

# Foundation Based Education Cycle One

Learning to Do, Learning to Be, Learning to Know, Learning to live Together



## Science & Technology

## SCIENCE AND TECHNOLOGY

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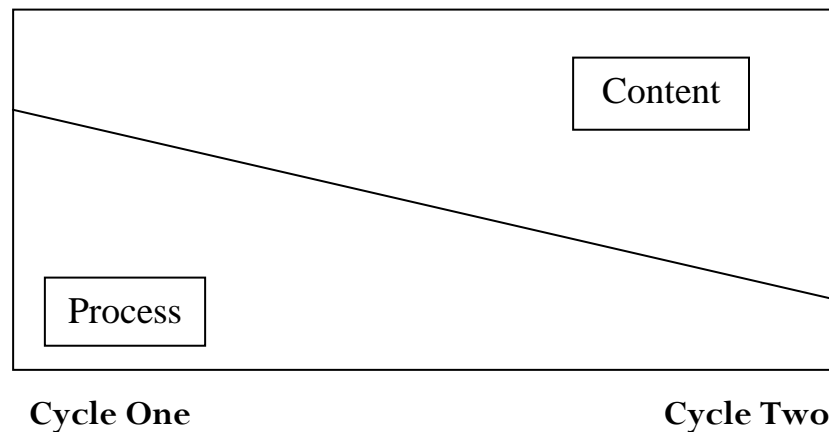
## SCIENCE AND TECHNOLOGY

### Introduction

Science is an educational area that seeks to help the children describe and explain the natural and physical world. Technology helps the children apply scientific knowledge, skills and concepts to meet needs and solve problems.

Young children are naturally curious and this curiosity leads them to explore the world around them. This domain area gives the children an opportunity to communicate their questions and make sense of their environment. Young children explore their world by observing and manipulating common objects. They investigate and interpret their observations through their senses.

During Cycle One, Science and Technology experiences must provide a foundation for more formal instruction later on. At this level there is a stronger emphasis on the process skills than on content knowledge as opposed to Cycle Two where content plays a greater role.



The class setting for Science and Technology should be intellectually challenging and interesting. Tools and simple equipment must be available for use in gathering data to extend the senses. A science learning center should be set up where children can explore the properties of objects such as magnets and materials such as water.

The main objectives of Science and Technology in the first cycle are:

- To motivate children with interesting science material and to help them build a foundation for language, mathematics, science and technological skills.
- To introduce children to important cognitive and process skills such as observing, comparing, space/time relationships, communicating and manipulating.
- To challenge children with problem solving steps i.e. identifying a problem, proposing a solution, implementing the proposed solution, evaluating the success of the solution and communicating the results.

In order to have a successful Science and Technology program teachers should:

- Base activities on children's prior knowledge and experience.
- Encourage children to ask questions and let them give possible explanations.
- Listen to their ideas.
- Keep activities short and within the children's developmental range.
- Make science experiences as interactive as possible by providing hands-on/ enquiry activities.
- Vary the activities; use the outside as much as possible.
- Encourage the children to collect the materials they need.
- Establish a home / school connection.
- Encourage children to take things home and/or bring things from home.
- Provide opportunities to investigate familiar products and materials.
- Use simple tools and technology to construct and create.
- Enjoy the science time. Enthusiasm is contagious!

## SCIENCE AND TECHNOLOGY

### EARTH AND SPACE SCIENCE

#### Standards / Goals

- # 1 Earth and Space Science: The student understands atmospheric processes and the water cycle.
- # 2 Earth and Space Science: The student understands Earth's composition and structure.
- # 3 Earth and Space Science: The student understands the composition and structure of the universe and Earth's place in it.
- #10 Technology Sciences: The student understands the nature of technology.
- #11 Technology Sciences: The student understands the design of technology.
- #13 Basic Science and Technology Skill: The student can define the nature of scientific and technological inquiry.
- #14 Basic Science and Technology Skill: The student can explain the nature of scientific knowledge.
- #15 Basic Science and Technology Skill: The student understands the abilities for a scientific and technological world.

#### TOPIC: WEATHER

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills</i> : attentive listening, writing and speaking</p> <p><i>Social Skills</i>: staying with the group, looking at the speaker, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills</i>: analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills</i>: observing, comparing, measuring, classifying, predicting, investigating, using space / time relations, communicating, manipulating, interpreting</p>	<p>Outdoor environment</p> <p>Related books:</p> <ul style="list-style-type: none"> <li>● 'Sergio and the Hurricane' - Alexandra Wallner</li> <li>● 'Rain' by - Kristin Ward</li> <li>● 'Weather'-- Gallimard Jeunesse</li> <li>● 'Rain' - Joy Palmer</li> <li>● 'Weather Watch' - Julian Rowe and Molly Perham</li> <li>● 'Wind and Weather' - Barbara Taylor</li> <li>● 'My Science Book of Weather' - Neil Ardley</li> </ul>

	<p>Poems and videos related to theme</p> <p>Construction Material e.g. different types of paper and cardboard boxes</p> <p>Art materials e.g. paper, glue, markers, fabric, straws, art sticks, wood, paint, scissors, prick pins, paint, paintbrushes etc.</p> <p>Puzzles related to theme</p> <p>Material for role-play (props, clothes)</p> <p>Weather Chart</p> <p>Materials for experiments e.g. ice, water, thermometer, containers, various types of materials: cotton, knitwear, rubber, plastic wrap, newspaper, rubber bands, paper cups, eye droppers</p> <p>Examples of clothing for a weather doll/bear</p> <p>Posters/pictures showing different weather conditions</p>
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Target Behavior	Content	Suggested Experiences	Assessment Opportunities
1. Explore and observe changes in the weather on a daily basis	<p>Weather Observation</p> <p>Vocabulary – sunny, rainy, windy, cloudy, rainbow, sunshine, clouds, sun, hot, cool warm, breezy, chilly</p>	<p><b>Whole Class and Small group</b></p> <p><i>Process Skills: Observing, predicting, comparing, measuring, classifying</i></p> <p>Daily Weather Chart activities</p> <p>Each morning groups of children or individuals will go outside and report on the weather and complete the chart.</p> <p>Sort weather pictures</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Observing and telling about daily weather conditions.</li> <li>● Drawing a picture about the daily weather condition.</li> <li>● Writing about the daily weather condition.</li> <li>● Identifying symbols or pictures on a weather chart that represent the daily weather condition.</li> <li>● Telling how the weather condition affects him/her.</li> <li>● Comparing weather</li> </ul>

			conditions over a period of time.
2. Identify appropriate dress for different weather conditions	Matching clothes with weather conditions Weather affects decisions made about clothing	<p><b>Whole Group</b> During Shared Reading read “Bear Gets Dressed” by Arnold Lobel (Harper &amp; Row)</p> <p><b>Small group /Centers</b> <i>Process Skills: Communicating, comparing, classifying, inferring</i> Sort collections of clothes (or pictures of clothes) into piles i.e. for sunny days, for windy days for cold days Dress dolls or teddy bears in clothing suitable for the weather conditions <i>Process Skills: Manipulating, comparing, investigating</i> Teacher prepares squares of material cut larger than the rim of a coffee can. <i>(There must be enough samples of material for each group of five students.)</i> The children must investigate the type of material that is suitable for rainy weather. Newspaper is spread out to protect work surfaces from spills. A square of material is spread over the top of an open coffee can and secured with a</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Sorting appropriate clothing for given weather conditions.</li> <li>• Conducting an investigation and recording the results</li> <li>• Using process skills</li> </ul>

		rubber band. The children use an eyedropper to drop water on the material and observe what happens. After trying several samples of material they record what happens and tell which material is better for rainy day wear and why.	
3. Explore and describe different kinds of weather	Types of weather conditions e.g. sunny, windy, rainy, cloudy <i>Vocabulary: temperature, thermometer, rainfall, rain gauge, wind vane, north, south, east, west</i>	<b>Small group / Centers</b> <i>Process Skills: Observing, comparing, communicating, manipulating</i> Simple experiments to: Measure heat, rainfall, wind strength and direction Teacher demonstrates how to use a thermometer. Children will then measure the temperature in different places i.e. in the sun, in the shade. <i>Process Skill: Manipulating</i> Create weather collages, 3D pictures Make pinwheels, sun visors, sail boats, Create weather books	Teacher observes or records a child: <ul style="list-style-type: none"> <li>• Telling how weather conditions are alike / different.</li> <li>• Observing a science experiment and telling / drawing / writing what was observed.</li> <li>• Creating working models. e.g. sailboats, pinwheels, rain gauge, wind vane</li> <li>• Identifying different weather conditions.</li> <li>• Predicting what will happen e.g. when ice is placed in the sun.</li> </ul>
4. Design, construct and use a weather instrument	Weather instruments that measure the: <ul style="list-style-type: none"> <li>• Amount of rainfall.</li> <li>• Direction of the wind.</li> </ul>	<b>Whole Class</b> <i>Process Skill: Communicating</i> Discussion about weather instruments	Teacher observes or records a child: <ul style="list-style-type: none"> <li>• Drawing a design for a weather instrument.</li> </ul>



	<ul style="list-style-type: none"> <li>• Strength of the wind.</li> </ul>	<p><b>Small Group / Centers</b>  <i>Process Skills: Observing, using space / time relations, comparing, communicating, manipulating, measuring, investigating</i>  The children can create a mini weather station using home-made instruments. Daily rainfall, temperature, wind direction and wind strength can be measured and recorded.</p>	<ul style="list-style-type: none"> <li>• Constructing a weather instrument.</li> <li>• Using a home-made weather instrument.</li> <li>• Recording information from observations.</li> </ul>
5. Develop an awareness of the water cycle	<p>Formation of clouds  Types of clouds</p> <p>What causes the rain to fall  Movement of water through the Water Cycle:</p> <ul style="list-style-type: none"> <li>• Where does rain come from?</li> <li>• Where does rain go?</li> <li>• Can you see water go up?</li> <li>• Can you see rain come down?</li> </ul> <p><i>Vocabulary: evaporation, condensation</i></p>	<p><b>Whole Class or small group</b>  <i>Process Skills: Observing and predicting</i>  Observe the types of clouds on rainy, sunny and cloudy days</p> <p><i>Process Skills: Investigating, observing, manipulating</i>  Experiment:  Put cold water in a pan and let it boil.  Place ice in a screw top glass jar and tighten the cover.  Hold the jar over the pan. (<i>Use oven mitts</i>)  Discuss what happens.</p>	<p>Teacher observes and records a child:</p> <ul style="list-style-type: none"> <li>• Explaining in their own words the different processes of the water cycle.</li> </ul>

TOPIC: WATER

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> Observing, communicating, using space/time relations, manipulating, measuring, investigating, predicting, inferring</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>• ‘McGraw Hill Science’ Grade K, 1 &amp; 2</li> <li>• ‘Primary Science for the Caribbean: How to Teach Primary Science’ – Ralph Douglass</li> <li>• ‘Teaching Elementary Science’ – William K. and Mary K. Esler</li> </ul> <p>Books related to topic:</p> <ul style="list-style-type: none"> <li>• Linkers ‘Water discovered through Art and Technology / Science’ – Karen Bryant-Mole</li> <li>• Macdonald Science Starters – ‘Drips and Drops’</li> <li>• Science Explorers ‘Water’ – Nicola Edwards and Jane Harris,</li> <li>• Rainbow – Science is Fun ‘Floating’ – Charles Warren</li> </ul> <p>Water, ice, containers, spoons, a rock, a sponge, a coin, a block, a craft stick, a cork or any other small items, stop watch or timer, clock</p> <p>Pictures of sources of water</p>

Target Behavior	Content	Suggested Experiences	Assessment Opportunities
<p>1. Identify and observe the properties of water</p> <ul style="list-style-type: none"> <li>• Water is wet and flows.</li>   <li>• Water takes the shape of the container, which it is in.</li>   <li>• Water reflects.</li>   <li>• Things look different</li> </ul>	<p>Water is wet and flows.  Water takes the shape of the container it is in.  Water reflects.  Water is transparent.  Things look different when placed in water.  <i>Vocabulary: wet / dry, flow, transparent, reflect, reflection</i>  <i>Tall, wide, long, round, fast, faster, fastest</i></p>	<p><b>Small group / Centers</b>  <i>Process Skills: Observing, communicating, comparing, manipulating, predicting, investigating</i>  Let the children have free play in the Water and Sand tray.  Place some sand on sheets of newspaper and place water on sheets of newspaper. Ask the children to place water on the newspaper. The children are asked to describe the two sets of newspaper.  Ask the children <i>How does water move?</i><sup>1</sup> Let them have drop races. Place water in several differently shaped containers and freeze it.  <i>In order to have the children predict ask them what shape the ice will be.</i></p> <p><b>Whole Class</b>  Let the children observe pictures of reflections and discuss experiences of seeing a reflection in the water.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Articulating the properties of water with use of appropriate vocabulary.</li> <li>• Describing experiments</li> </ul>

<sup>1</sup> Place a row on water drops at one end of the cookie tray, tilt the tray slowly and see which drop wins the race

<p>when placed in water. Water makes things look bigger.</p>		<p><b>Small Group / Centers</b> Place water in a clear plastic container e.g. a cut water bottle and let a child hold the bottle and look at their hand through the container, Ask <i>Does your hand look different when you look at it through the water?</i> Place a drop of water on a piece of clear plastic. Hold the plastic over a letter in a book and let a child look at the letter. Place a paintbrush in a transparent container filled with water. Let the children look at the paintbrush from the side of the container.</p>	
<p>2. Identify and observe the states of water</p>	<p>Water has three forms. When water changes from one form to another the amount stays the same. <i>Vocabulary: wet / dry, liquid, solid (ice), gas (steam), evaporate, freeze, water vapour, melt, boil, condensation</i></p>	<p><b>Whole class or small group</b> <i>Process Skills: Observing, communicating, using space/time relations, manipulating, measuring, investigating, predicting, inferring</i> Freeze and boil water and discuss observations Pour a cup of water in a plastic container and put in the freezer. When it has turned to ice, let the ice melt and measure the amount of water in the container. Put an ice cube in a paper cup</p>	<p>Teacher observes and records a child:</p> <ul style="list-style-type: none"> <li>• Identifying and naming the three forms of water.</li> <li>• Using suggested process skills when experimenting with water.</li> </ul>

		<p>and discuss what happens. Guess how long the ice-cube will take to melt under different conditions, (in the sun, in the fridge, in the classroom, in the shade).</p> <p>Let the children observe what happens as water boils. Place a cold spoon at the end of the steam and discuss what happens.</p> <p>Make a glass of ice-water and observe how long it takes before condensation is seen.</p> <p>Place a child's hand in cold water and then <b>warm</b> water and ask them to tell the difference.</p>	
3. Discuss sources of water	<p>Sources of water</p> <p><i>Vocabulary: source, tap, faucet, pond, spring, water tank, cistern, well</i></p>	<p><b>Whole Class or small groups</b></p> <p>Discussion about sources of water based on picture discussion or during Shared Reading</p> <p><i>Process Skills: Observing, comparing, communicating</i></p> <p>Children collect water from different sources and compare them (by sight or smell).</p> <p>Children can <i>infer</i> that most of our water comes from the rain.</p>	<p>The teacher observes and records a child:</p> <ul style="list-style-type: none"> <li>● Telling sources of water.</li> <li>● Telling why water from certain sources cannot be used for drinking.</li> </ul>

		The process by which desalination takes place can be demonstrated <sup>2</sup>	
4. Tell ways of using water	People use water for many different reasons. <i>Vocabulary: bathing, washing, drinking, cooking, cleaning etc.</i>	<b>Whole Class</b> Discussion during Shared Reading The children create a 'Uses of Water' booklet	Teacher observes or records a child: <ul style="list-style-type: none"> <li>Telling, drawing, writing about uses of water.</li> </ul>
5. Demonstrate and tell how to conserve water	It is very important not to waste water by leaving taps running.	<b>Whole Class</b> Discussion Demonstration by teacher <i>Process Skills: Observing, using space / time relations, measuring</i> <b>Small group / Centers</b> In order for the children to become aware of how much water is wasted by dripping taps they can: <ul style="list-style-type: none"> <li>Count drops from a dripping tap in a given period of time, e.g. one minute</li> <li>Measure the amount of water that drips in an hour.</li> </ul>	Teacher observes or records a child: <ul style="list-style-type: none"> <li>Telling ways of saving water at home or at school.</li> </ul>
6. Explore and identify what sinks or floats.	When you put something in water it either stays on the top (floats) or goes under the water (sinks). <i>Vocabulary: float / sink, heavy /</i>	<b>Small group/ Centers</b> <i>Process Skills: Observing, communicating, comparing, using space / time relations, manipulating, classifying, investigating</i>	Teacher observes or records a child: <ul style="list-style-type: none"> <li>Testing for floating and sinking</li> </ul>

<sup>2</sup> Salted water can be boiled in a small pan. As steam forms a cold metal spoon is placed in the steam. The drops of condensed water that form on the spoon are caught as they drip. This water will be fresh. If the water is allowed to boil until there is none left in the pan, the children will observe that salt is left as a residue.

	<i>light</i>	<p>Children can work in pairs. Each group is given a bowl of water, a rock, a sponge, a coin, a block, a craft stick, a cork or any other small items. The children are asked to investigate which sink and which float.</p> <p>Give children a pumice stone to drop into the water and ask them to observe and tell what happens.</p>	<ul style="list-style-type: none"> <li>• Making boats that float</li> <li>• Telling the result of an experiment.</li> </ul>
7. Design and construct a boat that floats	Designing and making a boat that can float.	<p><b>Small Group / Centers</b></p> <p><i>Process Skills: Observing, communicating, comparing, using space/time relations, manipulating, classifying, investigating, measuring</i></p> <p>The children can make boats and test their design to see if the boat sinks or floats. They can also see how long it takes to sink.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Making and testing a boat.</li> </ul>

TOPIC: AIR

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> observing, communicating, investigating, controlling variables, manipulating, comparing, predicting, inferring, using space/time relations</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>● ‘McGraw Hill Science’ Grade K, 1 &amp; 2</li> <li>● ‘Primary Science for the Caribbean: How to Teach Primary Science’ – Ralph Douglass</li> <li>● Teaching Elementary Science’ – William K. and Mary K. Esler</li> </ul> <p>Related books:</p> <ul style="list-style-type: none"> <li>● ‘Air &amp; Flying’ – David Evans and Claudette Williams</li> <li>● Modern Curriculum Press – ‘Science Level A, Life – Health – Earth – Physical’</li> </ul> <p>Jars with covers, mesh, rubber bands, pumps, bicycle tires, inflatable toys, balloons,</p> <p>A bucket, lengths of rope, dish liquid, empty dish liquid bottles, straws, cups of water, umbrella, soda cans, paper to make fans</p> <p>Six large sheets of tissue paper , glue, a hair dryer</p> <p>Paper to make airplanes, windmills, streamers, feathers, beads, cloth for parachutes, string, objects to be used as a weight for the parachutes</p>

Target Behavior	Content	Suggested Experiences	Assessment Opportunities
<p>1. Recognize the importance of air</p>	<p>Air is important for breathing, making things move, pumping things up, drying and cooking.</p> <p><i>Vocabulary: air, breathe, wind</i></p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Observing, predicting, controlling variables, investigating</i></p> <p>The teacher can collect two insects and put one in a jar with a cover without holes and one in a jar with a mesh cover. The jars can be placed in the Science Center for observation. The</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Telling why air is important.</li> <li>● Carrying out experiments and communicating what took place.</li> </ul>



		<p>children can observe what happens to the insects. The children can breathe in and out whilst holding their diaphragms.</p> <p><i>Process Skills: Manipulating, comparing</i></p> <p>Children can make a display of inflatable objects e.g. balloons, tires, toys.</p> <p><b>Small Group / Centers</b></p> <p><i>Process Skills: Investigating, inferring, communicating</i></p> <p>The children can work in pairs, each makes a mark on the chalkboard with a wet sponge. They blow on the mark until it dries and tell what happens to the mark.</p>	
2. Investigate the presence of air around us	<p>Air is present but cannot be seen.</p> <p><i>Vocabulary: air, gas, invisible</i></p>	<p><b>Small Group / Centers</b></p> <p><i>Process Skills: Investigating, communicating</i></p> <p>On a windy day the children can go outside and put up an umbrella.</p> <p><i>Question 'What do you feel when you push or pull an umbrella in front of you?'</i></p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Carrying out experiments.</li> <li>● Describing /drawing what happened.</li> </ul>

		<p>The children can fan their face with their hands to feel the air.</p> <p><i>Process Skill: Manipulating</i></p> <p>Let the children make paper fans.</p> <p><i>Process Skills: Predicting, observing, communicating</i></p> <p>Place an empty soda can in water and observe what happens.</p> <p>Take an empty dish liquid bottle and squeeze it. (<i>This needs to be done in an open place.</i>)</p> <p><i>Process Skills: Observing, communicating</i></p> <p>Let the children go outside on a windy day and feel the breeze and discuss what they feel.</p> <p><i>Process Skills: Manipulating, observing, investigating, communicating</i></p> <p>In pairs they can blow up a balloon and let the air escape and see how it feels on different parts of the body.</p> <p>Blow through a straw into a cup of water and observe what happens.</p> <p>Make bubble mix in a bucket.</p> <p>Give each child a length of wire and let them make a loop at one</p>	
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		<p>end. Dip the loop into the mix and make large bubbles. Challenge them to discover how to get the air out of the bubbles.</p>	
3. Investigate how air takes up space	Air takes up space.	<p><b>Small Group / Centers</b> <i>Process Skills: Observing, investigating, manipulating, communicating</i> Blow up paper bags Ask 'What will happen if you burst the bag with your hands?' Place an empty soda can or a blown up balloon in the water tray and observe what happens. Make a hot air balloon by pasting six large tissue paper leaf shapes together. Place a hair dryer under the opening, turn it on and observe what happens to the balloon.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Following instructions for doing experiments.</li> <li>• Answering guided questions.</li> </ul>
4. Investigate how air moves different things	Air can cause movement.	<p><b>Small Group / Centers</b> <i>Process Skills: Comparing, using space/time relations, investigating, communicating, manipulating</i> Children can make parachutes and test them. Try to move beads by blowing into a straw Try to move cut out paper butterflies using a fan. In pairs, one holds two pieces of</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Following instructions for doing experiments.</li> <li>• Answering guided questions.</li> </ul>

		paper and the other blows between them. The children explain what happens. Children can see how long they can keep a feather in the air by blowing on it	
<p>5. Design, construct and use an object that proves:</p> <ul style="list-style-type: none"> <li>• Air surrounds us.</li> <li>• Air takes up space.</li> <li>• Air can be used to move objects.</li> </ul>	Making fans, kites, windmills, paper planes	<p><b>Small Group/Centers</b></p> <p>Children can make windmills, kites, paper planes or streamers and fly them.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Designing and using the created object or model.</li> </ul>

TOPIC: LAND

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> observing, classifying, comparing, manipulating, communicating, predicting</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>• ‘McGraw Hill Science’ Grade K, 1 &amp; 2</li> <li>• ‘Primary Science for the Caribbean: How to Teach Primary Science’ – Ralph Douglass</li> <li>• ‘Teaching Elementary Science’ – William K. and Mary K. Esler</li> </ul> <p>Books related to topic:</p> <ul style="list-style-type: none"> <li>• ‘Talk about Sand’ –Angela Webb</li> <li>• ‘I Am a Rock’ – Jean Marzollo</li> <li>• First Look – ‘Under the Ground’ – Daphne Butler</li> <li>• ‘Rocks and Soil’ – Kay Davies and Wendy Oldfield</li> </ul> <p>Outside environment</p> <p>Different rocks, sand, sand tray, plastic sieves, sand tools and shapes, small buckets and spades, scales, hand lenses, coins, pumice rocks, jars, paper cups, soil</p> <p>Sorting trays, Venn diagrams, hoops, paper plates with sections, string</p>

Target Behavior	Content	Suggested Experiences	Assessment Opportunities
<p>1. Identify different earth materials</p> <p>2. Classify rocks according to their properties</p>	<p>Earth materials consist of dirt, sand and rocks.</p> <p><i>Vocabulary: soil, sand, sift, smooth/rough, sharp, shiny, bumpy, heavy/light</i></p>	<p><b>Small Group / Centers</b></p> <p><i>Process Skill: Comparing</i></p> <p>Take some dirt from different environments and compare them.</p> <p><i>Process Skills: Classifying, measuring</i></p> <p>Collect rocks and sort them according to their attributes</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Comparing soil from different places and identifying differences.</li> <li>• Examining dirt and telling/drawing what is observed.</li> </ul>

		<p>such as color, shape, size, texture, weight</p> <p><i>Process Skills: Observing, classifying, investigating</i></p> <p>Use coins to scratch different rocks and observe what happens, then sort the rocks accordingly.</p> <p><i>Process Skills: Predicting, investigating, inferring, observing, classifying, communicating, manipulating</i></p> <p>Rub two rocks together and tell what happens.</p> <p>Pour vinegar on rocks, observe what happens and sort</p>	<ul style="list-style-type: none"> <li>• Examining and sorting rocks according to own criteria.</li> <li>• Experimenting with rocks.</li> </ul>
3. Observe and identify what soil / sand is made of	<p>Soil consists of stones, living and non-living things.</p> <p>Sand comes from rocks and shells.</p> <p>Sand is made up of grains.</p> <p>Dry sand flows like water.</p> <p>Sand absorbs water easier than soil.</p> <p>Sand behaves differently when wet.</p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Communicating, observing, comparing, classifying</i></p> <p>Field trip to the beach to collect shells, pebbles and sand.</p> <p><b>Small Group / Centers</b></p> <p><i>Process Skill: Investigating</i></p> <p>Free sand play to observe how sand flows when dry, how sand moves when wet / dry, what happens when you blow on sand, the differences between wet and dry sand, which sand is better for molding shapes.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Telling the differences between sand and soil.</li> <li>• Telling the differences between wet and dry sand.</li> </ul>

		<p><i>Process Skill: Observing, comparing</i>  Take up some dirt and look at it under a hand lens and sift it.  Repeat with sand from the beach.  Compare results.</p> <p><i>Process Skills: Observing, investigating, hypothesizing, using space/time relations</i>  The teacher makes three small holes in the bottom of two cups. Fill one cup with sand and one with soil and pour water into each.  The children observe what happens and see which holds water longer.  Create pictures using sand.  Use shells to make craft or pictures.</p>	
4. Design and construct a paper weight	<p>Making a paper weight  <i>Vocabulary: paper-weight</i></p>	<p><b>Small Group / Centers</b>  <i>Process Skills: Comparing, using space/time relations, investigating, communicating, manipulating</i>  Create a paper-weight.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Creating a paper weight.</li> </ul>

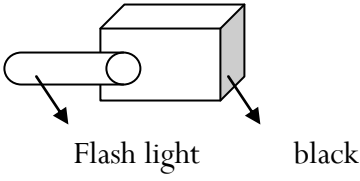
TOPIC: THE SKY

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> observing, comparing, inferring, manipulating</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>• ‘McGraw Hill Science’ Grade K, 1 &amp; 2</li> <li>• ‘Primary Science for the Caribbean: How to Teach Primary Science’ – Ralph Douglass</li> <li>• ‘Teaching Elementary Science’ – William K. and Mary K. Esler</li> </ul> <p>Books related to topic</p> <ul style="list-style-type: none"> <li>• ‘Why Does the Moon Change Shape’ – Isaac Asimov,</li> <li>• ‘The Magic School Bus – Lost in the Solar System’ – Joanna Cole &amp; Bruce Degen</li> <li>• ‘Do Stars Have Points’ – Melvin and Gilda Berger</li> <li>• ‘Me and My Place in Space’ – Joan Sweeney</li> </ul> <p>Outdoor environment</p> <p>Art material: card, construction paper, glue, paint, colors, markers, prick pins, paintbrushes, silver paper or foil, hangers (wire), star cut-outs</p> <p>Posters / pictures of day and night skies: Calendars</p>

Target Behavior	Content	Suggested Experiences	Assessment Opportunities
<p>1. Observe and identify objects in the day and night sky</p>	<p>Different objects (celestial bodies) can be seen in the day and night skies.</p> <p><i>Vocabulary:</i> moon, stars, sun, sky, sphere, planet</p> <p>Day and Night</p> <p><i>Vocabulary:</i> rotate, spin, Earth</p>	<p><b>Whole Class</b></p> <p><i>Process Skill: Observing</i></p> <p>The children go outside to look at the sky (<i>Do not let the children look directly at the sun</i>) and discuss what is seen.</p> <p><i>Process Skill: Comparing</i></p> <p>Compare objects seen in the day and night sky (<i>To look at the night sky can</i></p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Naming, identifying and describing objects seen in the day and night skies.</li> <li>• Telling about daytime and night time activities.</li> <li>• Describing how the shape of</li> </ul>



<p>2. Tell how day and night occurs</p> <p>3. State the different phases of the moon</p>	<p>Stars The sun is the closest star. The sun is a ball of hot gases. The sun gives us light and heat. The sun causes seasonal changes.</p> <p>Moon The moon is not a star. The moon is our nearest neighbor in space. The moon changes (full, half, crescent)</p> <p>Earth Earth is a planet. There are other planets that move around the sun. <i>Vocabulary: planet, solar system, universe, telescope</i></p> <p><i>Extension Topic – ‘Man in Space’ (Link with Social Studies)</i></p>	<p><i>be a parent / child assignment)</i> Compare posters or pictures of day and night skies Teacher demonstration of the rotation of the Earth around the sun <i>Process Skill: Manipulating, inferring, using space, / time relations</i> Children can make their own models and <i>infer</i> that different places on Earth receive sunlight at the same time. Calendar Activity Record the days when the moon is full, half or a crescent <b>Small Group</b> <i>Process Skill: Manipulating</i> Children can create day / night mobiles with cut out (pricked) stars, moons and suns. Discuss / role – play day and night activities Collect pictures of sunrise, sunsets Create pictures of sunrise or sunset Make a collage or models of the moon phases</p>	<p>the moon seems to change.</p>
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		<p><i>Process Skill: Observing, manipulating</i>  The children can make a constellation box<sup>3</sup></p> 	
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## SCIENCE AND TECHNOLOGY

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<sup>3</sup> To make the constellation box, cut off one end of a large shoe box. Cut out a circular hole about 6 cm. diameter in the opposite end. With a pin puncture holes in a piece of black construction paper. The holes must be made in the pattern of a common constellation. Tape the paper over the cut-off end of the box. Make the room dark and shine a flashlight through the hole

## LIFE SCIENCE

### Standards / Goals

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|---|---|
| # 4 Life Science:                       | The student understands the structure and function of cells and organisms.                |
| # 5 Life Science:                       | The student understands the relationships among organisms and their physical environment. |
| # 6 Life Science:                       | The student understands biological evolution and the diversity of life.                   |
| #13 Basic Science and Technology Skill: | The student can define the nature of scientific and technological inquiry.                |
| #14 Basic Science and Technology Skill: | The student can explain the nature of scientific knowledge.                               |

### TOPIC: LIVING AND NON-LIVING THINGS

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> communicating, observing, comparing, inferring, manipulating, classifying, investigating, predicting, controlling variables</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>● ‘McGraw Hill Science’ Grade K, 1 &amp; 2</li> <li>● ‘Primary Science for the Caribbean: How to Teach Primary Science’ – Ralph Douglass</li> <li>● ‘Teaching Elementary Science’ – William K. and Mary K. Esler</li> </ul> <p>Immediate and School environment</p> <p>Poems, books, and videos related to theme</p> <p>Concrete materials: living specimens of plants, animals (pets e.g. hamsters, cats...) and examples of non-living things</p> <p>Artificial plants</p> <p>Aquarium/nest/ a toy barn, doghouse, terrarium...</p> <p>Magnifying glasses</p> <p>Plastic/real/stuffed/magnet animals, fruits, vegetables</p> <p>Material for role play (props, clothes)</p> <p>Posters/pictures/charts of living and non-living things (different</p>

	types of animals, plants, people...), magazines Venn and Carroll Diagrams or strings/threads, hoops/sorting rings
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<b>Target Behavior</b>	<b>Content</b>	<b>Suggested Experiences</b>	<b>Assessment Opportunities</b>
1. Tell the differences between living and non-living things	<p>Differences between living and non-living things</p> <p>Living things breathe, move, grow, feed and reproduce.</p> <p><i>Vocabulary: living, non-living, dead</i></p> <p><i>Breathe, gills, nose, lungs, mouth</i></p> <p><i>Crawl, wiggle, glide, leap, walk, fly etc.</i></p> <p><i>Hatch, birth, young, seed, seedling</i></p> <p><i>Names of Baby Animals e.g. calf, chick, lamb etc.</i></p> <p><i>Names of male, female animals e.g. cow / bull, hen / rooster etc.</i></p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Communicating, comparing, manipulating, classifying</i></p> <p>Discussion about the differences between living and non-living things using: posters / pictures, videos, plastic or living specimens...</p> <p>Tour of the school or immediate environment to identify samples of living and non-living things</p> <p><b>Small group / Centers</b></p> <p><i>Process Skills: Observing, classifying, manipulating</i></p> <p>Observing in the Science Center, which contains plastic or living specimens of animals, plants, and examples of non-living things</p> <p>Having the children sort examples of living and non-living things using a Venn/Carroll Diagrams, hoops/sorting rings...</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Listing differences between living and non-living things.</li> <li>• Sorting examples of living and non-living things.</li> <li>• Identifying/pointing out living and non-living things using pictures and real objects.</li> </ul>
2. Demonstrate an understanding that all living things have needs	<p>What living things need to survive: air, food, water, shelter</p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Communicating</i></p> <p>Discussion about what living things need to survive (food, air, water, shelter) using video, posters/charts, role-plays...</p> <p><b>Small group / Centers</b></p> <p><i>Process Skills: Communicating, manipulating,</i></p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Telling what living things need to survive.</li> </ul>

		<p><i>investigating, comparing, controlling variables, predicting, measuring</i></p> <p>Take two glass jars and put live cockroaches in each. Cover one with wire mesh secured by a rubber band and cover the next with a screw top cover. Let the children predict and then observe what happens.</p> <p>Take two similar potted plants. Smear the leaves and stem of one with Vaseline (to stop air from entering the plant). Leave the plants in the sun and water them regularly. Let the children observe and see what happens.</p> <p>Let the children observe what happens when they pinch their nose and close their mouth.</p> <p>Place a wet cotton ball into a washed half eggshell and sprinkle grass seeds on it. Observe what happens.</p> <p>A control experiment can be set when the seeds are placed on a dry cotton ball. For enjoyment the eggshell can be decorated as a face and set on a decorated strip of 1 by 6 inch card strip. When the grass sprouts it will become 'hair'.<sup>4</sup></p> <p>Three groups of children can plant a bean in two separate pots with the same conditions with one exception.</p>	
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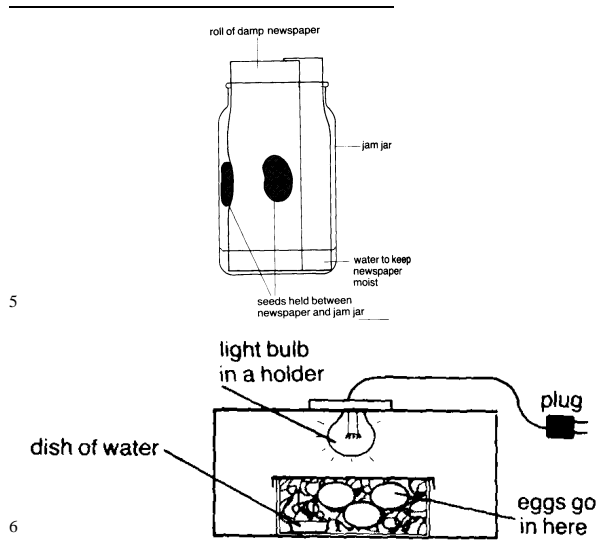
		<p>Group One – Waters one container and not the other</p> <p>Group Two – Places one pot in sunlight and the other in the dark</p> <p>Group Three – Uses sand in one container and soil in another</p> <p>Children can compare and contrast the results.</p>	
3. Classify living things into groups	<p>Classifying living things:</p> <ul style="list-style-type: none"> <li>• Humans, animals, plants</li> <li>• Animals - insects, birds, reptiles, amphibians, mammals</li> <li>• Plants – herbs, shrubs and trees</li> <li>• Other ways of classifying – external coverings, ways of moving, habitat, movement, sounds made</li> </ul>	<p><b>Whole Class</b></p> <p>Discussion about the various groups that living things belong to using posters/pictures/charts</p> <p>Sing songs/recite poems/rhymes</p> <p><b>Small group / Centers</b></p> <p><i>Process Skills: Classifying, communicating, comparing, manipulating</i></p> <p>Having the children sort examples of living things into the various groups (fishes /birds/ insects... or living things that fly / crawl /swim/ walk...) using a Venn/Carroll Diagrams, hoops/sorting rings</p> <p>Role play animal movements and sounds</p> <p>Cut and paste activities using magazines...</p> <p>Matching activities</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Sorting living things into the various groups and giving reasons for choice (using a Venn/Carroll Diagrams, hoops/sorting rings...)</li> <li>• Demonstrating how animals move and make sounds that animals make.</li> </ul>
4. Recognize and name the different parts of plants and their functions	<p>Parts of plants (root, stem, leaf, trunk) and their functions</p> <p>Root – stabilizes the plant and provides food and water</p> <p>Stem – supports other</p>	<p><b>Whole Class</b></p> <p>Using an actual or artificial plant to point out and name the parts and their functions</p> <p>Making a collage</p> <p><b>Small group / Centers</b></p> <p><i>Process skills: Observing, comparing, classifying, manipulating</i></p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Naming and identifying the different parts of the plant and their functions.</li> </ul>

	parts of the plant Leaf – makes food	Collecting and comparing leaves and roots of different plants Nature walk in the immediate environment to observe and compare plants Making and comparing leaf prints and rubbings of e.g. a tree trunk	
5. Identify how animals are alike and different	Identification of animal characteristics Classification by similar characteristics e.g. presence of a backbone, body covering, facial features <i>Vocabulary: backbone, feathers, fur, skin, scales, eyes, ears, mouth, nose, beak, wings, legs, footprints</i>	<b>Whole Class</b> <i>Process Skills: Communicating, observing, classifying, inferring</i> Using children's suggestions create an animal ABC, then classify the animals from the suggested list (e.g. those with / without a backbone). Zoo trip Show and tell (animals) <b>Small Groups / Centers</b> <i>Process Skills: Observing, communicating, manipulating, classifying, inferring</i> Using cut-out pictures of animals, plastic, sponge animals the children can identify similarities and differences between different types of animals	Teacher observes or records a child: <ul style="list-style-type: none"><li>• Identifying how animals are alike and different.</li><li>• Classifying animals by similar characteristics.</li></ul>
6. Investigate features that help animals and plants live and survive in different environments	Easily observable physical features that help animals / plants live in certain places e.g. Ducks – webbed feet, oily feathers Birds – differently shaped beaks for	<b>Whole Class or Small Groups</b> Discussion about how animals defend themselves using secondary sources e.g. videos, books <i>Process Skills: Observing, communicating, comparing, classifying, investigating</i> Observe and compare animals in natural settings e.g. by the beach, in the school environment (indoors and outdoors)	Teacher observes or records a child: <ul style="list-style-type: none"><li>• Identifying features that help animals and plants live in certain environments.</li><li>• Listing ways in which animals defend themselves.</li></ul>

<p><i>Related Topics:</i></p> <ul style="list-style-type: none"> <li>• <i>Animals of Long Ago (Dinosaurs)</i></li> <li>• <i>Habitats</i></li> </ul>	<p>feeding Fish – gills, scales, body shape <b>-Survival Features</b> Cactus – fleshy stems, no leaves Plants – brightly colored flowers or fruits Shells – turtles, tortoises, crabs Use of color for camouflage Stings – bees, wasps, scorpions, centipedes</p>		
<p>7a. Differentiate between old and young animals and plants</p> <p>7b. Identify the different ways in which animals reproduce</p>	<p>Names of young /parent animals and plants Animals reproduce by laying eggs or giving live birth. Plants reproduce by producing seeds or by growth from plant parts. <i>Vocabulary: hen/chick, cow/calf, dog/puppy, cat/kitten, plant/seedling,</i></p>	<p><b>Whole Class or small group</b> <i>Process Skills: Communicating, observing, classifying</i> Collect and match pictures of old and young living things Sequence pictures to show stages of growth. Investigate the life of a butterfly, frog, hen Watch related videos Grow peas or beans Grow plants from cuttings e.g. carrot, onion, potato, ‘spider’ plant <i>Process Skills: Investigating, controlling variables, observing, comparing, communicating, manipulating, measuring,</i></p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Matching and naming parents and young of different living things.</li> <li>• Identifying ways in which animals and plants reproduce.</li> </ul>



	<p>horse/foal, frog/tadpole...</p> <p>Cutting, stem, root, leaf, seed</p> <p>Live birth, eggs, hatch, lay, life cycle, caterpillar, cocoon, butterfly, tadpole, frog, chick, chrysalis, change, egg yolk</p>	<p>predicting</p> <p><sup>5</sup>Germination experiments are to be set up consecutively:</p> <ol style="list-style-type: none"> <li>1. Seeds with water</li> <li>2. Seeds without water</li> <li>3. Seeds placed in a dark place with water</li> <li>4. Seeds placed in a dark place without water</li> </ol> <p>Changes (if any) to seeds are recorded. Growth can be measured with standard or non-standard units.</p> <p>Take three, green, potted plants. Place one in the sunlight and cover one with a large brown paper sack. Let the children observe and tell what happens after two or three days. Let one plant stay without water and observe what happens to the plant.</p> <p><sup>6</sup>Incubate an egg until it hatches.</p>	
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The box can be a shoebox filled with grass. Be sure to use fertilized eggs.

TOPIC – THE HUMAN BODY

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> communicating, observing, comparing, inferring, manipulating, classifying, investigating, predicting, controlling variables</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>● ‘McGraw Hill Science’ Grade K, 1 &amp; 2</li> <li>● ‘Primary Science for the Caribbean: How to Teach Primary Science’ – Ralph Douglass</li> <li>● ‘Teaching Elementary Science’ – William K. and Mary K. Esler</li> </ul> <p>Books related to topic:</p> <p>‘Seeing’, ‘Hearing’, ‘Tasting and Smelling’, ‘Touching and Feeling’ by Angela Littler</p> <p>‘Bright Ideas for Science’ - Scholastic</p> <p>PowerKids Readers, Clean and Healthy series: ‘Washing My Hands’; ‘Brushing My Teeth’; ‘Eating Right’; ‘Let’s Exercise’; ‘Taking Care of My Hair’; ‘Taking My Bath’</p> <p>Let’s Explore Science ‘Me and My Body’ – David Evans and Claudette Williams</p> <p>Literature, magazines, cassettes and videos related to theme</p> <p>Male / female dolls, full-length mirror, materials for making stethoscopes, clay / plasticine, crackers, stopwatch, skeleton, measuring equipment, soap, old white T-shirt, white face cloths</p> <p>Immediate school environment</p> <p>Tray with 5 – 10 items on it e.g. a plastic cup, a book, a soft toy, a Lego block, a cylindrical block, a bell, a tissue, a pencil, a ruler and a rag</p> <p>Blindfolds, a bag containing different items with different textures</p>

	<p>Several paper bags filled with fruit or vegetables that have a strong scent, fine haired paintbrushes, feathers</p> <p>Hand lenses, small mirrors, parts of objects e.g. a leaf, a piece of bark or shell; cup, commercial posters or pictures with hidden pictures, ‘find the difference’ pictures, string or hops, tape recording of everyday sounds, objects of different textures for a Feely bag, pieces of fruit, food or vegetables, small cups with different flavoured drinks, percussion instruments, <sup>7</sup>smell pots and strongly scented items e.g. onion, herbs, milk, drink mix or coffee, orange, chocolate, vinegar etc.</p>
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Target Behavior	Content	Suggested Experiences	Assessment Opportunities
1. Identify basic body parts and their functions	<p>Identifying and naming body parts and their functions</p> <p>Skeleton – gives the body shape, protects vital organs (brain, lungs, heart and stomach)</p> <p>Muscles – help the body to move</p> <p>Skin – protects the body</p> <p>Brain – controls thinking and body function</p> <p>Lungs – help us to breathe</p> <p>Heart – pumps blood through out the body</p> <p>Stomach – breaks down food</p> <p><i>Vocabulary: skeleton, skull, pelvis, ribs, lungs, heart, stomach, muscles, contract, extend, urinate, stool,</i></p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Observing, communicating, manipulating, measuring, comparing, investigating, space/time relations</i></p> <p>Using a child, puppets or dolls teacher can name parts of the body.</p> <p>Trace the outline of a child onto large sheets of paper and place it on a bulletin board. Let the children place body part labels in the correct position.</p> <p>Singing songs such as ‘Head, Shoulders, Knees and Toes’ that help children to remember body parts</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Naming, locating and labeling body parts correctly.</li> <li>● Telling the basic functions of each body part.</li> </ul>

<sup>7</sup> Smell pots can be made by covering empty yogurt pots with pieces of panty hose held in place with a rubber band.

	<p><i>digest</i></p> <p><b>Curriculum Link:</b> Health and Physical Education</p>	<p>Playing a simplified version of ‘I Spy’</p> <p>Give the children clues and let them guess the body part, e.g. ‘I am thinking of a body part that I use for chewing.’</p> <p><b>Small Group / Centers</b></p> <p>Pairs of children can listen to each other’s heartbeat using home-made stethoscopes.</p> <p>Older children can use a stopwatch to count how many beats are heard in one minute. Results can be graphed.</p> <p>Use clay to make models of the internal organs.</p> <p>Children can measure different parts of the body e.g. feet and graph the results.</p> <p>The children can look at their skin through a magnifying glass.</p> <p>Using markers, draw the outline of a heart, stomach and lungs on an old white T-shirt. Children can wear the shirt and identify the internal organs.</p>	
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<p>2a. Identify and name the senses and sense organs</p>	<p>We have five senses – touch, taste, sight, hearing and smell. <i>Vocabulary: sense names, eyes, ears, nose, mouth, tongue, skin, hands</i></p>	<p><b>Whole Class</b> Discussion stimulated by Shared Reading, singing or rhymes e.g. ‘Two Little Eyes’ <i>Process Skills: Communicating, observing, manipulating</i> Project - Creation of an interactive sense display</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Identifying, naming and matching the senses and the respective body parts.</li> </ul>
<p>3. Develop an awareness that senses can be used to learn about the environment</p>	<p>Our senses help us to learn about our environment.</p>	<p><b>Whole Class</b> <i>Process Skills: Observing, communicating, comparing</i> Sight – <sup>8</sup>Change Game <sup>9</sup>Kim’s Game Sense Walk – Teacher uses open-ended questioning to help the children identify what they hear and see. A child is blindfolded and placed in the middle of a circle of children. Someone calls the child and the child must find the person. The teacher asks if it</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Identifying given items using their senses.</li> <li>• Telling why we need the senses.</li> <li>• Identifying the source of a sound.</li> </ul>

<sup>8</sup> Let the children find a partner. Each child looks carefully at the other. One partner closes their eyes and the other makes a change in his/her appearance. His/her partner opens his/her eyes and tries to find the change. The partner’s roles are reversed. *The teacher may help those children who have difficulty in changing their appearance. Changes must be simple e.g. changing shoes, undoing a button. The teacher can also demonstrate by letting the children find a change that he/she made.*

<sup>9</sup> The teacher places up to ten items on a tray and lets the children look at them for 2 or 3 minutes. He / She removes the tray and asks the children to name the objects that were on the tray.

		<p>was easy to find the person and why/why not).</p> <p><b>Small Group / Centers</b></p> <p><i>Process Skills: Communicating, manipulating, predicting, inferring</i></p> <p>Feely Bag – A bag is filled with different items. A blind folded child must guess what the items are.</p> <p>What is in the Bag? – Children must identify what is in the bag by smelling and feeling.</p>	
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<p>4. Participate in simple experiments to discover information using their senses</p>	<p>Exploration using the senses.  <i>Vocabulary: high / low; hard / soft; same / different; sweet / sour; bitter / salty; hot / cold; rough / smooth; dry / wet; loud / soft</i></p>	<p><b>Small Group / Centers</b>  <i>Process Skills: Communicating, manipulating, classifying, inferring, investigating</i>  <u>Sight</u>  Observing given natural objects with or without a hand lens and then comparing what has been observed.  Identifying an object by its part e.g. a shell, a flower, a leaf etc.  Explore a given area within a hoop and telling /drawing what was observed.  Play 'I Spy'  <u>Sound</u>  Children are asked to guess the sound after listening to a recording e.g. rain, a kettle whistling, crying, a dog barking etc.  The children can work in pairs. One is seated and blindfolded. The other plays a note on a triangle in various positions and the partner has to point to the direction of the sound.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Comparing items and telling about differences.</li> <li>● Noting differences and similarities between pictures.</li> <li>● Identifying objects by smell, taste or touch.</li> <li>● Identifying objects by sound.</li> <li>● Identifying objects by their parts.</li> </ul>
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		<p><u>Touch</u> Use a Feely bag Individual children can test themselves for sensitivity for touch by touching parts of the body with a feather or a strand of hair or a fine paintbrush.</p> <p><sup>10</sup><u>Taste</u> Blindfolded children can be given small pieces of food to taste and identify e.g. pretzels, pickles, grapes, candy, citrus fruits or different flavours of juice.</p> <p><u>Smell</u> Smell pots can be used for smelling. A child sniffs one pot and guesses what is in the container.</p>	
5. Identify ways of maintaining body function	<p>Healthy habits: proper nutrition, exercise, rest, hygiene</p> <p><b>Curriculum Link</b> Health and Physical Education Social Studies</p>	<p><b>Whole Class</b> Discussion about personal health habits</p> <p><b>Small Group/Centers</b> <i>Process Skills: Observing, communicating, investigating, comparing, interpreting, comparing,</i></p>	<p>Teacher observes and records the child:</p> <ul style="list-style-type: none"> <li>• Identifying ways of maintaining body function.</li> <li>• Collecting and organizing data</li> </ul>

<sup>10</sup> Safety rules must be adhered to. Children should be reminded to take care of their sense organs and not to taste, touch or smell objects or substances without adult presence.



		<p><b>Small Group / Centers</b></p> <p>Give each pair of children two white face cloths. Dip them in a mixture of water, potting soil and oil, and then dry them. Tell them to wash one with soap and water and the other using water only. After the two cloths have dried the children can compare the cloths and infer that soap helps to clean things.</p> <p>Give each child in the group a cracker, a new toothbrush and a small plastic cup of water. Let the children chew the cracker and use the mirror to look at their teeth. Let the children brush their teeth and re-examine them. The children can compare the state of their teeth and infer that brushing helps remove plaque and food particles from the teeth.</p> <p>Particles that remain cause plaque.</p> <p>The children can also collect data about exercise by interviewing adults and asking how much time they spend exercising. Results can be graphed.</p>	
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## SCIENCE AND TECHNOLOGY

### PHYSICAL SCIENCE

#### Standards / Goals

# 7 Physical Science:	The student understands the structure and properties of matter.
# 8 Physical Science:	The student understands the sources and properties of energy.
# 9 Physical Science:	The student understands force and motion.
#10 Technology Sciences:	The student understands the nature of technology.
#11 Technology Sciences:	The student understands the design of technology.
#13 Basic Science and Technology Skill:	The student can define the nature of scientific and technological inquiry.
#14 Basic Science and Technology Skill:	The student can explain the nature of scientific knowledge.
#15 Basic Science and Technology Skill:	The student understands the abilities for a scientific and technological world.

#### TOPIC: MATTER

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> communicating, observing, comparing, inferring, manipulating, classifying, investigating, predicting, controlling variables</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>• ‘McGraw Hill Science’ Grade K, 1 &amp; 2</li> <li>• ‘Primary Science for the Caribbean: How to Teach Primary Science’ – Ralph Douglass</li> <li>• ‘Teaching Elementary Science’ – William K. and Mary K. Esler</li> </ul> <p>Books related to topic:                      Everyday Science series – ‘Changing Form’, ‘Materials’ – Peter Riley                      ‘Bright Ideas for Science’ - Scholastic</p> <p>Sorting trays, plastic plates, hoops, string, Venn and Carroll diagrams, small containers, beads, blocks, laces, assorted plastic toys, teddy bear counters, colored counters, objects with different textures e.g. sandpaper, colored strings, toys, cubes, colored paper clips, buttons</p>

	and other items that can be sorted by color, shape, texture and size, A large transparent container, water, rocks or other solid items, balloons, clay, string, a straw, an empty juice box, a sponge
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Target Behavior	Content	Suggested Experiences	Assessment Opportunities
<p>1. Classify objects by their properties</p>	<p>Materials can be classified according to size, color, shape, texture, weight or any other criteria such as natural or artificial, living, non-living, (suggested by the teacher or children).</p> <p><i>* A very good way to start a topic on matter is for the children to make collections of different kinds: wood, plastic, cloth, metal, stones and rocks, shells, paper. The children can sort and group them. They should be encouraged to feel and touch the materials and describe them verbally.</i></p>	<p><b>Small Group / Centers</b></p> <p><i>Process skills: Observing, comparing, communicating, classifying, measuring</i></p> <p>The children are given a mixed bag of objects to sort. Each group is given 5 plates, one has:</p> <ul style="list-style-type: none"> <li>• 2 items that are the same shape and color but different sizes</li> <li>• 2 items the same shape, weight and size but a different color</li> <li>• 2 items with the same color, weight and size with different shapes</li> <li>• 2 items that have the same color, weight, size and shape but different texture</li> <li>• 2 items that have the same color, size, shape, texture but different weights</li> </ul> <p>The children will find out why the items are different.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Sorting objects and giving reasons for choice.</li> </ul>

<p>2. Sort matter by its physical properties</p>	<p>Matter is anything living or non-living that has mass and takes up space.          Mass is the amount of material that an object has in it.          Volume is the amount of space that an object takes up.          Matter can be described by its state.          The three states of matter are solid, liquid and gas.  <i>Vocabulary: matter, solid, liquid, gas</i></p>	<p><b>Small Group / Centers</b>          The teacher provides each group with different objects or materials that are examples of the different states of matter (solid, liquid, gas) e.g. water, beads/cubes, an inflated balloon.          Through guided questioning the child can discover the properties of each state.</p> <ul style="list-style-type: none"> <li>• Can you hold it in your hands?</li> <li>• Can you pour it?</li> <li>• Does it change shape?</li> <li>• Is it a solid, liquid or gas?</li> </ul> <p>Children can find or collect examples of each state of matter.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Classifying objects or materials as being solid, liquid or gas.</li> <li>• Giving examples of solid, liquid or gas</li> </ul>
<p>3. Explore properties of matter</p>	<p>Matter has three states.          All matter has mass (weight) and takes up space.  <i>Vocabulary: space, level, rise</i></p>	<p><b>Small Group / Centers</b>  <i>Process Skills: Observing, predicting, communicating, measuring, manipulating</i>  <b>Matter takes up space.</b>          Fill a transparent container with water and mark the water level.          Drop a rock or another solid into the water and observe what happens (the water level rises)          Repeat but add water or another</p>	<p>Teacher observes and records when a child:</p> <ul style="list-style-type: none"> <li>• States the properties that all matter share.</li> </ul>

	<p><i>Weight, mass, weigh, heavy / light, heavier / lighter</i></p>	<p>liquid instead of a rock. Blow air into a balloon and observe what happens. Put a balloon over the neck of a clean 2-litre plastic soda bottle. Ask group members what is in the bottle. Holding the balloon tightly on the neck, ask a child to squeeze the ‘empty’ bottle and state what happens. <b>Matter has mass (weight)</b> Children weigh different solids and liquids. Children find a way to compare the weight of an inflated and a deflated balloon.</p>	
<p>4. Investigate the differences between the states of matter</p>	<p>A solid has a shape and volume of its own. A liquid has a certain volume but no shape of its own. It takes the shape of the container into which it is poured. A gas has no volume or shape of its own. <i>Vocabulary: liquid, solid, gas, shape, volume, container</i></p>	<p><b>Small Group / Centers</b> <i>Process Skills: Observing, communicating, comparing, classifying, manipulating, investigating</i> Observe different solids when placed in water to see if their shape changes. Pour liquids into different containers and freeze. The ice will be the same shape as the container. Boil water and watch as the steam disappears. (<i>The steam disappears because it diffuses into</i></p>	<p>Teacher observes or records when a child:</p> <ul style="list-style-type: none"> <li>• Tells the differences between the states of matter.</li> </ul>

		<p><i>the air.)</i></p> <p>Put water into a glass, blow air into it through a straw. The air changes into bubbles.</p> <p>Blow up different-shaped balloons (The balloon shape determines the shape of the air).</p>	
5. Investigate ways in which matter can be changed.	<p>Matter can be changed.</p> <p>It can be changed by changing the form or the state.</p> <p>You can change the form by stretching, twisting, bending, squashing and mixing with water.</p> <p>You can change the state by changing the temperature (heating, freezing)</p> <p><i>Vocabulary: heating, freezing, melt, mixing, dissolving</i></p>	<p><b>Small Group / Centers</b></p> <p><i>Process Skills: Observing, communicating, comparing, classifying, manipulating, investigating</i></p> <p>Each child in the group is given an object and asked to change its shape e.g. clay, balloons, string, a straw, an empty juice box, a sponge</p> <p>Older children can design a table to record their results.</p> <p>Take several substances such as sugar, drink mix, oil, flour and sand. Place them in separate containers, add water to them and stir. Observe what happens and record results.</p> <p>Place water or juice in several differently shaped containers and freeze it. <i>In order to have the children predict ask them what shape the ice will be.</i></p> <p>Light a candle and observe what</p>	<p>Teacher observes and records when a child:</p> <ul style="list-style-type: none"> <li>• Demonstrates how to change the form or state of matter.</li> </ul>

	<p><i>Related Topics:</i></p> <ul style="list-style-type: none"> <li>● <i>Same / Different</i></li> <li>● <i>Materials</i></li> <li>● <i>Water</i></li> <li>● <i>Paper</i></li> <li>● <i>Change (Cooking)</i></li> </ul>	<p>happens.          Children observe melting by placing shallow bowls filled with ice-cubes, butter or ice cream in the sun.          Children place a shallow bowl of water in the sun and note what happens after a period of time.          Children observe what happens to a candle, paper, an egg (boiled or fried) or other foods (e.g. popcorn (microwavable)) when heated. *<i>Stress safety rules</i></p>	
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TOPIC – HEAT

<b>Skills</b>	<b>Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences</b>
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing  <i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns  <i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving  <i>Process Skills:</i> communicating, observing, comparing, inferring, manipulating, classifying, investigating, predicting, controlling variables</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>● ‘McGraw Hill Science’ Grade K, 1 &amp; 2</li> <li>● ‘Primary Science for the Caribbean: How to Teach Primary Science’ – Ralph Douglass</li> <li>● ‘Teaching Elementary Science’ – William K. and Mary K. Esler</li> </ul> <p>Immediate Environment          Objects or pictures of: the sun, candles, iron, stove, coals (lit), lamps, flashlights, bulbs etc.</p>

	<p>Two smooth stones, rocks, sticks or wooden blocks</p> <p><sup>11</sup>Thermometers (Different kinds), containers for water</p> <p>Shallow bowls, ice-cream, butter/margarine, ice, a candle, matches, paper, an egg, pot or frying pan or microwave oven</p> <p>Plastic cups, hand-towel or sock, aluminum foil, paper, kitchen paper, warm water</p> <p>Objects made of different materials e.g. rubber, wood, plastic, paper, metal</p> <p>Poster showing uses of heat</p>
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Target Behavior	Content	Suggested Experiences	Assessment Opportunities
1. Recognize that there is a relationship between heat and light	<p>a. Where there is light heat is produced.</p> <p>b. There can be heat without light.</p> <p><i>Vocabulary: heat, hot, warm, cold, friction, light</i></p>	<p><b>Whole Class / Small Group Teacher-directed activity.</b></p> <p><i>Process skills: Observing, comparing, communicating, manipulating</i></p> <p>Teacher shows the children objects and or pictures of a number of objects such as the sun, candles, iron, stove, coals (lit), lamps, flashlights, bulbs, hair dryer etc.</p> <p>Children talk about each object / picture and then children sort them into subsets using hoops or Venn or Carroll diagrams:</p> <ul style="list-style-type: none"> <li>• Those that produce heat and light</li> <li>• Those that produce heat.</li> </ul>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Sorting the objects / pictures into the given subsets.</li> </ul>

<sup>11</sup> The children will not be reading degrees. It is suggested that strips be made to tape on the Fahrenheit side of the thermometer. The strips can be coloured to match areas on the thermometer (Centigrade degrees) e.g. Cold (below 0-blue), cool (0-20-green), warm (20-30-yellow), hot (above 30-orange)



		<p><i>Process skills: Observing, comparing, communicating, manipulating, investigating, controlling variables, space/time relations</i></p> <p>On a sunny day children can place different objects in the sun. After a time the children can touch the objects and tell how they feel. As a control similar objects can be put in a cupboard or in the shade. The teacher can switch on a lamp and allow one or to children to place their hand above the bulb and tell what they feel. (<i>This activity must be strictly supervised.</i>)</p>	
2. Demonstrate how heat can be produced	<p>Friction produces heat. <i>Vocabulary: rub together, palm</i></p>	<p><b>Whole Class</b> <i>Process Skills: Observing, communicating, manipulating, comparing, investigating, predicting</i></p> <p>Teacher asks children to rub the palms of their hands together, (<i>teacher demonstrates first</i>), and tell what happens.</p> <p>Teacher repeats by letting the children rub two wooden blocks or two rocks. Teacher lets the children predict what will happen to the blocks, sticks or</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Predicting that the objects get hotter when they are rubbed together.</li> <li>● Demonstrating how to produce heat.</li> </ul>

		rocks.	
3. Identify instruments that can be used to measure how hot or cold something is	Measurement of heat <i>Vocabulary: thermometer, temperature</i>	<p><b>Whole Class</b>  <i>Process skills: Observing, communicating, manipulating, predicting, inferring</i>  Discussion about measuring instruments known by the children.  Teacher shows the collection of thermometers and lets the children tell of experiences with them.  Teacher fills two bowls one with warm water and one with cold and lets the children tell which is hotter. Their predictions are confirmed with the thermometer</p> <p><b>Small Group / Centers</b>  Children then predict and measure the heat in different places e.g. in the sun or shade, by a window, in a cupboard. Children can infer and tell the hottest, coldest spots in the classroom and then check by using a thermometer to measure.</p>	Teacher observes or records a child: <ul style="list-style-type: none"> <li>• Telling experiences of using a thermometer.</li> <li>• Measuring with a thermometer and communicating results by telling or drawing.</li> </ul>
4. Recognize and observe how heat changes matter	Heat changes matter. Heat comes from different sources.	<p><b>Small Group / Centers</b>  <i>Process skills: Observing, communicating, investigating,</i></p>	Teacher observes or records a child: <ul style="list-style-type: none"> <li>• Telling / drawing what has</li> </ul>

	<p><i>Vocabulary: solid, liquid, melt, evaporate (some children)</i></p>	<p><i>manipulating, controlling variables</i></p> <p>Children observe melting by placing a tray with a piece of chocolate, ice, a candle and a slice of cheese in the sun.</p> <p>Children place a shallow bowl of water in the sun and note what happens after a period of time.</p> <p>Children observe what happens to a slice of bread when placed in a toaster and what happens to water when boiled.</p> <p>Children can put 5 ice-cubes into each of two transparent containers. One is filled with cold water and the other with hot water. After 5 minutes they can observe and compare the number of ice cubes remaining in each container.</p> <p>Some children can have an ice-cube melt race. Each team is given one ice cube and asked to find ways to melt their ice cube before the other teams melt theirs.</p>	<p>been observed.</p> <ul style="list-style-type: none"> <li>● Using enriched vocabulary.</li> <li>● Explaining an experiment.</li> <li>● Predicting changes.</li> </ul>
<p>5. Recognize that dark materials absorb heat and light materials reflect heat</p>	<p>Dark materials absorb more heat than light ones.</p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Observing, comparing, communicating, investigating</i></p> <p>Let the children go outside.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Explaining why darker objects are hotter when placed in the sun.</li> </ul>

		Place large sheets of black and white construction paper in an area which is exposed to the sun. After several minutes let them feel the papers. Discuss the results. Discuss the type of clothes to be worn on a sunny day.	<ul style="list-style-type: none"> <li>Telling why it is important to wear light-colored clothes on sunny days.</li> </ul>
6. Identify common examples of good/bad conductors of heat	Conductors of heat allow heat to pass through easily. Metals are good conductors. Plastic, glass, wood and paper are poor conductors. <i>Vocabulary: conductor, poor/good, metal, plastic, hot, warm, cool, cold</i>	<p><b>Whole Class</b> <i>Process skills: Observing, comparing, manipulating, communicating</i> Place spoons with different handles e.g. metal, wooden and plastic in a container of moderately hot water. After some time let the children touch the spoon handles and say if the handle is hot, warm, cool or cold.</p> <p><b>Small Group / Centers</b> Place different objects in the sun and after some time let the children tell which is hotter (objects must be made of different materials e.g. rubber, wood, plastic, paper, metal).</p>	Teacher observes or records a child: <ul style="list-style-type: none"> <li>Identifying which items let the heat pass through and which do not.</li> </ul>
7. Demonstrate how insulation works	Insulators keep heat inside.	<p><b>Whole Class / Small Group</b> <i>Process skills: Observing, comparing, communicating, manipulating, investigating, inferring, controlling variables</i> Place warm water in</p>	Teacher observes or records a child: <ul style="list-style-type: none"> <li>Predicting and giving reasons for the prediction..</li> </ul>

		<p>different containers such as:</p> <ul style="list-style-type: none"> <li>• Regular cup</li> <li>• Insulated cup and let the children predict which cup will keep the water warm. Children can then see if their predictions are right</li> </ul> <p>Fill several cups with warm water. Wrap different materials around the cups e.g. aluminum foil, a sock or hand-towel, a piece of kitchen paper. Let the children infer which will keep the water warm for a longer time. Ask the children why.</p>	<ul style="list-style-type: none"> <li>• Recording observations.</li> <li>• Giving reasons for what has been observed.</li> </ul>
8. Find a way to keep a bottle of water cool	Materials that keep heat inside can also keep things cool.	<p><b>Whole Class / Small Group</b>  <i>Process skills: Observing, comparing, communicating, manipulating, investigating</i>  The children use different materials to wrap bottles of cool water to see which keeps the water cool for the longest time.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Investigating with different materials.</li> <li>• Problem solving.</li> </ul>
9. Explain why we need heat	Uses of heat	<p><b>Whole Class</b>  <i>Process skills: Observing, communicating</i>  Discussion using a poster  Role-play  Demonstration of uses of heat  e.g. cooking, warming</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Identifying uses of heat.</li> </ul>

TOPIC: LIGHT

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> communicating, observing, comparing, inferring, manipulating, classifying, investigating, predicting</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>● ‘McGraw Hill Science’ Grade K, 1 &amp; 2</li> <li>● ‘Primary Science for the Caribbean: How to Teach Primary Science’ – Ralph Douglass</li> <li>● ‘Teaching Elementary Science’ – William K. and Mary K. Esler</li> <li>● ‘Finding Out – Primary Science for the Caribbean’ Bk. 2 – June Mitchelmore</li> <li>● ‘Science – Silver Burnett &amp; Ginn</li> <li>● ‘Let’s Explore Science - Color &amp; Light’ – David Evans and Claudette Williams</li> <li>● ‘Newbridge Early Science Big Book – Light’ - Melvin Berger</li> <li>● ‘Science for young children – Shadows’ - Judith M. Taylor, ‘My Shadow’ – Sheila Gore Simple</li> </ul> <p>Science series and other books related to theme</p> <p>Immediate Environment</p> <p>Picture cards of or objects that provide light</p> <p>Shoeboxes and small colored blocks or other colored items</p> <p>Seeds or potted plants</p> <p>Hoops or sorting trays or Venn diagrams</p> <p>4 flashlights with varying degrees of brightness or a lamp, a candle, a kerosene lamp, a flashlight with a florescent bulb, pictures of the sun and moon</p> <p>Shiny metal objects, aluminum foil, mirrors</p> <p>Flashlights, dominoes, white sheets of paper, large cardboard box</p> <p>Prisms, oil, bubble mix, hose, colored sheets of cellophane</p>

Target Behavior	Content	Suggested Experiences	Assessment Opportunities
1. Identify uses and sources of light	Uses and sources of light <ul style="list-style-type: none"> <li>• For sight</li> <li>• For plant growth</li> <li>• For seeing color</li> </ul>	<p><b>Whole Class</b>  <i>Process skills: Observing, communicating, manipulating, comparing</i>            Ask the children to close their eyes and tell what they can see. Let them discuss how they found objects during an evening power outage. Discussion during Shared Reading activities Building a collection of items or pictures of items used to provide light</p> <p><b>Small Group / Centers</b>  <i>Process skills: Observing, comparing, communicating, manipulating, classifying, inferring</i>            Let the children use shoeboxes and fill them with colored blocks or other items. They can cover the box and make a pin-hole at one end to let the light in. They will infer that they need light to be able to see the blocks and colors clearly. They can also note changes when bigger holes are made. Germination experiments can be set up to show that plants</p>	Teacher observes or records a child: <ul style="list-style-type: none"> <li>• Telling or drawing uses of light.</li> <li>• Sorting for given criteria.</li> <li>• Experimenting.</li> </ul>

		<p>need sunlight for growth. The relationship between sunlight and vitamin D can also be discussed with older children.</p> <p>Sorting pictures or objects e.g. flashlight, candle, light bulb, iron, kettle into subsets such as those that provide light and those that do not or natural and man-made sources of light e.g. moon, torch, dragonfly, fire, lamps</p>	
<p>2. Investigate the properties of light</p> <ul style="list-style-type: none"> <li>Develop an awareness that light varies in brightness</li> </ul>	<p>Brightness of light  <i>Vocabulary: bright, brighter, brightest, dull, dim, brightness</i></p>	<p><b>Whole Class (can be repeated in small groups)</b></p> <p><i>Process skills: Observing, comparing, investigating</i></p> <p>Display 4 flashlights with varying degrees of brightness or 4 lamps with bulbs of different wattage (25, 40, 75, 100) or a candle, a lamp, a bright flashlight and a florescent lamp and ask the children to compare the intensity of the light. They can order them with number cards or words depending on their level.</p> <p>Discuss experiences of bright sunny days and dull cloudy or</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>Ordering objects in terms of the brightness of the light they provide.</li> </ul>



<ul style="list-style-type: none"> <li>• Develop an awareness that light shines through some objects and is reflected by others</li> </ul>	<p>Light shines through transparent objects. Some materials reflect light better than others. <i>Vocabulary: transparent, clear, dull, shiny</i></p> <p><i>Vocabulary: reflect, reflection, smooth, shiny, reflectors, periscope</i></p>	<p>stormy days. Discuss which is brighter the sun or the moon/stars. <b>Small Group / Centers</b> <i>Process skills: Observing, comparing, communicating, manipulating, classifying, investigating</i> Let the children collect different items made of wood, fabric, metal, plastic, china, glass, paper and cardboard. The children then shine a flashlight on them and record what they observe. The teacher uses guiding questions such as: What sort of objects does the light pass through? Can you see light through your hand? What do you see when you shine the light on...? Let the children collect shiny metal objects including aluminum foil. Ask them what they see when they look at them. They can also use one or more mirrors. They can also try to draw a picture or write whilst looking in a mirror. A sheet of card can be covered with foil and bent. Children can tell what happens to the</p>	<ul style="list-style-type: none"> <li>• Investigating and communicating results of observations.</li> </ul>
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		reflected image. The foil can also be crumpled and the image seen compared with when the foil is smooth. The children can also see if they can reflect the light on to the ceiling or wall. Older children can make a periscope using a ruler and two mirrors attached to the ruler with plasticine. The mirrors can be placed at different angles and the results of observations noted.	
4. Develop an awareness of how shadows are formed	<p>Formation of shadows Light is necessary for the formation of shadows. Shadows are produced when light cannot pass through a solid object or shape. <i>Vocabulary: shadow, dark, light</i></p>	<p><b>Whole Class</b> <i>Process skills: Observing, comparing, communicating, manipulating, measuring</i> If possible let the children search for shadows on a sunny and a cloudy day. On a sunny day let them play 'Shadow Tag' (children try to tag each others shadow by jumping on it) Let the children compare shadows e.g. whose is longer, wider etc. They can measure them with non-standard units. Indoors the children can use a flashlight and a domino to create a shadow on a piece of white</p>	<p>Teacher observes or records child:</p> <ul style="list-style-type: none"> <li>● Describing experiences with shadows.</li> <li>● Observing that there are no shadows when the sun is not out.</li> <li>● Communicating what has been done or observed during exploration.</li> </ul>

		<p>paper. (The room must be darkened.)</p> <p><b>Small Group / Centers</b></p> <p>In the Science Center the children can observe what happens to the shadow when the flashlight is held in different positions. If the room cannot be darkened the activities can be done in a cardboard box.</p>	
5. Investigate how shadows travel	<p>Shadow position/movement</p> <p><i>Vocabulary: longer, shorter, behind, in front, left, right</i></p>	<p><b>Whole Class</b></p> <p><i>Process skills: Observing, comparing, communicating</i> , measuring</p> <p>On a sunny day let the children explore how the shadow copies them.</p> <p>Take the children outside at different times of the day and let them stand in the same place and observe the position and length of their shadow. If there is a pole in the school environment the children can measure its shadow at different times of the day.</p> <p><i>Parents can be asked to do these activities at the weekend.</i></p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Measuring shadows.</li> <li>• Noting that the shadow changes position according to where the light source is.</li> </ul>
6. Investigate ways in which we make use of shadows	<p>Using shadows</p> <p>Shadows show the shape of objects without detail.</p> <p><i>Vocabulary: shade, patterns, blinds,</i></p>	<p><b>Whole Class</b></p> <p><i>Process skills: Observing, comparing, communicating</i></p> <p>Let the children stand in the</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Making shadow pictures or patterns.</li> </ul>

	<p><i>parasol</i></p>	<p>shadow of a building or tree on a sunny day. Ask them how they feel (cool). Let them observe and discuss other areas of shade e.g. under a sunshade or shop blind or umbrella. <b>Small group /Centers</b> <i>Process skills: Observing, comparing, communicating, manipulating</i> Let the children make animal shadow shapes on the wall outside or use a white sheet as a screen and a flashlight to represent the sun.</p>	<ul style="list-style-type: none"> <li>Identifying shady areas.</li> </ul>
<p>7. Investigate how light produces color</p>	<p>Light rays bend as they pass through water. White light can be separated into the rainbow colors when it is refracted through a prism, soap bubble or drop of oil on the surface of water. <i>Vocabulary: bend, light ray, colors, rainbow, through, prism</i></p>	<p><b>Small Groups / Centers</b> <i>Process skills: Observing, comparing, communicating, manipulating, investigating, predicting</i> Put a straw into a glass of water and let the children look at the straw from the side and tell what they see. Let the children look through prisms and record what they see. Children can look for rainbows or create them using a hose. A bowl of water can be put in the sun. Drops of oil are dropped onto the surface of the</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>Communicating the results of observations of refraction of light. (<i>The term refraction will not be used by the children.</i>)</li> </ul>

		<p>water. The children look at the water and say what they see. The children can work with a partner and create a rainbow. Place some water in a transparent tray. One child holds a mirror in the tray of water. The other child shines a flashlight on the mirror and tries to 'catch' the rainbow on a white sheet of paper held in front of him or her opposite to the mirror.</p> <p>Two children can cover the end of their flashlights with different colors of cellophane and then shine them on to the same spot of a piece of white paper. They will observe that a different color is seen.</p>	
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TOPIC – SOUND

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> communicating, observing, comparing, inferring, manipulating, classifying, investigating, predicting</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>● ‘McGraw Hill Science’ Grade K, 1 &amp; 2</li> <li>● ‘Primary Science for the Caribbean: How to Teach Primary Science’ – Ralph Douglass</li> <li>● ‘Teaching Elementary Science’ – William K. and Mary K. Esler</li> </ul> <p>Books related to topic</p> <ul style="list-style-type: none"> <li>● ‘Hearing’ –Angela Littler</li> <li>● ‘Sound Experiments’ – Ray Broekel</li> <li>● ‘First Science’ Making Sounds’ Julian Rowe and Molly Perham</li> <li>● ‘Everyday Science – Sound’ – Peter Riley</li> <li>● McGraw Hill Science Grade K Teacher’s Edition</li> <li>● SRA learning Center Science – ‘Air and Sound’</li> </ul> <p>Immediate school environment, pre-recorded sounds on audio-tape, cassette player, objects and instruments to create sounds, blindfolds</p> <p>Posters of scenes where sounds are being made e.g. a busy street, at work, a farm yard, a circus, zoo or Coney island scene, in the home/yard, pictures of farm animals, noisy objects such as an alarm clock, a watch, clothes, earmuffs, construction paper, tape, glue, card (to make megaphones), a megaphone</p> <p>Junk material, rubber bands, combs, empty containers, bottles, pencils, foil, cling film to make instruments and paint to decorate them</p> <p>Paper cups and string to make toy telephones</p>

Target Behavior	Content	Suggested Experiences	Assessment Opportunities
1. Identify sounds in the environment	Identifying sound source Auditory discrimination Objects, animals and humans make distinctive sounds. <i>Vocabulary: sound, direction</i>	<p><b>Whole class</b>  <i>Process skills: Observing, comparing, communicating</i>            Children are asked to close their eyes and listen for one or two minutes and tell or draw what they heard.            The teacher makes different sounds in different places in the classroom using a variety of objects. The children with eyes closed are asked to identify the sound and say where the sound is located. This activity can be done outside. A child can be chosen to make the sound.            Begin with familiar sounds.</p> <p><b>Small group / Centers</b>            Children are given farm animal picture cards and asked to make the animal sound to match the pictures or one child makes an animal sound and the others point to the animal that makes the sound.  <i>Some local radio stations have pre-recorded environmental sounds and may make a recording for you.</i></p>	Teacher observes or records a child: <ul style="list-style-type: none"> <li>● Discriminating between sounds.</li> <li>● Identifying sounds heard.</li> <li>● Drawing the correct object for sounds heard.</li> <li>● Identifying the direction of a sound.</li> <li>● Making and identifying animal sounds.</li> </ul>

<p>2. Create sounds using objects or their bodies</p>	<p>Many things can be used to create sound. Sound is created by vibrating objects.</p>	<p><b>Whole Class</b> <i>Process skills: Observing, comparing, communicating, manipulating</i> During Shared Reading the teacher can tell a story stopping at certain points for the children to make representative sounds, e.g. the sound of footsteps, rain. Children can feel their throats to see what happens when they speak or hum. They can then use a balloon to demonstrate how vocal cords work.<sup>12</sup> Children can create sound pictures using a variety of objects and instruments.</p>	<p>Teacher observes and records a child:</p> <ul style="list-style-type: none"> <li>● Creating sounds to illustrate a story.</li> <li>● Creating sound pictures for given words in the listening center.</li> <li>● Recognizing that sound is made when something vibrates</li> </ul>
<p>3. Classify sounds heard</p>	<p>Sounds can be pitched at different levels Pitch has to do with how fast or slow something vibrates. The faster something vibrates the higher the pitch. <i>Vocabulary: high / low, loud / soft, pitch, speed, vibrates, faster / slower, megaphone</i></p>	<p><b>Whole Class or Small Group</b> <i>Process skills: Observing, comparing, communicating, manipulating, investigating</i> Children listen with eyes closed and identify loud / soft sounds heard. They can draw a picture or tell what they heard. Children look at posters and identify whether the sounds being made are loud or soft. Let the children hold plastic rulers on the end of their desks</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Identifying and ordering loud / soft sounds.</li> <li>● Telling or drawing objects, animals that make given sounds.</li> <li>● Experimenting and making sounds louder or softer</li> <li>● Experimenting and making high and low pitched sounds.</li> </ul>

<sup>12</sup> Blow up a balloon and stretch the neck as you let out the air. The sound will change as the neck of the balloon is pulled in and out.



		<p>and slap the other end. They listen to the pitch. They vary the pitch by moving more of the ruler on or off the desk.</p> <p><b>Small Group / Centers</b>          Children can make loud / soft sounds using a variety of objects. Children can make sounds louder by making and using a megaphone or softer by wrapping a noisy object in clothes or by using earmuffs or by covering the ears.</p>	<ul style="list-style-type: none"> <li>• Making and using megaphones.</li> </ul>
<p>4. Design and construct musical instruments and use them to accompany singing, action rhymes and / or musical activities</p>	<p>Instruments created from 'junk' material can make musical sound.</p> <p><i>Vocabulary: names of instruments</i>  <i>*In order to raise the level of thinking children can use different materials or objects and compare and contrast the sound that is produced; e.g. vary the thicknesses of the rubber bands when making the guitar or vary the length of the cardboard tube when making a trumpet.</i></p>	<p><b>Small Group / Centers</b>  <i>Process skills: Observing, comparing, communicating, manipulating, measuring, investigating</i>          Making musical instruments  <i>Guitar</i> – Use a 500g margarine tub and thick rubber bands or a book, two pencils and rubber bands.  <i>Trumpet</i> – Use a cardboard tube from a roll of kitchen paper, smooth aluminum foil attached over one end of the tube with a rubber band. Make an air hole in the foil with a sharp pencil. Use a comb to make a <i>harmonica</i>.  <i>Organ</i> - Use bottles filled with</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Making musical instruments.</li> <li>• Identifying the pitch of the sound created.</li> <li>• Recognizing that sounds produced by the instruments are dependent upon the materials used to make them.</li> </ul>

		<p>different amounts of water. The child can blow across the bottles to make different notes. These can be ordered according to the pitch of the notes made.</p> <p><i>Drums</i> can be made out of different containers covered at one end with plastic wrap or other suitable material.</p>	
5. Demonstrate how sound moves	<p>Sound moves in waves away from what is being vibrated. Sound waves travel through different materials.</p> <p>A sound is made by tiny, fast air movements, which make your eardrums vibrate.</p> <p><i>Vocabulary: vibrate, sound waves</i></p>	<p><b>Whole Group</b>  <i>Process skills: Observing,, communicating</i>  Teacher - directed  The teacher demonstrates how sound waves move by dropping a pebble into a bowl of water and having the children observe the rippling effect.</p> <p><b>Small Group Experiments</b>  <i>Process skills: Observing, comparing, communicating, manipulating, investigating, predicting</i>  Take a ticking clock outside and tie it to a clothes line with a piece of string. Place your body in different places and listen for the ticking  Place a watch at one end of a table until you cannot hear it ticking. Rest your head on the table and listen (<i>Sound travels</i></p>	<p>Teacher questions children to evaluate understanding.</p> <p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Demonstrating social skills when working with others.</li> <li>● Following instruction.</li> <li>● Predicting and inferring (<i>Teacher uses open-ended questioning</i>)</li> </ul>

		<p><i>better along wood than in the air)</i></p> <p>Children can tap objects on different surfaces and create sounds e.g. fabric, wood or in water.</p> <p>Take a very long piece of garden hose and use it as a telephone.</p> <p>Make tin can or paper cup telephones and experiment with them. They can try speaking with the string tight or loose and see if their partner can hear them. (<i>A tight string can vibrate so the sounds will be heard.</i>)</p>	
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TOPIC: ELECTRICITY

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> communicating, observing, comparing, inferring, manipulating, classifying, investigating, predicting</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>● ‘McGraw Hill Science’ 1 &amp; 2</li> <li>● ‘Teaching Elementary Science’ – William K. and Mary K. Esler</li> <li>● ‘ The Big Book of Safety for Young Children’ – Cindy Barden</li> <li>● Websites: <a href="http://www.brainpop.com/science/electricity">www.brainpop.com/science/electricity</a></li> <li>● <a href="http://www.edisonkids.com">www.edisonkids.com</a></li> </ul> <p>Books related to topic</p>

	<ul style="list-style-type: none"> <li>• ‘Everyday Science: Electricity’ – Peter Riley</li> <li>• ‘Let’s Explore Electricity and Magnetism’ – Karin Underwood and Heather Monaghan</li> <li>• ‘Do-it-Yourself Science: All About Electricity’ – Melvin Berger</li> <li>• ‘Simply Science: Electricity’ – Darlene R. Stille</li> <li>• ‘Science Factory: Electricity and Batteries – Michael Flaferty</li> </ul> <p>Immediate school environment  A collection of electrical items e.g. toys, small appliances, flashlights  Safety goggles, batteries, battery holder, wire, flashlight bulbs and holders, brass fasteners, large paper clips, buzzers, crocodile clips and leads</p>
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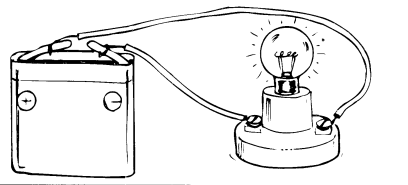
Target Behavior	Content	Suggested Experiences	Assessment Opportunities
1. Identify sources and uses of electricity	<p>Electrical energy can be used to perform many tasks.  Electricity can be used to make things move, make things hot or cold, make light and sound.  Electricity comes through wires or from batteries.  <i>Vocabulary: electricity, current, battery, plug, socket, cord, cables, wires, buzzer, switch, hot/cold, light, sound, move/motion, Names of household appliances</i></p>	<p><b>Whole Class</b>  <i>Process Skills: Communicating, comparing, classifying,, manipulating</i>  Survey the classroom and school environment to see how many electrical appliances they can find, draw them and sort them into groups; those with batteries or plugs or both. Venn diagrams can be used.  Discussion during Shared Reading or Picture Discussion  Making a display of items using electricity</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Listing items that use electricity.</li> <li>• Classifying appliances into those that use electricity and those which use batteries.</li> <li>• Explaining that electrical energy changes into heat, sound or motion.</li> </ul>

		<p>Children can do home projects e.g. List electrical items used in each room of the home and outside.</p> <p>Comparing batteries</p> <p>Invite an older person to tell how they survived without electricity.</p> <p>Write about experiences of power outages.</p> <p><b>Small Group / Centers</b></p> <p>Children can cut pictures of electric items and sort them into those which make sounds or light, those used for heat or to make things cold or those that move. Some items will fit in two subsets. Charts can be created to show results.</p>	
2. Identify and demonstrate ways to use electricity safely	<p>Electricity needs to be handled with care.</p> <p>A strong electric current passing into your body can cause shock, bad burns or heart attack.</p> <p>Electric current produces heat that can cause fire.</p> <p>Do not run electrical cables under carpets or rugs.</p> <p>Some batteries are dangerous e.g. car batteries.</p> <p>Safety Rules:</p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Communicating, observing, inferring</i></p> <p>Teacher demonstrates how to use electricity safely.</p> <p>Discuss pictures that show safe and unsafe practices.</p> <p>Invite someone from GEBE to talk about safety.</p> <p><b>Small Group / Centers</b></p> <p>Design safety posters.</p> <p>Write and perform skits about</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Naming or telling ways of using electricity safely.</li> </ul>

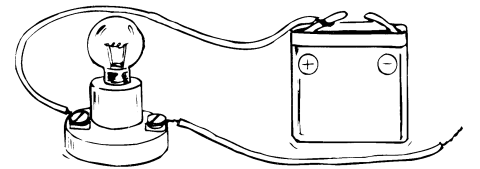
	<p>Never stick metal objects into electrical appliances that are turned on.</p> <p>Never use electrical appliances near water.</p> <p>Do not plug in a cord with wet hands or while standing in water.</p> <p>Checked for frayed wires or overloaded sockets</p> <p>Do not use appliances with loose cables or exposed wires.</p> <p>Do not fly kites near overhead cables.</p> <p>Be careful not to touch appliances that have been turned off and may still be hot.</p>	<p>electrical safety.</p> <p>Be a safety detective for a day and note unsafe situations.</p>	
3. Investigate how electric circuits work	<p>Electricity flows through a circuit. When the circuit is broken the flow of electricity stops.</p> <p>Electrical conductors e.g. metals are materials that allow electricity to flow through them.</p> <p>Electrical insulators e.g. rubber do not allow electricity to pass through them.</p> <p>Switches control the flow of electricity.</p> <p><i>(Good preparation will ensure a</i></p>	<p><b>Whole Class</b></p> <p>Discuss safety procedures for making circuits.</p> <p>Discussion about circuits known to the children e.g. a toy race car or train on a track.</p> <p>Human Circuit</p> <p>The children stand in a circle.</p> <p>One child is the battery and another child the bulb. The battery starts by clapping hands against the child next to him/her. Each child repeats the action with the child to the right</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Describing what happens when they switch on a circuit.</li> <li>● Making circuits independently and comparing them.</li> <li>● Explaining how circuits work and what happens when there is a break in the circuit.</li> <li>● Making simple predictions</li> </ul>

	<p><i>positive experience for the children.</i></p> <ul style="list-style-type: none"> <li>• <i>Check the bulbs before giving them to the children.</i></li> <li>• <i>Check the batteries.</i></li> <li>• <i>Check the leads, if you are using crocodile clips make sure that there are no breaks between the wire and the clip.</i></li> <li>• <i>Make sure that the voltage of the battery matches that of the bulb.)</i></li> </ul> <p><i>Vocabulary: circuit<sup>13</sup>, electric current, bulb, battery, volts, terminal, + (positive), - (negative), blow, bulb holder, lead, crocodile clip, screw, unscrew, wire, circuit break, switch</i></p>	<p>until ‘the bulb’ is reached. The ‘bulb waves his/her hands up to show the bulb is on. To show what happens when a circuit is broken two children drop out of the circle so that clapping has to stop. Balls can be passed around for variation. The more balls used the greater the flow of electric current.</p> <p><i>Safety Procedures for students:</i></p> <ul style="list-style-type: none"> <li>• <i>Treat fragile bulbs gently.</i></li> <li>• <i>Open and close crocodile clips carefully.</i></li> <li>• <i>If something is damaged or not working properly let an adult know.</i></li> <li>• <i>Dispose of broken pieces immediately.</i></li> <li>• <i>Keep your working area clean and tidy.</i></li> </ul> <p><b>Small Group / Centers</b>  <i>Process Skills: Observing, comparing, communicating,</i></p>	<p>and confirming or rejecting them by investigation.</p> <ul style="list-style-type: none"> <li>• Using materials safely.</li> </ul>
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<sup>13</sup> A complete or closed circuit



A broken circuit



		<p><i>manipulating, investigating, predicting, inferring</i>  <i>( Whether these activities are whole class or center will depend on the level and ability of the children)</i></p> <p>Set up the equipment for a circuit and ask the children to join the battery and bulb with two leads. Let them investigate what happens if the bulb is unscrewed or you undo the crocodile clip.</p> <p>Let the children assemble the circuits themselves and ask if they can use one lead to light the bulb or what happens inside the bulb.</p> <p>Let the children find as many ways as possible to break the circuit or set up a circuit with a break and ask them to make it complete.</p> <p>Some children may want to investigate electrical conductors by using different materials to bridge the gap in a circuit. The children can predict which materials will allow the electricity to pass through and then see if the results match their predictions. Spoons made</p>	
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		of wood, metal and plastic, rulers, pipe cleaners, rubber bands, plastic tubing, aluminum foil, coins can be used.	
4. Use their knowledge of circuits to construct models using lights or buzzers	Bulbs in circuits can be replaced by buzzers. When using buzzers the way that the wires are connected is important.	<b>Small Group / Centers</b> Children can replace light bulbs in their circuits with buzzers. <i>(The positive terminal on the battery (+) must be connected to the positive or red wire of the buzzer).</i> They can use their circuit to provide light or doorbells for a model house.	Teacher observes or records a child: <ul style="list-style-type: none"> <li>Using circuits in models.</li> </ul>

TOPIC: FORCE AND MOTION

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Manipulative Skills:</i> cutting, painting, drawing</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, generating ideas, expressing ideas, problem solving</p> <p><i>Process Skills:</i> communicating, observing, using space relations, comparing, inferring, manipulating, classifying, investigating, controlling variables</p>	<p>Books related to topic:</p> <ul style="list-style-type: none"> <li>‘Make It Go - David Evans and Claudette Williams</li> <li>McGraw Hill Science ‘Make Things Move’ Activity Notebook</li> <li>‘Everyday Science: pulling and Pushing’ – Peter Riley</li> <li>‘My Science Book of Movement’ – Neil Ardley</li> </ul> <p>Picture Cards of various objects, hoops or yarn to make two hoops, labels – moves, does not move</p> <p>Large poster e.g. of Coney Island, a playground or a street scene</p> <p>Full-length mirror, plasticine</p> <p>Small objects e.g. a small wagon, a toy car, a pull-along toy, a heavy school bag, (items that must be pushed or pulled</p> <p>Hoops, labels – roll / slide, objects that can be rolled e.g. ball,</p>

	<p>marble, a toy car, a toilet roll tube or cylindrical block and objects that slide e.g. a pencil, a book, a ruler, a clothes pin.</p> <p>Toy cars, toy trucks, sand, masking tape, large blocks to make inclines, 3 smooth boards to make ramps, pieces of carpet and matting. Marbles, a track (can be made from plastic tubing)</p> <p>Items with wheels, pulleys, cotton reels, ropes, buckets.</p>
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<b>Target Behavior</b>	<b>Content</b>	<b>Suggested Experiences</b>	<b>Assessment Opportunities</b>
1. Develop an awareness of force	<p>A force is any push or pull on an object that causes it to start moving, stop moving or change direction or speed.</p> <p><i>Vocabulary: force, push, pull, stretch, twist, bend, squash, squeeze, press, scratch, lift, kick, throw</i></p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Observing, using space relations, communicating, manipulating, classifying</i></p> <p>The teacher gives each child a piece of plasticine (clay, 'Play Dough') and asks them to demonstrate each type of force using the plasticine. Teacher names an action e.g. push, pull and the children do the action. The activity is repeated with other action words, however this time the teacher asks the children to decide if the action is a push or a pull e.g. stretching is a pull, pressing is a push. A discussion can follow on how force is used in a school day</p> <p><i>Curriculum Link</i></p> <p><i>In Physical Education the children can demonstrate push or pull by kicking, bouncing or throwing a</i></p>	<p>Teacher observes and records a child:</p> <ul style="list-style-type: none"> <li>• Defining force.</li> <li>• Demonstrating the effects of force.</li> </ul>

		<p><i>ball, tug of war</i>  <b>Small Group / Center</b>  Paper / pencil races:  The children use air force and move the pencil by blowing through a drinking straw.  Water wheels can be made to demonstrate water force. The teacher gives each child a circle of thin card. The children make cuts in the circle to form flaps. And fold them back. A pencil is pushed through the center of the circle. The children then work in pairs. One pours water over his/her partner's water wheel. The force of the water makes the water wheel spin. The children can experiment with empty washing-up liquid bottles filled with water and see how far they can make a rubber duck move across a water tray.</p>	
<p>2. Explore how things move.</p>	<p>Identifying things that move  <i>Vocabulary: up / down, back / forth, roll, slide, bounce, throw, lift fast / slow bend, twist, turn, nod shake, side to side</i></p>	<p><b>Whole Class</b>  <i>Process Skills: Observing, communicating</i>  Use a poster and let the children tell how the things move e.g. slide, roll, swing, spin, lift.  <b>Small Group / Centers</b>  <i>Process Skills: Observing,</i></p>	<p>Teacher observes and records a child:</p> <ul style="list-style-type: none"> <li>● Sorting correctly into given criteria.</li> <li>● Telling how things move.</li> <li>● Finding different ways of moving a ball.</li> </ul>

		<p><i>communicating, classifying, comparing, using space relations, manipulating</i></p> <p>Give pairs of children picture cards to sort into things that move and things that do not move.</p> <p>Give the children different items e.g. a car, a ball, a yo-yo, a rocket, a swing, a top, a block and let them say how they move,</p> <p><b>Whole Class</b></p> <p>Outside let the children work in pairs to move a ball to each other in different ways.</p> <p><i>Curriculum Link – Physical Education</i></p> <p>Ask the children to move their body parts and say how they move and which can move in different directions.</p> <p>Children can also use a full-length mirror to monitor their movements.</p>	<ul style="list-style-type: none"> <li>• Using appropriate vocabulary.</li> </ul>
<p>3. Recognize that a push or a pull is needed to move certain objects</p>	<p>Objects can not move by themselves. A push or a pull is needed to start the motion.</p> <p><i>Vocabulary: push, pull, drag, force, heavy / heavier / heaviest, light / lighter / lightest</i></p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Observing, comparing, communicating, manipulating, inferring, using space relations</i></p> <p>Ask two children to move a box</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Inferring that moving heavier objects requires more force.</li> <li>• Identifying and sorting</li> </ul>

		<p>of items without lifting it up. One pushes the box to move it, the other pulls the box toward him/her to move it. Let the children discuss the actions. They can also compare the strength of force needed to move a full, empty or half-full box of books.</p> <p><i>Questions:</i>  <i>Which is easier to move? Why?</i>  <i>Which required more force to move it?</i></p> <p><b>Small Group / Centers</b>  Give groups of children several objects e.g. a small wagon, a toy car, a pull-along toy and let them sort them, using Venn diagrams, into those that must be pushed or pulled or both. The children work in groups and give each group objects that can be rolled e.g. ball, marble, a toy car, a toilet roll tube or cylindrical block and objects that slide e.g. a pencil, a book, a ruler, a clothes pin. Let the children move each object and sort them into subsets  <i>(In order for the children to infer ask them why the objects move</i></p>	<p>objects that are pushed or pulled.</p> <ul style="list-style-type: none"> <li>• Drawing objects that are pushed or pulled.</li> </ul>
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		<i>differently)</i>	
4. Explore how weight, surface or incline (slope) affects motion	<p>Objects that are round roll. Flat objects slide. The incline of a ramp or slope affects the speed of movement. The type of surface also affects the speed.</p> <p><i>Vocabulary: fast / faster / fastest, weight, slope, incline</i></p>	<p><b>Small Groups / Centers</b> <i>Process Skills: Using space relations, observing, communicating, comparing, manipulating, controlling variables, investigating</i> <sup>14</sup>The children can explore how weight, <sup>15</sup> surface or <sup>16</sup>incline affects motion</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>Investigating the effects of weight, surface and incline on motion.</li> </ul>
5. Demonstrate how wheels make things easier to move	<p>Wheels make motion easier. <i>Vocabulary: pulley</i></p>	<p><b>Whole Class</b> Make a display of all objects that have wheels. (Items can be brought from home) <b>Whole Class demonstration repeated in Small Center Groups</b> Place some rocks in a Ziploc bag. Let a child push the bag by hand. Then let the child put the bag on a toy flatbed truck. Ask the child which was the easier way to move the bag of rocks and what makes it easier. Let the children move toy cars with the wheels removed and tell why wheels are necessary.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>Experimenting and solving problems</li> <li>Telling why wheels make it easier to move heavy objects.</li> <li>Adding items to the class display</li> <li>Explaining what has been observed.</li> </ul>

<sup>14</sup> Let the children ‘race two toy trucks, one without cargo and one with cargo (sand) and mark where each truck stops

<sup>15</sup> Set up three slopes at the same height. Cover two with different materials e.g. a carpet, a mat. Let the child roll the same toy vehicle down the slopes and observe what happens.

<sup>16</sup> Set up two or three different slopes varying the incline. Let the children push cars down the slopes and observe what happens.

		Let one child sit in a box and ask his or her classmates to use broom handles to move him/her. ( This can be done with a heavy book and cylindrical, wooden building blocks) Let the children experiment with pulleys in lifting buckets of sand. ( <i>Simple pulleys can be made with cotton reels and rope</i> )	
6. Design and construct a model that uses wheels to make it go	Wheels make motion easier. <i>Vocabulary: wheel, axle, pulley, cog wheel</i>	<b>Small Group / Centers</b> <i>Process Skills: Using space relations, observing, communicating, comparing, manipulating</i> Children use materials available to make cars, carts or pulleys.	Teacher observes or records a child: <ul style="list-style-type: none"> <li>• Making models with wheels that can move.</li> </ul>

TOPIC: MAGNETS

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Manipulative Skills:</i> cutting, painting, drawing</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> communicating, observing, using space relations, comparing, inferring, manipulating, classifying, investigating,</p>	<p>Teacher Resources:</p> <ul style="list-style-type: none"> <li>• ‘McGraw Hill Science’ 1 &amp; 2</li> <li>• ‘Teacher Edition K: Science Horizons’ – Silver Burdett &amp; Ginn</li> <li>• ‘ Science ’ – Silver Burdett &amp; Ginn</li> <li>• ‘Teaching Elementary Science’ – William K. and Mary K. Esler</li> <li>• ‘DiscoveryWords Teaching Guide 1: Magnets’ Houghton Mifflin Science</li> </ul>

<p>predicting  <i>Children should be told not to put magnets near electrical equipment or near computers.</i></p>	<ul style="list-style-type: none"> <li>• Websites: <a href="http://www.brainpop.com/science/forces/magnetism">www.brainpop.com/science/forces/magnetism</a></li> <li>• <a href="http://www.eduplace.com">www.eduplace.com</a></li> </ul> <p>Books related to topic:</p> <ul style="list-style-type: none"> <li>• ‘Simply Science Magnets’ – Darlene R. Stille</li> <li>• ‘Science Factory: Magnetism and Magnets’ – Micheal Flaherty</li> <li>• ‘What Makes a Magnet’ – Franklyn M. Branley</li> <li>• ‘Everyday Science: Magnets’ – Peter Riley</li> <li>• ‘Simple Science: My Magnet’ – Robert Pressling</li> <li>• ‘Amazing Magnets’ – Julian Rowe and Molly Perham</li> <li>• ‘Magnets’ – Ed Catherall</li> <li>• ‘Science Book of Magnets – Neil Ardley</li> <li>• ‘Science with Magnets’ – Helen Edom</li> </ul> <p>Assorted magnets, a bag of small objects, tape, paper clips (plain and colored), paper, card, small toys, colors, crayons, markers, transparent container, water, glass jars or containers, yarn or string, iron filings, ‘Ziploc’ bags, magnetic games</p>
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Target Behavior	Content	Suggested Experiences	Assessment Opportunities
<p>1. Investigate magnets:</p> <ul style="list-style-type: none"> <li>• What they are</li> <li>• What they do</li> </ul>	<p>A magnet is anything that will attract or pull iron, steel and certain other metals to it.  <i>Vocabulary: magnet, bar, horseshoe, attract, iron, steel, metal</i></p>	<p><b>Small Groups / Centers</b>  <i>Process Skills: Observing, comparing, communicating, manipulating, classifying, predicting</i>            Provide the children with magnets (bar or horseshoe) and several small objects in a bag. The children can view the objects and predict whether or</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Experimenting with magnets.</li> <li>• Predicting and classifying.</li> </ul>



		<p>not the magnet will attract them Predictions are recoded on a chart.</p> <table border="1"> <tr> <th colspan="2">Predictions</th> </tr> <tr> <td>Attracts</td> <td>Does not Attract</td> </tr> <tr> <td></td> <td></td> </tr> </table> <p>The children then test their predictions and record their results.</p>	Predictions		Attracts	Does not Attract			
Predictions									
Attracts	Does not Attract								
2. Tell how magnets are used in daily life	<p>Magnets are used for:</p> <ul style="list-style-type: none"> <li>• Toys and games</li> <li>• Can openers</li> <li>• Doors</li> <li>• Refrigerator magnets</li> <li>• Magnetic numbers and letters</li> </ul>	<p><b>Whole Class</b> <i>Process Skills: Observing, communicating, manipulating</i> Discuss a poster or collect magnetic items used at home or at school.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Participating in the discussion and giving suggestions as to how magnets are used.</li> </ul>						
3. Investigate magnetic force	<p>Magnetic force is the push or pull created by a magnet. Magnetic force can pass through air and some other materials without touching them. The strength of the magnet being used or the thickness of the material will affect the magnetic force on the object. <i>Vocabulary: magnetic force, magnet, pull, pulling, push, pushing, thick, thickness, strong, strength</i></p>	<p><b>Small Group / Centers</b> <i>Process Skills: Observing, using space relations, comparing, communicating, manipulating, investigating, inferring</i> Put a metal spoon near a magnet and then pull it away. The children should feel the push as the magnet pulls the spoon and the pull when they are separated. Place a paper clip on a plastic boat and place the boat in a clear container of water. Use a</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Inferring that magnetic force can move an object without touching it.</li> <li>• Investigating the strength of the magnetic force.</li> </ul>						

		<p>magnet underneath the container and try to move the boat.</p> <p>See how many sheets of card or paper can be held by a refrigerator magnet.</p> <p>Find out if a magnet can attract through wood.</p> <p>Place paper clips in a glass and try to lift them by placing the magnet on the side of the glass.</p> <p>Place paper clips on toy cars and race them without letting the magnet touch the cars.</p> <p>Mazes can be drawn on cards. Children can draw an animal on a piece of card and cut it out and attach a paper clip to it. The child has to guide the 'animal' through the maze using a magnet.</p> <p>Children can try to lift paper clips off the table using a magnet. By placing objects between the raised paper clips and the magnet they can investigate which objects make the clip fall. The children record their findings.</p>	
4a. Compare the strength of different magnets	Some magnets are stronger than others.	<b>Small Group / Center</b> <i>Process Skills: Observing,</i>	Teacher observes or records a child:

<p>4b. Compare the strength of different parts of a magnet <b><i>Use bar magnets that are painted in red and blue.</i></b></p>	<p>Magnets differ in shape, size, strength and thickness. <i>Vocabulary: Bar, magnet, horseshoe magnet, ring / disc magnet, strip magnet, flat, paper clips</i></p> <p>Magnets have poles. Two poles that are alike push apart. Two poles that unlike pull and stick together. <i>Vocabulary: push apart (repel), pull, attract, ring magnet</i></p>	<p><i>comparing, communicating, manipulating, investigating</i> Different kinds of magnets are tied to a piece of dowelling at regular intervals and the same height. The piece of dowelling is held over a bed of paper clips. The children can guess which magnet will attract the most paper clips, and then check the results.</p> <p>Use a bar magnet to pick up paper clips and observe where the paper clips stick. (<i>The magnetic force is strongest at the poles.</i>) Try with a ring magnet. Place the ends of two bar magnets together and observe and record what happens. Turn one of the magnets around and repeat the investigation. Try to line up four or five bar magnets so that they stick together. Place five ring magnets on a pencil held vertically. Change some around and record what happens.</p>	<ul style="list-style-type: none"> <li>● Investigating the strength of magnets.</li> <li>● Recording data.</li>   <li>● Telling that magnets have poles.</li> <li>● Telling that unlike poles attract and like poles repel.</li> <li>● Applying knowledge gained by positioning magnets so that they attract each other.</li> </ul>
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<p>5. Observe magnetic patterns</p>	<p>Different kinds of magnets make different patterns.  <i>Vocabulary: patterns</i></p>	<p><b>Small Group / Centers</b>  <i>Process Skills: Observing, comparing, communicating</i>  Place some iron filings in a 'Ziploc' bag and lay the bag on a table. Spread the filings out. Place two bar magnets on the bag with unlike poles next to each other but not touching. Observe and draw what you observe.  Repeat the experiment with other types of magnets. Compare the results.  Draw a face on a thin sheet of card. Draw large eyes, nose and mouth but not eyebrows or hair. The teacher pours some iron filings on to the picture. The child holds a magnet under the card and tries to complete the picture by moving the filings around and positioning them to make hair, eyebrows and a moustache or beard.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Comparing patterns made by magnets.</li> </ul>
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## SCIENCE AND TECHNOLOGY

### TECHNOLOGY SCIENCE

#### Standards / Goals

#10 Technology Sciences:	The student understands the nature of technology.
#11 Technology Sciences:	The student understands the design of technology.
#12 Technology Sciences:	The student understands the scientific <sup>17</sup> enterprise.
#13 Basic Science and Technology Skill:	The student can define the nature of scientific and technological inquiry.
#14 Basic Science and Technology Skill:	The student can explain the nature of scientific knowledge.
#15 Basic Science and Technology Skill:	The student understands the <sup>18</sup> abilities for a scientific and technological world.

#### TOPIC: SIMPLE MACHINES

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> communicating, observing, comparing, inferring, manipulating, classifying, investigating, predicting</p>	<p>Related Books:</p> <ul style="list-style-type: none"> <li>● True Book ‘Experiments With Simple Machines’ – Salvatore Tocci</li> <li>● ‘Machines We Use’ – Sally Hewitt</li> <li>● ‘Work and Simple Machines’ – Jon Richards</li> <li>● ‘Science Experiments With Simple Machines’ – Ashton Nankivell</li> </ul> <p><a href="http://www.ed.url.edu/smart96/elemsc./smartmachines/machine.html">www.ed.url.edu/smart96/elemsc./smartmachines/machine.html</a></p> <p>Simple machines: e.g. scissors, stapler, sharpener, nutcracker, tongs, bottle opener, pliers, hammer, saw, screw, screwdriver, nuts and bolts, nail, ramps, rake, broom, pulley, wheels and axles</p> <p>Pictures of tools</p> <p>Toy tools</p>

<sup>17</sup> Undertaking

<sup>18</sup> Identifying a problem; proposing a solution; implementing proposed solutions; evaluating a product or design; communicating a problem, design and solution

	<p>Tongue depressors, rulers, teddy bear counters, pencils</p> <p>Construction material</p> <p>Paper, card, glue, tape, scissors, string, straws, rulers, toothpicks, plastic bottle caps, cotton reels</p>
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Target Behavior	Content	Suggested Experiences	Assessment Opportunities
<p>1. Observe, identify and use simple machines</p>	<p>A simple machine (tool) is used to make work easier.</p> <p>Work is the process of making an object move.</p> <p><i>Vocabulary: Names of simple machines found in the immediate environment</i></p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Observing, comparing, communicating</i></p> <p>Teacher displays five or more simple machines, e.g. a pair of scissors, a bottle opener, a broom, a stapler, a knife and a pencil sharpener.</p> <p>She then asks the children to name more objects that make work easier. Pairs of children can then select one simple machine, describe it, tell what it does and explain how it makes work easier.</p> <p><b>Small Group</b></p> <p><i>Process Skills: Observing, comparing, communicating, manipulating, comparing, investigating</i></p> <p>Give each group a job to do e.g. cutting a piece of card, opening a bottle of juice, keeping papers together, breaking open a nut and ask them to do it without</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Naming simple machines.</li> <li>● Explaining ideas clearly.</li> <li>● Selecting appropriate tools and using them correctly.</li> </ul>

		<p>using any tools. Then let them select an appropriate tool to do the job and compare the results.</p> <p><b>Home / School Link</b></p> <p><i>Children can draw or collect pictures of simple machines used in the home.</i></p>	
2. Demonstrate an awareness of safety procedures to be followed when using simple machines	<p>Safe use of selected simple machines.</p> <p><i>Vocabulary: safety, warning, instructions, warning label</i></p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Observing, communicating, manipulating</i></p> <p>Discussion and teacher demonstration</p> <ul style="list-style-type: none"> <li>• Tools/simple machines in the classroom</li> <li>• Safe handling of specific tools e.g. scissors, stapler, knives</li> <li>• Following safety warning labels on simple machines</li> </ul>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Handling and using tools correctly.</li> </ul>
3. Explore how simple machines work	<p>Simple machines work in different ways.</p> <p>There are different types of simple machines.</p> <p><i>Vocabulary: lever, ramp (inclined plane), pulley, wheel and axle</i></p>	<p><b>Whole Class</b></p> <p><i>Process Skills: Observing, communicating, comparing, manipulating, investigating</i></p> <p><u>Levers</u></p> <p>Teacher shows the children how to open a can by using a screwdriver to lift off the cover. He/ She explains that a lever helps to lift things. If there is a see-saw in the playground let the children observe how it</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Identifying the different types of simple machines.</li> <li>• Constructing a simple machine.</li> <li>• Telling how simple machines make work easier.</li> <li>• Giving examples of the use of simple machines in the home, school and community.</li> </ul>

		<p>works. There is a load, a force and an area of support. When using a screwdriver you use force to push it down and it is supported by the rim of the can. When you push down the load (cover) goes up.</p> <p><b>Small Group</b> Let pairs of children make their own see-saws using rulers and blocks or tongue depressors and pencils. They can experiment by moving the pencil (support) and applying different amounts of force to see how it affects the load (teddy bear counters) that is to be lifted.</p> <p>The children can identify tools that are levers e.g. bottle openers, scissors.</p> <p><u>Ramp</u></p> <p><b>Whole Class</b> Let the children go outside and look at ramps. (They are usually placed by steps ) Ask the children why ramps are built. Let them discuss how ramps make moving heavy items easier.</p> <p><b>Small Group</b> Let the children build ramps</p>	
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		<p>using construction material for model homes.</p> <p>They can also go on a ‘ramp hunt’ and tell where they have seen ramps in the community.</p> <p><u>Pulley</u></p> <p><b>Whole Class</b></p> <p>The teacher demonstrates the use of the pulley and asks the children how it makes work easier. If the school has a flag post, he/she can show how a pulley is used to raise the flag. Let the children tell other ways a pulley is used e.g. men lifting buckets of sand/water on construction sites, raising buckets at a well, a fisherman reeling in his catch.</p> <p><b>Small Group</b></p> <p>The children can design and make their own pulleys.</p> <p><u>Wheel and axle</u></p> <p><b>Whole Class</b></p> <p>The teacher uses toy vehicles to demonstrate the use of the wheel and axle. The children can discuss how wheels make work easier.</p> <p><b>Small group</b></p> <p>The children can design and</p>	
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		construct a simple machine that has a wheel and axle, e.g. a cart.	
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TOPIC: ENVIRONMENTAL SCIENCE

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> attentive listening, clear and fluent speaking, eye-contact with the speaker, writing</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p> <p><i>Critical Thinking Skills:</i> analyzing, synthesizing, evaluating, applying, problem solving</p> <p><i>Process Skills:</i> communicating, observing, comparing, inferring, manipulating, classifying, investigating, predicting</p>	<p>Outside Environment</p> <p>Related Books:</p> <ul style="list-style-type: none"> <li>• ‘How Green Are You?’ – David Bellamy</li> <li>• ‘One Child’ – Christopher Cheng and Steven Woolman</li> <li>• ‘In My Neighborhood – Garbage Collectors’ – Paulette Bourgeois and Kim LaFave</li> <li>• ‘Saving Our Planet Series – Ava Deutsch Drutman               <ul style="list-style-type: none"> <li>○ ‘Land’ – Primary</li> <li>○ ‘Air’ – Primary</li> <li>○ ‘Water’ – Primary</li> </ul> </li> </ul> <p>Rubber gloves, waste bin with garbage, petroleum jelly and index cards Newspapers, wire mesh and water ‘Junk’ materials such as bottle caps, paper cups Art supplies</p>

Target Behavior	Content	Suggested Experiences	Assessment Opportunities
<p>1. Develop an awareness of how human activities affect the environment</p>	<p>The <i>environment</i> is the world around us.  Human beings affect their environment.  Any type of change people make to the environment affects animals, plants and the land.  Littering is an example of poor environmental behavior.  <i>Vocabulary: waste, litter, change, environment</i></p>	<p><b>Whole Class</b>  <i>Process Skills: Observation, communicating, comparing</i>  Let the children observe the state of their classroom / playground at the beginning of the day and then in the afternoon before leaving for the day. Children note changes. Discuss the changes and how they can be prevented. Teacher uses this example to illustrate how human action affects the Earth. Further explain to the children that the Earth has limited resources and cannot cope with all the waste that we produce.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Telling, drawing or writing about changes observed in the classroom.</li> <li>● Telling, writing or drawing ways in which they can improve the condition of their classroom.</li> </ul>
<p>2. Identify helpful and harmful changes to the environment</p>	<p>Human beings affect the environment in helpful or harmful ways.  Clearing land for construction of roads and housing can affect animals and plants.  <i>Vocabulary: reuse, reduce, recycle, waste</i></p>	<p><b>Whole Class</b>  <i>Process Skills: Observation, communicating, comparing, classifying</i>  The children can compare two photographs of a certain community, (each photograph must have at least a decade between them). The children can note the changes and classify them as harmful or helpful.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>● Classifying changes to the environment as helpful or harmful.</li> <li>● Classifying waste.</li> </ul>

		<p>The children can also observe changes in the school environment in the morning and afternoon hours.</p> <p>The teacher can empty the classroom waste bin on large sheets of newspaper. Using rubber gloves the waste can be classified, e.g. paper, metal, plastic and food. Discussion can be held as to which items are genuine waste. Further discussion can be held about what can be:</p> <ul style="list-style-type: none"> <li>• Reused / recycled</li> <li>• Used for gardening as compost</li> <li>• Real waste</li> </ul>	
<p>3. Identify ways of reducing pollution of the environment</p>	<p>The effects of pollution often change the environment. There are many kinds of pollution e.g. air, water and land.</p> <p>Air pollution is caused by industrial smoke e.g. GEBE; fumes from cars and burning leaves and trash.</p> <p>Water pollution happens when sewage, chemicals and trash are dumped into water e.g. Great</p>	<p><b>Whole Class / Small Group</b>  <i>Process Skills: Observation, communication, comparing, investigating</i>  <u>Air Pollution</u></p> <p>In order to observe how polluted the air is the children can cover index cards with petroleum jelly and leave them in different parts of the classroom or playground. After a few days they can check and</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Demonstrating and telling ways of reducing pollution.</li> </ul>

	<p>Salt Pond. Oil spills also affect the water.</p> <p>Littering causes land pollution. We can reduce pollution by reusing, reducing or recycling waste products.</p>	<p>observe the foreign matter that has been collected on the cards. The children can record the number of times that they see the air being polluted by vehicles or burning trash in one week and discuss what could be done to reduce air pollution.</p> <p><u>Water Pollution</u></p> <p>Collect samples of water from the Great Salt Pond, Belair Pond, the sea, a well and rain. Leave them for a few days until the pollutants settle and see which has less dirt.</p> <p>Visit Belair Pond and The Great Salt Pond at Sucker Garden and discuss the differences in terms of the effects of pollution. Discuss ways of water pollution prevention.</p> <p><u>Land Pollution</u></p> <p>Weigh the contents of the class waste bin everyday for a week to see how much waste is collected. Graph the daily results. Discuss findings. Older children can remove bottles, cans and other items that can be reused or recycled. Reweigh the waste and compare</p>	
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		<p>the weights.          Research what recycled goods are used for.  <sup>19</sup>Make recycled paper from different types of waste paper and investigate which is stronger or looks the best. Use the recycled paper to make cards.          Create something out of junk material</p>													
		<p>Make a chart to show how waste can be reduced e.g.</p> <table border="1"> <thead> <tr> <th>Material</th> <th>Reduction of Waste</th> <th>How</th> </tr> </thead> <tbody> <tr> <td>Paper Cups</td> <td>Reuse</td> <td>Wash and reuse again</td> </tr> <tr> <td>Bottle caps</td> <td>Reuse</td> <td>As counters</td> </tr> <tr> <td>Water</td> <td>Reduce waste</td> <td>Turn off taps after use</td> </tr> </tbody> </table> <p>Invite someone from Public</p>	Material	Reduction of Waste	How	Paper Cups	Reuse	Wash and reuse again	Bottle caps	Reuse	As counters	Water	Reduce waste	Turn off taps after use	
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Bottle caps	Reuse	As counters													
Water	Reduce waste	Turn off taps after use													

<sup>19</sup> Soak old newspaper in warm water overnight to make a pulp. Spread some of the pulp evenly on a letter-size piece of wire mesh. Place a ‘Handy Wipe’ cloth over the mesh and squeeze out as much water as possible. Remove the mesh carefully. Place another cloth on top of the pulp and place the cloths and pulp between two boards and leave to dry. Before it is totally dry, remove the boards and cloths. Lay your paper on newspaper to finish drying.

		<p>Works to speak to the class about how waste is collected, disposed of and controlled.</p> <p>Visit the Dump.</p> <p>Compare photographs of Philipsburg in the 20<sup>th</sup> century and present and observe the changes around the Dump.</p>	
4. Create a poster to encourage recycling or design and construct an object out of junk materials		<p><b>Small Group /Centers</b></p> <p>Create a model out of junk materials</p> <p>Design a poster encouraging others in school to reduce waste or recycle.</p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Creating an object or poster</li> </ul>

TOPIC: COMPUTER

Skills	Suggested Resources for Choice Centers, Projects or Teacher-directed Experiences
<p><i>Communication Skills:</i> computer skills</p> <p><i>Social Skills:</i> staying with the group, sharing material, using quiet voices, participating, staying on task, taking turns</p>	<p>Computers and printers</p> <p>Computer software</p> <p>‘Basic Computer Skills’ – McGraw Hill, Grade K - 2</p> <p>True Books</p> <ul style="list-style-type: none"> <li>• ‘Personal Computers’ – Charnan and Tom Kazunas</li> <li>• ‘The Internet for Kids’ - Charnan and Tom Kazunas</li> <li>• ‘The World Wide Web’ – Larry Dane Brimner</li> <li>• ‘E-Mail’ - Larry Dane Brimner</li> </ul>

Target Behavior	Content	Assessment Opportunities
1. Demonstrates an understanding of the history of computers	History of Computers	Teacher observes or records a child <ul style="list-style-type: none"> <li>• Creating a pictorial time-line to show the history of computers.</li> </ul>
2. Knows the characteristics and uses of computer hardware and operating systems	<ul style="list-style-type: none"> <li>• Naming hardware of the computer : keyboard, mouse, printer, monitor, hard and floppy disc, CD, tower, component, CPU, hardware</li> <li>• Starting up a computer, monitor and printer</li> <li>• Identifying the alphanumeric and special keys ( arrows, tab, scroll function keys; enter/return; delete/backspace; shift and space bar)</li> <li>• Finger placement on home row (A, S, D, FG, space bar (left hand) / space bar, HJ, K, L, ; (right hand);</li> <li>• Finger position on alphabetic keys, number keys and symbol keys</li> <li>• Handling diskettes, CDs and other equipment with care.</li> </ul> <p><i>Vocabulary: computer (PC), keyboard, mouse, printer, monitor, hard and floppy disc, CD, tower, component, arrows, tab, scroll function keys, enter/return keys delete/backspace keys, shift key, space bar, home row, open, close, delete, save. Files, programs, print</i></p>	Teacher observes or records a child: <ul style="list-style-type: none"> <li>• Identifying different computer components.</li> <li>• Using correct terminology and procedures for handling hardware and software.</li> <li>• Opening and closing programs and files</li> <li>• Saving and deleting files.</li> <li>• Printing</li> <li>• Identifying alphabetic keys.</li> <li>• Identifying number keys.</li> <li>• Identifying special keys.</li> <li>• Demonstrating proper finger placement on home row keys.</li> </ul>

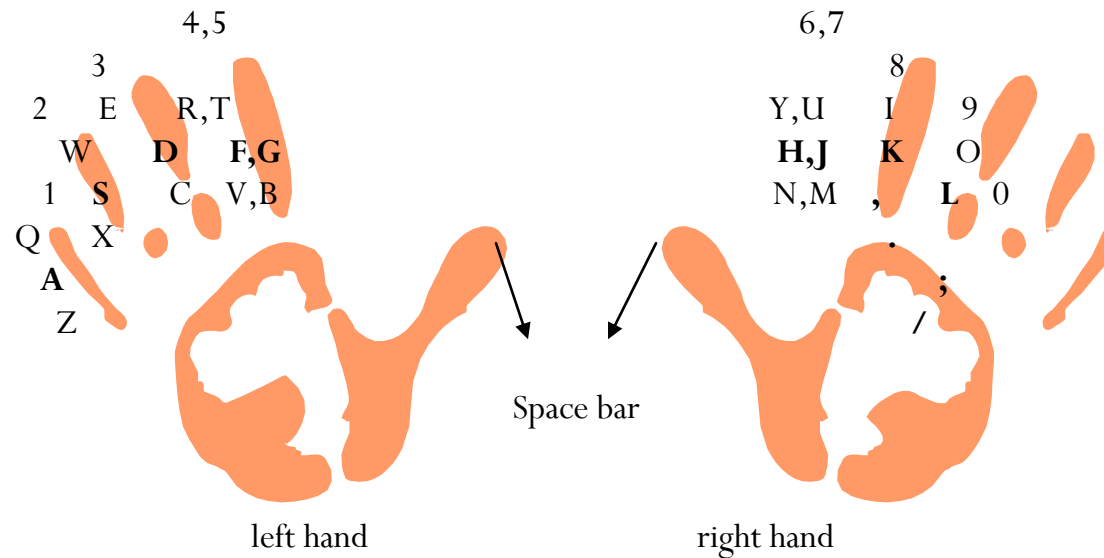


<p>3. Demonstrates an understanding of the characteristics and uses of computer software programs</p>	<ul style="list-style-type: none"> <li>• Typing using correct body and hand positions</li> <li>• Classifying software programs (word processors, special purpose programs, games)</li> <li>• Using menu options and commands of different software programs</li> </ul> <p><i>Vocabulary: keyboard, type, word processor, text, graphics, insert, select, delete, menu, edit, format, font, style, cut, copy, paste, multimedia, movie clip art, data, spreadsheet, graph</i></p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Typing using correct body and hand positions.</li> <li>• Identifying differences between word processors, spreadsheets, databases and games.</li> <li>• Using a word processor: <ul style="list-style-type: none"> <li>○ Entering text.</li> <li>○ Selecting and deleting text.</li> <li>○ Editing text using cut, copy and paste options.</li> </ul> </li> <li>• Using graphics and other multimedia: <ul style="list-style-type: none"> <li>○ Using paint and draw tools.</li> <li>○ Inserting, deleting and sizing movie clip art or graphics.</li> </ul> </li> <li>• Using a spreadsheet: <ul style="list-style-type: none"> <li>○ Navigating in a spreadsheet.</li> <li>○ Using spreadsheet terminology.</li> <li>○ Answering questions from spreadsheet data.</li> <li>○ Editing/entering data.</li> <li>○ Inserting and deleting a record.</li> </ul> </li> </ul>
<p>4. Demonstrates the ability to use the Internet and electronic references</p>	<p>Parts of the Internet  Internet safety  Netiquette (Rules of behavior when using the Internet)</p> <p><i>Vocabulary: World Wide Web (www), network, e-mail, netiquette, Internet, search engine, browser, home page, web site</i></p>	<p>Teacher observes or records a child:</p> <ul style="list-style-type: none"> <li>• Using Internet terminology.</li> <li>• Following rules for acceptable Internet and e-mail use.</li> <li>• Accessing a web site.</li> <li>• Navigating a web site.</li> </ul>

		<ul style="list-style-type: none"> <li>Using key words to search a reference CD-ROM.</li> </ul>
5. Identifies the uses of technology at home and school	<p>Uses of technology: pagers, telephones. VCRs, washing machines, cars</p> <p><i>Vocabulary: names of appliances and tools that have microprocessors, personal computers, desktops, laptops, notebooks</i></p>	<p>Teacher observes or records a child;</p> <ul style="list-style-type: none"> <li>Identifying how computers and other technological tools and appliances are used at home and in school.</li> </ul>

### COMPUTER KEYBOARD HAND POSITIONS

Home row (A, S, D, F/G, H/J, K, L, ;)



## APPENDIX

### GLOSSARY

#### <sup>20</sup>*PROCESS SKILLS*

- ***Observing:***
  - Identifying properties of an object, i.e., shape, color, size, and texture
  - Using indirect methods, i.e., hand lenses, microscopes, thermometers, to observe objects and events
  - Observing objects or events by counting, comparing, estimating, and measuring
- ***Using Space / Time Relation:***
  - Describing an object's position i.e., above, below, beside, etc., in relation to other objects
  - Describing the motion, direction, spatial arrangement, symmetry, and shape of an object compared to another object
  - Describing events in terms of sequence or duration or period of time compared to other events
- ***Comparing:***
  - Identifying similarities and differences among objects
- ***Communicating:***
  - Constructing and using written reports, diagrams, graphs, or charts to transmit information learned from science experiences
  - Verbally asking questions about, discussing, explaining, or reporting observations
  - After an investigation, reporting the question tested, the experimental design used, the results, and conclusions drawn and using tables and graphs where appropriate

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<sup>20</sup> Reference: Mechling, K., Bires, N., Kepler, L., Oliver, D., and Smith, B. (1985) A Recommended Science Competency Continuum for Grades K-6 for Pennsylvania Schools. Harrisburg, PA. Pennsylvania Department of Education

- ***Manipulating:***
  - Handling objects or materials
- ***Classifying:***
  - Identifying properties useful for classifying objects
  - Grouping objects by their properties or similarities and differences
  - Constructing and using classification systems
  - Comparing and ordering objects by length, area, weight, volume, etc.
- ***Measuring:***
  - Measuring properties of objects or events by using standardized units of measure
  - Measuring volume, mass, weight, temperature, area, length, and time, using appropriate units and appropriate measuring instruments
- ***Investigating:***
  - Finding out what happens when certain things are done
- ***Predicting:***
  - Proposing results or outcomes based on observation and inference
- ***Inferring:***
  - Suggesting explanations for events based on observations
  - Distinguishing between an observation and an inference
- ***Defining Operationally:***
  - Stating definitions of objects or events in terms of what the object is doing or what is occurring in the event
  - Stating definitions of objects or events based on observable characteristics
- ***Interpreting Data:***
  - Organising and stating in his/her own words information derived from a science investigation
  - Revising interpretations of data based on new information or revised data
- ***Hypothesizing:***

- Identifying questions or statements which can and cannot be tested
- Designing statements, i.e., questions, inferences, predictions, that can be tested by an experiment
- ***Controlling Variables:***
  - Changing one factor that may affect the outcome of an event whilst keeping the others constant (the same)
- ***Experimenting:***
  - Designing an investigation to test a hypothesis
  - Conducting simple experiments

## <sup>21</sup>SAMPLE SCIENCE PROCESS SKILLS ACTIVITIES

### Observing

- Observe the physical properties of water in different states (solid, liquid, gas)
- Various species of birds are commonly found around our island especially near bodies of water. Take a nature walk and look for them. Ask children to observe their size and color patterns they display, what they eat, what they like to stand on, and how they fly.
- When you return to the classroom show the children large colored pictures of the birds they observed. Ask them to tell you things that they saw and liked about each bird. Then, let them draw the birds they observed using colored crayons or pencils.
- Place a bird feeder and a water bath outside the classroom window. Let children spend some time each day observing and describing the birds as they feed and bathe. Involve children in replacing food and water in the stations.
- Collect or make musical instruments for the children to explore, such as bells, pipe wind chimes, xylophone, sand blocks, and a wood block tambourine. Have children tell you whether the sound is high or low, loud or soft. Then ask children to match the sound their instrument makes to a tone on a pitch pipe.
- Create a rhythm sequence on the tambourine or sand blocks and have children imitate it on their instrument.
- Have children identify mystery instruments and sounds played by children hidden from view.

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<sup>21</sup> Note that these are all simple sample activities that help to develop and teach the process skills. You will need to decide the appropriateness of each for whole class or small group instruction as well as pose the right questions for each skill.

### **Using Space / Time Relations**

- Have students engage in activities whereby they must tell the position of one object in relation to others. (Over, under, between etc.)
- Sequence the events of a water experiment
  - Orally
  - Using picture cues
  - Role Play

### **Comparing**

- Make a learning center that includes objects to weigh and balance. Use objects that are small and heavy as well as large and light. Give two objects to a child and ask the child to tell you which one is the heavier. Then have him/her compare the objects on a balance. Finish by making a mobile from objects the children have drawn or constructed.

### **Communicating**

- Communicating involves the sharing of information through words, pictures, graphs and diagrams. Students can write letters to friends from another school telling them that they will be describing their class. They can describe the light in the room. What time of the day is the light the brightest and what the room smells like. They can also draw a map of the room to include with the letter.

### **Manipulating**

- Allow children to engage in the use and manipulation of various hands-on materials.

### **Classifying**

- Go on a leaf hike with the children around your school environment. Ask them to pick up leaves as they go. Ensure that children avoid poisonous leaves. When they return to the classroom have them sort the leaves they collected into groups. Ask the children to tell you how they sorted the leaves. Then tape a leaf on the wall and let each child match it with a leaf from their collection. Make and display a class leaf collection using as many different kinds of leaves as possible. Then let children make leaf prints using crayons or colored pencils.
- Observe, classify and graph classroom objects as living or non-living.

## Measuring

- Students can determine how many small cups of water a pitcher holds by pouring, counting and tallying.
- Students create a simple classroom graph showing the height (or weight) of each other after conducting measurements.

## Investigating

- Pupils can investigate what happens to water when it is boiled for a long time.

## Predicting

- Predict, identify and record data regarding what plants need to survive by observing plants being grown under different conditions. First encourage children to predict what will happen. Use two similar, healthy plants. Ask the children to take turns watering one plant while ignoring the other for a week or two, keeping both plants in the same place. Have them check the results of the experiment and compare this with their prediction.

## Inferring

- Identify various internal body parts (heart, lungs, stomach and brain). After discussing the body's use of these organs, students will infer where these organs are located within the body. To record this information, students will make a traced model of the outer body and position cut-outs of internal organs.
- Have the children infer how their senses are used to warn their body of danger.

## Defining Operationally

- The process by which a scientific term is defined according to what must be done and what should be observed in order to identify the concept. For example, we can define what "strength" is. If we decide that strength is the weight that a paper bag can hold without tearing or bursting then we can make meaningful comparisons when we test different paper bags made of various materials in a variety of ways.
- Pupils can practice making operational definitions using a simple circuit. They will need a battery, flashlight bulb and insulated wire with both ends stripped. Have students look at a diagram of a simple closed circuit. Set up the battery, bulb and wire so the bulb lights. Have them write their definition of a closed circuit based on what they did. Next, let them look up the word circuit in their dictionary and write it down. Have them discuss how their definition is different



from the one given in the dictionary. Ask them how their definition communicated what the closed circuit did. How did making a closed circuit help them define it.

### **Interpreting Data**

- Collect, record, and interpret data about the beat of the heart just before and after exercise. Have children create improvised devices for listening to the heart such as using empty napkin rolls. Select six children whose hearts they will listen to before exercising. Have the children perform various rapid exercises in the presence of the others. Thereafter, let them listen to their hearts again. Have them interpret the before and after data.

### **Hypothesizing**

- Hypothesize about how to solve a problem.
- First encourage hypothesizing (guessing). Then use several objects - soap, a dry sock, a wooden block, sponge, and a block. Ask children to guess which objects will float when dropped into water in a tub. Then drop the objects in the water, one by one, to see what happens. Have them compare each result with their hypotheses.

### **Controlling Variables**

- In first trial raise a pendulum and release it from a height of 100 cm. In second trial raise and release the same pendulum from a height of 60 cm. In third trial raise and release the same pendulum from a height of 20 cm. Do this while keeping two variables the same which are the string length (100 cm) and the bob size. Have pupils identify which variable is being tested and which variables are being controlled.

### **Experimenting**

- This involves making a plan to test a hypothesis. Students can make a plan to test which magnet is stronger. First have them write a hypothesis about which magnet will pick up more paper clips. Let them design their experiment. The only variable that changes is the magnet. The paper clips must remain constant. Students can design a chart to show their results. Have them perform the experiment. Let them compare their hypothesis with the results through discussion.

## <sup>22</sup>*SAFETY TIPS FOR CHILDREN*

### *In the Classroom*

- Listen to the teacher.
- Wear old clothes or aprons to protect your uniform.
- Be careful with glass and sharp objects.
- Never taste or smell things unless your teacher tells you to.
- Clean up spills right away.
- Report accidents right away.
- Keep the Science center neat.
- Clean up when you are finished.
- Always wash your hands after you have finished experiments.

### *Outside*

- Listen to your teacher.
- Stay with your group.
- Never taste or smell things unless your teacher tells you to.
- Don't touch plants or animals unless your teacher tells you to.
- Put living things back where you found them.
- Report accidents right away.

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<sup>22</sup> Taken from McGraw Hill Science Teacher's Multimedia Edition

## CHECKLISTS

*(Taken from the National Curriculum Frameworks)*

### Integrated Science and Technology Process Checklist

Name: \_\_\_\_\_ Year: \_\_\_\_\_

Place an artifact in the student's portfolio which shows he or she is using the following process skills	DATES			
Observing				
Comparing				
Classifying				
Measuring				
Discussing/Reporting				
Predicting				
Making Hypotheses				
Controlling Variables				

# Integrated Science and Technology Inquiry Skills Checklist

Name: \_\_\_\_\_ Year: \_\_\_\_\_

Place an artifact in the student's portfolio which shows he or she is using the following Inquiry skills (based on Bloom's taxonomy).				
	DATES			
<b>LOW LEVEL</b>				
<b>Knowledge</b> <ul style="list-style-type: none"> <li>• Identify</li> <li>• Define</li> <li>• Name</li> <li>• List</li> <li>• Match</li> <li>• Recall</li> <li>• Describe</li> <li>• State</li> <li>• Tell</li> <li>• Write</li> </ul>				
<b>Comprehension</b> <ul style="list-style-type: none"> <li>• Explain</li> <li>• Paraphrase</li> <li>• Restate</li> <li>• Summarize</li> <li>• Give examples</li> </ul>				
<b>HIGHER LEVEL</b>				
<b>Application</b> <ul style="list-style-type: none"> <li>• Demonstrate</li> <li>• Dramatize</li> <li>• Illustrate</li> <li>• Sequence</li> <li>• Compare/Contrast</li> <li>• Solve</li> </ul>				
<b>Analysis</b> <ul style="list-style-type: none"> <li>• Analyze</li> <li>• Classify</li> <li>• Diagram</li> <li>• Distinguish</li> <li>• Verify</li> <li>• Discriminate</li> </ul>				
<b>HIGHEST LEVEL</b>				
<b>Synthesis</b> <ul style="list-style-type: none"> <li>• Compose</li> <li>• Design</li> <li>• Hypothesize</li> <li>• Invent</li> <li>• Speculate</li> <li>• Create</li> </ul>				
<b>Evaluation</b> <ul style="list-style-type: none"> <li>• Criticize</li> <li>• Judge</li> <li>• Justify</li> <li>• Prioritize</li> <li>• Rate</li> <li>• Evaluate</li> </ul>				

### PROCESS SKILLS CHECKLIST

Place this checklist in the child's portfolio to record when the child used the skill.  
Include the child's evidence of skill use, e.g. the child's work, photographs or anecdotal records.

Name of Child:							
Skills	Dates						
<i>Observing</i>							
<i>Using Space/Time Relations</i>							
<i>Comparing</i>							
<i>Communicating</i>							
<i>Manipulating</i>							
<i>Classifying</i>							
<i>Measuring</i>							
<i>Investigating</i>							
<i>Predicting</i>							
<i>Inferring</i>							
<i>Defining Operationally</i>							
<i>Interpreting Data</i>							
<i>Hypothesizing</i>							
<i>Controlling Variables</i>							
<i>Experimenting</i>							