any additional training that is needed can be done over 4 sessions, which amounts to 8 hours at R 1, 800 per educator, over a period of 2 – 3 days, depending on the teacher's schedule.
- Further training is available per educator at a fee of R450 per session for 2 hours.
- All educators attending the additional training will be awarded a report for **Certificate of Attendance**.
- The teachers will choose from a menu of items.
- Areas tackled are as follows:
    - Content & Methodology;
    - Problem solving;
    - Understanding the total curriculum;
    - Lesson planning;
    - Testing and assessment;
    - Tackling language diversity;
    - Teaching activities;
    - Transfer of learning;
    - Projects and practical work;
    - Materials and resources;
    - Tracking of learner performance; and
    - ICT-based learning.
- The Department of Basic Education requires teachers to engage in workshops that improve their professionalism, competencies and gain PD (Professional Development) points.
- In 2016, it became a legal requirement and has been monitored by the Department of Basic Education.
- Each teacher will be expected to achieve at least 150 PD points in every three-year cycle.
- SACE will issue a Certificate of Achievement to each teacher who achieves the target number of PD points within the three years, as follows:
    - 150 points: Certificate of Achievement Bronze;
    - 151-300 points: Certificate of Achievement Silver; and
    - 300+ points: Certificate achievement Gold.

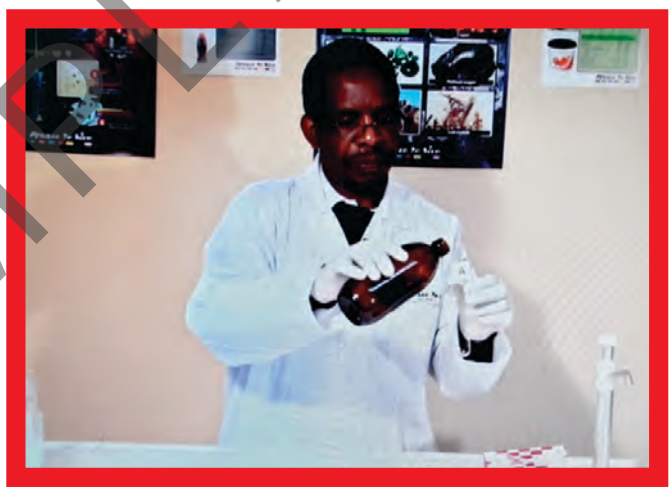


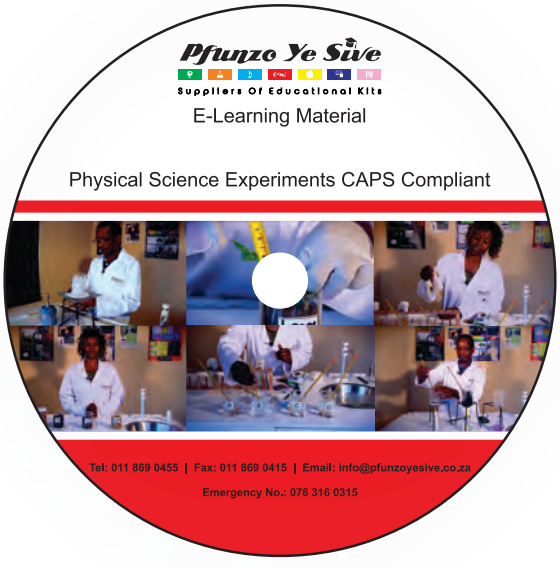
Optional Extra

- We have an IPAD with DVD – CAPS Aligned.
- Loaded with live demonstrations of the work to be covered in the term and year of assessment.
- These DVD's serves dual purposes:
    - For the teacher to brush up on lesson plans; and
    - For learners to watch and learn how to do experiments.

Pfunzo Ye Sive™
Suppliers Of Educational Kits

Experiment DVD`s





Pfunzo Ye Sive™
Suppliers Of Educational Kits

Recommendation

- 4 units per school

Transportation and Delivery

- We can deliver 10 – 15 units per week to respective schools.
- Depending on the size of the order, we would need lead time to plan and executive.
- Training will be done 2 days after deliver of units by our professional staff.
- All transporting will be handled by a Supplier, that has a proven track record, to deliver great service.
- Our transport provider is 100% BBBEE owned company employing over 80% preciously disadvantaged individuals.

Cost per unit

- Pfunzo Ye Sive **Mobile Science Laboratory™** Intermediate Phase (*including transport*):

  ⇒ Total: **Price on Request**.

- Optional Extra:

  ⇒ IPAD with DVD – **R 8, 980-00**.

- Additional Educator Training:

  ⇒ 4 sessions (8 hours) at **R 1, 800-00**.
  ⇒ Additional to above will be at **R 450-00** per session.