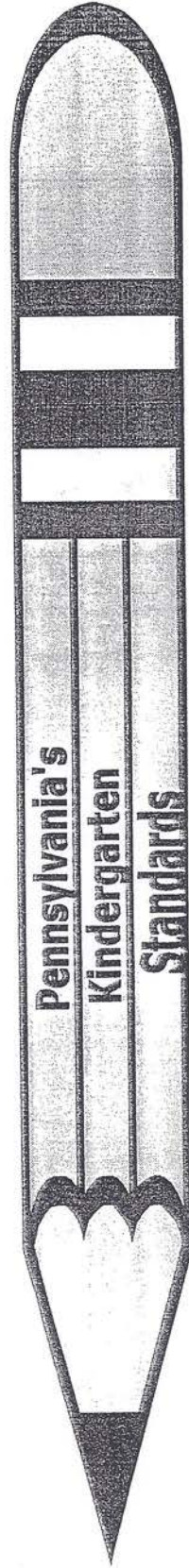


WORKING DRAFT

# Science



## Standard

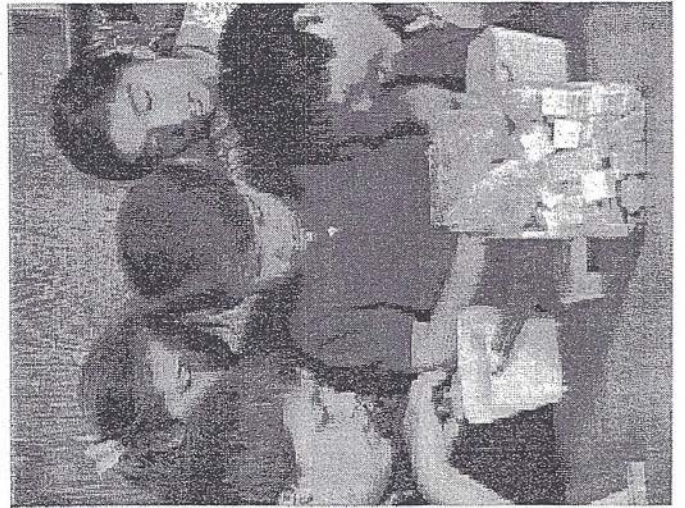
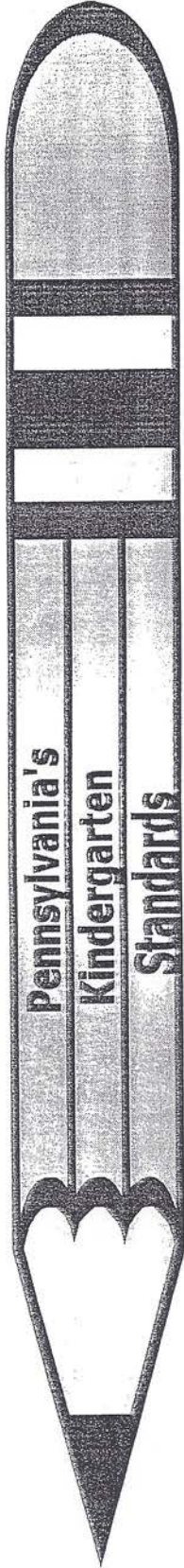
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Kindergartners learn about scientific concepts through the active exploration, observation and investigation of materials and ideas. These experiences provide the foundation for abstract and scientific thought. Students who are given opportunities to conduct experiments, gather data and make conclusions are developing skills that support discovery about the natural world, the scientific process and principles and technology.

WORKING DRAFT

# Science

## science and Technology



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## SCIENCE AND TECHNOLOGY

### 3.1 Unifying Themes

#### Fourth Grade Standards:

- Know that natural and human-made objects are made up of parts
- Know models as useful simplifications of objects or processes
- Illustrate patterns that regularly occur and reoccur in nature
- Know that scale is an important attribute of natural and human made objects, events and phenomena
- Recognize change in natural and physical systems

#### Content for Kindergarten

- A. Identify and describe what parts make up a whole
- B. Identify how a part relates to the whole in both natural and human-made objects
- natural*

#### Examples

##### The learner will:

- Play with fraction blocks and puzzles.
- Complete a variety of puzzles.
- Use geoboards to create shapes & identify attributes that shapes share e.g. 2 triangles can make a square.
- Take apart simple toys or safe household items & identify the types and uses of the parts within.
- Study common plants to identify the parts and explain their relationship to the whole.
- Sort a collection of parts into natural (nuts, twigs, seeds, leaves, etc) and human-made (buttons, laces, zippers, screws, nails, etc).
- Use model or toy gear-sets to explore the interdependence of parts in a system.

#### Supportive Practices

##### The teacher will:

- Integrate the concepts of parts and whole whenever relevant.
- Provide a wide variety of manipulatives that children can put together/take apart.
- Set up a learning station where children can take apart items, categorize parts and draw conclusions about their functions and relationships to the whole.

## SCIENCE AND TECHNOLOGY

### 3.1 Unifying Themes (continued)

Content for Kindergarten	Examples	Supportive Practices
C. Explore realistic models	<p>The learner will:</p> <ul style="list-style-type: none"> <li>▪ Explore realistic models through active learning.</li> </ul>	<p>The teacher will:</p> <ul style="list-style-type: none"> <li>▪ Provide realistic models.</li> </ul>
D. Explore patterns that regularly occur in nature	<ul style="list-style-type: none"> <li>▪ Identify natural patterns in leaves, insides of shells, coats of animals, etc.</li> <li>▪ Replicate natural patterns using appropriate materials in the classroom.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Discuss attributes of a pattern whenever appropriate and drawing children's attention to examples of patterns in the everyday environment.</li> <li>▪ Provide materials or experiences to help children develop understanding of non-linear patterns, e.g., concentric circles of a raindrop in a puddle, concentric rings of an onion.</li> <li>▪ Set up a learning station where children can explore patterns from a variety of materials.</li> </ul>
E. Identify observable patterns		
F. Develop beginning understanding of natural patterns	<ul style="list-style-type: none"> <li>▪ Select appropriately sized props to use in different types of play, e.g., furniture for a block building.</li> <li>▪ Use markers and crayons in the art area for drawing to enable child to develop perspective.</li> <li>▪ Use recyclables to make a model of items from real life, e.g., dinosaurs, boats, planes.</li> <li>▪ Use blocks and other manipulatives to recreate common structures seen in the neighborhood.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Introduce vocabulary including size comparisons, scale, perspective and symbols when relevant to various learning situations.</li> <li>▪ Draw children's attention to pictures in books and have them compare the size of pictures to the size of those items in real life.</li> <li>▪ Set up a learning station where children will explore with non-fiction books and manipulatives.</li> <li>▪ Ask thought provoking questions</li> </ul>
G. Begin to use the understanding of patterns to make predictions		
H. Explore the concept of scale		
I. Begin to use symbols to represent size		

## SCIENCE AND TECHNOLOGY

### 3.1 Unifying Themes

Content for Kindergarten	Examples	Supportive Practices
J. Recognize change	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Record his/her growth from infancy to kindergarten through the use of photographs, drawings and writing.</li> <li>▪ Plant seeds, recording the change in their appearance overtime.</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Read books about life cycles of animals and plants, view a movie on the construction of a house or visit a construction site to observe change in natural and physical systems.</li> </ul>
K. Examine and explain change through simple observation and recording	<ul style="list-style-type: none"> <li>▪ Record the seasonal change in the appearance of a tree throughout the year.</li> <li>▪ Explain fast, slow, forward and backward motion when using manipulatives and toys.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provide learning materials such as puzzles or magnetic games that require children to sequence the steps in a life cycle or to determine the order of events of everyday activities that lead to a change, e.g., the construction of a building from start to finish.</li> </ul>
L. Develop simple understanding about motion	<ul style="list-style-type: none"> <li>▪ Demonstrate understanding of how to put various items with wheels or without wheels into motion using inclines with different angles, e.g., make ramps in the block area and testing out how far materials will roll when slid down the ramp.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Take children on nature walks to observe and discuss changes in the local plants and animals.</li> </ul>
M. Describe change to objects caused by heat, cold, light or chemicals	<ul style="list-style-type: none"> <li>▪ Use dominoes or other similar items to discover motion can be transferred from one item to another.</li> <li>▪ Investigate animals and their adaptations that enable them to move in different habitats, e.g., the shape of penguin's body, the webbed toes of a frog, etc.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provide activities for observation and the documentation of change.</li> <li>▪ Provide nonfiction books that discuss a variety of vehicles that can be put into motion. Build a learning station where children can explore water, wind and gravity as forces that put objects at rest into motion.</li> </ul>

## SCIENCE AND TECHNOLOGY

### 3.1 Unifying Themes

#### Content for Kindergarten

#### Examples

The learner will:

- Participate in cooking projects that build understanding of changes caused by heat.
- Engage in a variety of teacher prepared experiments relating to heat, cold, light and chemical change and will be asked to make predictions, records observations and provide explanations for any change evidenced.
- Put common classroom items outside in direct sunlight or shade. Return later to feel and discuss the temperature changes in each of the items.

#### Supportive Practices

The teacher will:

- Have children compare and sequence the speeds of different types of motion, e.g., walking, skating, riding a bike, horse, car, plane, rocket, etc.
- Provide building materials in an area of the room where children can design vehicles and record their distance and/or speed using a chart.
- Utilize teachable moments like school construction to document physical changes and make a class book.
- Set up safe, hands-on experiments/cooking activities to demonstrate changes caused by chemicals, e.g. put plants in a variety of lighting conditions including no light; freeze a variety of common kitchen items like vinegar, milk, water, liquid soap, vegetable oil. Guide children in making predictions using charts or journals, have children record their observations using photos, drawings or writing and provide experiences that prompt children to explain the changes observed.
- Create a class book.

## SCIENCE AND TECHNOLOGY

### 3.2 Inquiry and Design

#### Fourth Grade Standards:

- Identify and use the nature of scientific and technological knowledge
- Describe objects in the world using the five senses
- Recognize and use the elements of scientific inquiry to solve problems
- Recognize and use the technological design process to solve problems

#### Content for Kindergarten

#### Examples

#### Supportive Practices

A. Build an introductory vocabulary of scientific terms

B. Form clear explanations based on observation and participation in common experiments

C. Connect known ideas with new knowledge to build understanding or refine concepts

D. Distinguish between scientific fact and a belief through literature

#### The learner will:

- Observe and participate in simple experiments.
- Ask questions about their observations.
- Predict what might happen next.
- Record results of experiments or observations using charts, graphs or journals.
- Share conclusions and explanations with other students.
- Respond to “what if” questions.

#### The teacher will:

▪

## SCIENCE AND TECHNOLOGY

### 3.1 Inquiry and Design (continued)

Content for Kindergarten	Examples	Supportive Practices
<p>C. Use the five senses as tools with which to: observe, collect information, classify, describe</p> <p>D. Use observation to develop a descriptive vocabulary based on sensory experiences</p>	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Identify the many ways senses are used.</li> <li>▪ Identify common items using their senses.</li> <li>▪ Use vocabulary to describe the degrees of similarities and differences based on use of the five senses.</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Provide opportunities for sensory exploration.</li> <li>▪ Model new vocabulary where appropriate to extend children's observations (e.g. That tree bark feels scratchy. Why do you think it feels rough?).</li> <li>▪ Provide connections with literature.</li> </ul>
<p>E. Demonstrate understanding of the process of scientific inquiry by:</p> <ul style="list-style-type: none"> <li>• Participating in scientific investigations</li> <li>• Asking relevant questions</li> <li>• Making predictions based on experience or observation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Explore objects, materials and events by acting upon them and noticing what happens.</li> <li>▪ Describe, compare, sort, and classify observable characteristics and properties.</li> <li>▪ Record observations, explanations and ideas through multiple forms of representation including drawing, simple graphs, writing and movement.</li> <li>▪ Listen to others with different perspectives.</li> <li>▪ Work collaboratively.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Set a clear focus for inquiry.</li> <li>▪ Provide opportunities to observe and explore to build a broader base of knowledge from which to construct new ideas.</li> <li>▪ Use scientific talk to support children's thinking.</li> </ul>
<p>F. Demonstrating willingness to modify explanations based on experience or observation</p>		



## SCIENCE AND TECHNOLOGY

### 3.2 Inquiry and Design *(continued)*

Content for Kindergarten	Examples	Supportive Practices
<p>G. Identify and explain basic problems</p> <p>H. Identify possible solutions</p> <p>I. Test out solutions</p> <p>J. Record steps taken</p> <p>K. Record results</p>	<p>The learner will:</p> <ul style="list-style-type: none"> <li>▪ Identify a problem to be solved.</li> <li>▪ Pose possible solutions.</li> <li>▪ Raise questions.</li> <li>▪ Test possible solutions.</li> <li>▪ Record steps taken to solve the problem using multiple forms of representations including drawing, writing and movement or by discussion with teacher assistance for charting.</li> <li>▪ Draw conclusions from results.</li> </ul>	<p>The teacher will:</p> <ul style="list-style-type: none"> <li>▪ Recognize opportunities for problem solving by raising questions.</li> <li>▪ Engage children in identifying and implementing solutions.</li> <li>▪ Set up problem solving activities.</li> <li>▪ Provide materials to test out solutions.</li> <li>▪ Provide documentation of steps taken and results by charting, posters, photography, or other communication means.</li> </ul>

**SCIENCE AND TECHNOLOGY**

**3.3 Biological Sciences**

**Fourth Grade Standards:**

- Know the similarities and differences of living things
- Know that living things are made up of parts that have specific functions
- Know that characteristics are inherited and, thus, offspring closely resemble their parents
- Identify changes in living things over time

**Content for Kindergarten**

**Examples**

**Supportive Practices**

**The learner will:**

**The teacher will:**

A. Identify the similarities and differences of living things

B. Identify the life processes of living things

C. Sort organisms according to their shared characteristics

D. Demonstrate a basic understanding of similarities and differences that relate to environmental habitat

E. Describe basic needs of plants and animals

F. Know that some organisms have similar external characteristics

▪ Document the growth of a living thing through drawings, writing, and/or photos.

▪ Explore the life process of living things (e.g. butterflies, frogs).

▪ Sort animals according to their coverings (e.g. fur, feathers, scales).

▪ Sort animals according to their habitats (e.g. air, land, water).

▪ Identify the basic needs necessary for plants and animals to survive.

▪ Classify animals by their common external characteristics.

▪ Provide samples of living things for students to investigate (e.g. butterfly garden, worm farm, bird feeder outside).

▪ Utilize local resources to broaden children's knowledge of living things, their habitats, and characteristics.

▪ Engage children in studying the needs of living things through growing plants, or taking care of animals.

▪ Use a Venn Diagram to sort animal habitats or characteristics.

▪ Provide connections with literature.

## SCIENCE AND TECHNOLOGY

### 3.3 Biological Sciences (continued)

Content for Kindergarten	Examples	Supportive Practices
<p>G. Understand that living things are made up of parts that have specific functions</p>	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Investigate the parts of plants.</li> <li>▪ Describe through writing, drawing or identifying pictures.</li> <li>▪ Investigate parts of insects.</li> <li>▪ Determine how the parts make things function (e.g. human body).</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Provide opportunities for exploration of parts of plants.</li> <li>▪ Use diagrams to demonstrate the parts of plants, animals, human body.</li> <li>▪ Provide nonfiction texts for students to explore parts of living things.</li> <li>▪ Respond to children's questions with honesty, respect and sensitivity.</li> <li>▪ Provide connections with literature.</li> </ul>
<p>H. Explore characteristics that can be inherited</p> <p>I. Identify characteristics for animal and plant survival identified with seasonal changes</p>	<ul style="list-style-type: none"> <li>▪ Identify physical characteristics that appear in parents and their off-spring using pictures.</li> <li>▪ Document by drawing changes over time of trees or plants.</li> <li>▪ Observe the behavior of local animals as they prepare for changes in seasons (e.g. rabbits, squirrels, birds).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provide pictures of adults and their offspring for identification of inherited physical characteristics.</li> <li>▪ Provide opportunities for children to observe plants and animals over time during seasonal change.</li> </ul>

**SCIENCE AND TECHNOLOGY**

**3.3 Biological Sciences (continued)**

Content for Kindergarten	Examples	Supportive Practices
J. Describe changes in living things over time	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Observe living things over different time periods. (a week, a month, seasons).</li> <li>▪ Document the changes from observations by drawing, writing or in photographs.</li> <li>▪ Recognize from illustrations the process (sequence) of changes in some living things (e.g. butterfly, frog, plants from bulbs or seeds).</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Provide opportunities for observations of living things over time.</li> <li>▪ Provide ways for children to document their observations.</li> <li>▪ Provide illustrations to demonstrate changes in life process.</li> <li>▪ Provide nonfiction text to illustrate concept of change over time.</li> </ul>
K. Record changes in life processes		
L. Describe basic needs of plants and animals		
M. Know that some organisms have similar external characteristics		

## SCIENCE AND TECHNOLOGY

### 3.4 Physical Science, Chemistry and Physics

**Fourth Grade Standards:**

- Recognize basic concepts about the structure and properties of matter
- Explore basic energy types and sources
- Explore and describe different types of force and motion
- Describe the composition and structure of the universe and the earth's place in it

**Content for Kindergarten**

A. Understand the meaning of what matter is

B. Describe properties of matter

**Examples**

**The learner will:**

- Sort and classify common classroom materials or household items by solid, liquid or gas.
- Work with materials at a sensory table filled with water, rice, sand, beans, etc. to explore the properties of solids and liquids.
- Use a filter to remove solid material from a mixture at the water table; using a filter to remove larger items from a mixture of solids at the sand table.
- Conduct an experiment to convert different common liquids into solids by freezing them and recording results, such as, how long it took to change each substance from a liquid to a solid.

**Supportive Practices**

**The teacher will:**

- Fill two clear containers. One with solid objects (label solid) and one with colored liquid (labeled liquid). Use another empty container (labeled gas). Explain that all three containers are different forms/states of matter.
- Rotate items in the sensory table to include water, rice, beans, soil and sand—materials that reflect a range of properties and can be used with a wide variety of tools or experimentation.
- Draw attention to the way different materials behave at the sensory table and in the environment such as: most solids do not lose shape unless another force causes it. Liquid flows and doesn't have a shape. Gas fills the space it is in.

## SCIENCE AND TECHNOLOGY

### 3.4 Physical Science, Chemistry and Physics *(continued)*

Content for Kindergarten	Examples	Supportive Practices
<p>C. Recognize that matter can change from one state to another</p> <p>D. Demonstrate an understanding that combining two or more substances can make new materials with different properties</p> <p>E. Develop a working vocabulary that manages concepts of material characteristics</p>	<p>The learner will:</p> <ul style="list-style-type: none"> <li>▪ Participate in safe, classroom cooking activities to combine substances to create new materials, such as play dough.</li> <li>▪ Make hypotheses about what will happen to different substances when water, heat or cold is added.</li> <li>▪ Make an “ocean in a bottle” by adding water and vegetable or baby oil to determine that some liquids do not mix.</li> <li>▪ Participate in an experiment to observe evaporation and condensation; making predictions and recording results.</li> </ul>	<p>The teacher will:</p> <ul style="list-style-type: none"> <li>▪ Model appropriate vocabulary while facilitating children’s interactions with different types of matter, including consistency, texture, thickness, mixture, liquid, solid, etc.</li> <li>▪ Ask probing questions when children are experimenting with various materials, such as, “What do you suppose will happen to the consistency when we add a liquid?”</li> <li>▪ Engage children in making predictions while working with different mixtures, such as, “Will the cake batter remain a liquid after we put it in the oven and add heat?” After the cake has baked ask children to think about whether the cake can be turned back into a liquid mixture; ask why they think they way they do.</li> <li>▪ Set up a learning station where children can design their own play dough recipe using a variety of materials, creating a picture recipe and then testing it out to make play dough.</li> <li>▪ Provide a variety of cooking experiences on a regular basis. (Make Jello, pasta, hardboiled eggs to demonstrate the substance as a liquid, gas (boiling water steam), and solid.</li> <li>▪ Utilize nonfiction Big Books and Read Alouds pertaining to matter.</li> <li>▪ Make graphic organizers. (States of Matter Chart, Changing Matter).</li> </ul>

## SCIENCE AND TECHNOLOGY

### 3.4 Physical Science, Chemistry and Physics (*continued*)

Content for Kindergarten	Examples	Supportive Practices
<p>F. Explore basic energy types and sources</p>	<p>The learner will:</p> <ul style="list-style-type: none"> <li>▪ Identify energy forms, i.e. sunlight, heat, and motion.</li> <li>▪ Make rockets with balloons.</li> <li>▪ Explore stored energy by building rubber band cars.</li> <li>▪ Demonstrate how energy can be transferred by working with dominoes.</li> <li>▪ Identify common toys and household items that require an energy source to function. Bring a toy from home to discuss and share the energy source.</li> <li>▪ Plant two seedlings. Put one in the sunlight and one away from the sunlight. Observe and record what happens.</li> </ul>	<p>The teacher will:</p> <ul style="list-style-type: none"> <li>▪ Create a learning station where children can engage in hands-on experiments to explore sources of energy and the transfer of energy.</li> <li>▪ Use nonfiction Big Books and Read Alouds.</li> <li>▪ Ask probing questions, such as, “What is propelling the rocket forward?” Elaborate on children’s explanations by introducing appropriate vocabulary, such as, “Yes, the air in the balloon is a source of energy.”</li> </ul>
<p>G. Explore variations of sound</p>	<ul style="list-style-type: none"> <li>▪ Use a variety of containers, recyclables and materials to make sound.</li> <li>▪ Identify if a sound is high or low.</li> <li>▪ Experiment when applying different force when striking an object or instrument to change the sound produced and discuss the results.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Take children on a sound walk and have them identify sources of sound; take children outside to listen to the rain and the sounds it produces when it strikes different surfaces.</li> <li>▪ Create a learning station where children can design different simple instruments from recyclable materials.</li> </ul>
<p>H. Identify directed air as a source of movement</p>		

## SCIENCE AND TECHNOLOGY

### 3.4 Physical Science, Chemistry and Physics (*continued*)

Content for Kindergarten	Examples	Supportive Practices
<p>I. Develop a directional vocabulary</p>	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Describe his/her play with wheeled toys, wind-up toys and boats using directional words such as forward, backwards, sideways, etc.</li> <li>▪ Create directed air using a variety of items including blowing through a straw, using a paper fan, using an electric fan, squeezing a bellow or hollow container like a ketchup bottle to propel cotton balls through an obstacle course, moving items of different weights across a table surface or boats in a water table.</li> <li>▪ Engage in art experiences where directed air produces different art effects, such as blowing through a straw to move paint on paper.</li> <li>▪ Build different toys that are propelled by directed air, such as pinwheels, paper planes, kites, windsocks and parachutes.</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Demonstrate how sound produces vibrations by striking a cookie sheet above the head of a drum. Place rice on the drum head and the vibrations from the cookie sheet will cause the rice to jump off the drum head.</li> <li>▪ Rotate materials in the classroom so that children can explore motion in numerous ways, such as adding inclines and wheeled toys to the block area, adding clear tubing to the water table to observe the movement of water, etc.</li> <li>▪ Create a learning station where children follow picture directions to create a variety of wind toys. Create a chart to record the conditions outside and the results achieved with each toy. Compare these results with children's attempts to power the toys by creating their own directed air with straws, fans and bellows inside the classroom.</li> <li>▪ Have children move in different directions (forward, backward, sideways, etc.).</li> </ul>



## SCIENCE AND TECHNOLOGY

### 3.5 Earth Sciences

#### Fourth Grade Standards:

- Know basic landforms and earth history
- Know types and uses of earth materia
- Know basic weather elements
- Recognize the earth's different water resources

#### Content for Kindergarten

#### Examples

#### The learner will:

- Use the terms flat land, hills and mountains to describe local spaces in the surrounding community.
- Study pictures/maps in fiction and non-fiction books to create a class mural that illustrates the concepts flat land, hills and mountains.

#### The teacher will:

- Identify and use books that show the appropriate land forms and draw the children's attention to these concepts.
- Take the children on a walk or fieldtrip to experience these landforms.
- Provide children with paper-mache and other art materials to create a model of these land forms.

#### Supportive Practices

- B. Distinguish between three types of earth:  
soil, rock and sand

- Examine materials in a learning center and labeling them as soil, rock or sand and studying soil as weathered rock and decomposed organic remains. Study rocks as pieces of the earth and studying sand as rock particles.
- Sort rocks by different attributes on a rock chart.

- Rotate soil, sand and different rock types in the sensory table for exploration; add water to these materials too.
- Take the children on a dig for soil samples and observing what is in the soil. (worms, leaves, rocks, etc.).

## SCIENCE AND TECHNOLOGY

### 3.5 Earth Sciences (*continued*)

Content for Kindergarten	Examples	Supportive Practices
<p>B (<i>continued</i>). Distinguish between three types of earth: soil, rock and sand</p>	<p>The learner will:</p> <ul style="list-style-type: none"> <li>▪ Investigate a collection of rocks and compare/contrast them.</li> <li>▪ Explore the process of erosion by breaking rock into smaller pieces using a wooden hammer and examine sand under a magnifying glass to identify broken pieces of rock and/or shell.</li> <li>▪ Conduct an experiment where small plants are grown in soil, rock or sand and the results are tracked over time and recorded on a chart.</li> <li>▪ Explore what a fossil is.</li> </ul>	<p>The teacher will:</p> <ul style="list-style-type: none"> <li>▪ Take the children on a rock discovery walk.</li> <li>▪ Ask questions about the attributes of the rocks.</li> <li>▪ Set up a learning center with earth materials where children can examine soil, rock and sand with magnifying glasses, describe their characteristics and classify/sort these items.</li> <li>▪ Guide the children in collecting a soil sample from a school garden or lawn and investigating its contents; label the contents as soil, rock or sand (possibly introduce the term clay).</li> <li>▪ Do a hands-on fossil making activity with coffee grinds and objects like leaves or clay, petroleum jelly, and objects to press into the clay.</li> </ul>
<p>C. Build a vocabulary of weather related terms</p>	<ul style="list-style-type: none"> <li>▪ Discuss the weather as it pertains to meaningful events such as going outside for recess, going on a fieldtrip, conducting an experiment that requires sunlight, wind, etc.</li> <li>▪ Create a mural using different art materials to illustrate the different types of precipitation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Use nonfiction and fiction big books and read alouds.</li> <li>▪ Design a learning station where children conduct hands-on experiments to investigate weather concepts, such as, making a cloud in a jar, making hail with different colored clay, building a wind-vane from cardstock and straws, etc.</li> </ul>
<p>D. Distinguish between different types of precipitation</p>		

## SCIENCE AND TECHNOLOGY

### 3.5 Earth Sciences (continued)

Content for Kindergarten	Examples	Supportive Practices
E. Distinguish between clouds and fog	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Conduct an experiment using a rain gauge or other water collecting device to discover the difference between drizzle, rain, pouring, etc.</li> <li>▪ Sort pictures of activities, clothing and toys according to the types of weather and season they would most closely be linked to, e.g. a kite would go with wind, an umbrella with rain, sunglasses with sun, etc.</li> <li>▪ Create a seasonal collage or booklet.</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Create learning materials where children sort pictures according to weather or season.</li> <li>▪ Place prisms in the classroom to explore the creation of rainbows and create rainbows outside on a sunny day by sprinkling water in the air.</li> <li>▪ Chart the daily temperature with the children and at the conclusion of the month transfer this information to a bar or line graph.</li> </ul>
F. Explore thermometers as tools for measuring temperature	<ul style="list-style-type: none"> <li>▪ Conduct an experiment using thermometers to explore the temperatures of liquids found throughout the school grounds, e.g., water from a fountain, the milk in a refrigerator, water from a puddle, paint at the art easel, etc.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Create a daily weather graph. Can use this to compare and contrast monthly weather patterns.</li> <li>▪ Draw attention to the daily weather report in the newspaper and discuss how weather is not the same in other areas of the state, country or world.</li> </ul>
G. Identify how weather affects daily circumstances	<ul style="list-style-type: none"> <li>▪ Conduct an experiment using thermometers to explore the temperatures of liquids found throughout the school grounds, e.g., water from a fountain, the milk in a refrigerator, water from a puddle, paint at the art easel, etc.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Create a K-W-L chart with the children about what they know about water on Earth. What they want to know and what they've learned at the end of the unit.</li> <li>▪ Design a learning station for hands-on activities making different bodies of water.</li> <li>▪ Read books about fresh and salt-water bodies.</li> </ul>
H. Explain how the different seasons affect plants, animals and daily human life	<ul style="list-style-type: none"> <li>▪ Identify streams, lakes, rivers, and oceans on a picture, map or globe in a learning station activity.</li> <li>▪ Explain what makes water solid and what makes ice melt.</li> <li>▪ Create a list of the ways water is used in their homes/communities and in the school.</li> <li>▪ Design a poster suggesting a way to take care of water.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Identify streams, lakes, rivers, and oceans on a picture, map or globe in a learning station activity.</li> <li>▪ Explain what makes water solid and what makes ice melt.</li> <li>▪ Create a list of the ways water is used in their homes/communities and in the school.</li> <li>▪ Design a poster suggesting a way to take care of water.</li> </ul>
I. Identify stream, river, lake, and ocean	<ul style="list-style-type: none"> <li>▪ Identify streams, lakes, rivers, and oceans on a picture, map or globe in a learning station activity.</li> <li>▪ Explain what makes water solid and what makes ice melt.</li> <li>▪ Create a list of the ways water is used in their homes/communities and in the school.</li> <li>▪ Design a poster suggesting a way to take care of water.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Identify streams, lakes, rivers, and oceans on a picture, map or globe in a learning station activity.</li> <li>▪ Explain what makes water solid and what makes ice melt.</li> <li>▪ Create a list of the ways water is used in their homes/communities and in the school.</li> <li>▪ Design a poster suggesting a way to take care of water.</li> </ul>
J. Explore the difference between fresh and salt-water bodies	<ul style="list-style-type: none"> <li>▪ Identify streams, lakes, rivers, and oceans on a picture, map or globe in a learning station activity.</li> <li>▪ Explain what makes water solid and what makes ice melt.</li> <li>▪ Create a list of the ways water is used in their homes/communities and in the school.</li> <li>▪ Design a poster suggesting a way to take care of water.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Identify streams, lakes, rivers, and oceans on a picture, map or globe in a learning station activity.</li> <li>▪ Explain what makes water solid and what makes ice melt.</li> <li>▪ Create a list of the ways water is used in their homes/communities and in the school.</li> <li>▪ Design a poster suggesting a way to take care of water.</li> </ul>

## SCIENCE AND TECHNOLOGY

### 3.5 Earth Sciences (*continued*)

Content for Kindergarten	Examples	Supportive Practices
<p>K. Identify examples of water in solid and liquid states</p>	<p>The learner will:</p>	<p>The teacher will:</p> <ul style="list-style-type: none"> <li>▪ Expose the children to globes and maps.</li> <li>▪ Plan visits to local fresh water bodies if appropriate to study the habitat and wildlife</li> <li>▪ Add appropriate animals to the water table so children can recreate habitats.</li> <li>▪ Bring icicles into the classroom and discuss what will happen, record how long it takes to melt, put the water back into the freezer—did it take the same amount of time to return to a solid?</li> <li>▪ Put snow in the sensory table for exploration and encourage the children to describe as well as explain the changes to the pile of snow.</li> <li>▪ Design a learning station to investigate water as a source of transportation.</li> </ul>
<p>L. Identify a variety of uses for water</p>		

## SCIENCE AND TECHNOLOGY

### 3.6 Technology Education

**Fourth Grade Standards:**

- Know that biotechnologies relate to propagating, growing, maintaining, adapting, treating and converting
- Know that information technologies involve encoding, transmitting, receiving, storing, retrieving, and decoding
- Know physical technologies of structural design, analysis and engineering, finance, production, marketing, research and design

**Content for Kindergarten**

A. Identify examples of technology and how these impact various aspects of daily life

**Examples**

The learner will:

- Cut out examples of technological devices from magazines, flyers, catalogs, etc. and classifying them on a poster into 3 categories: in my home, in my school, in people's work.
- Sort examples of technological devices according to shared functions, e.g., things that send pictures, things that work with numbers, things used to make food, things that send water, things that carry people, etc.

**Supportive Practices**

The teacher will:

- Draw attention to age-appropriate examples of technology throughout the course of study of all themes or topics.
- Add discarded technological devices to play areas for exploration, such as, an old typewriter in the writing area, a rotary phone and push-button phone to dramatic play, etc.
- Set up projects where children can compare and contrast older technology versus newer technology, such as, make applesauce using a hand-held masher, an applesauce mill and a food-processor. Compare the effort and time it took to prepare the applesauce using each method.
- Utilize fieldtrips to inform children about the various forms of technology in the local community and broaden children's understanding of how such devices assist people in using less effort, using less time, creating more of something at one time, etc.

## SCIENCE AND TECHNOLOGY

### 3.6 Technology Education (continued)

Content for Kindergarten	Examples	Supportive Practices
<p>B. Identify communication methods that exist in the community</p>	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Learn about the varied forms of written communication by making classroom signs, following picture recipes for making paint or cooking, following picture directions for science experiments, using charts and graphs, keeping different types of journals, writing letters to class visitors, sending postcards to their homes, using the computer for writing projects, sending e-mail to a class in another city, etc.</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Integrate the use of technology in ways that are relevant and meaningful to the children's explorations and play, such as, "If we take a picture of your block structure you will always be able to remember it. We could even write a story about it later."</li> </ul>
<p>C. Discuss common use of information technology including photocopying, photography and video</p>	<ul style="list-style-type: none"> <li>▪ Participate in making a classroom newsletter with the teacher's assistance or newspaper that informs others about what the children are doing in kindergarten from week to week.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Direct children to use technology in ways that it will help them to accomplish projects, such as, "If we type out your story on the computer, then we could print out 2 copies and each of you could illustrate the story in your own ways."</li> </ul>
<p>D. Narrate drawings and sketches using computer technology</p>	<ul style="list-style-type: none"> <li>▪ Use photography to document various projects or fieldtrips discussed earlier in the science standards.</li> <li>▪ Use video to record something of interest to share with the rest of the class, e.g., several children may act out a story and videotape it to share with the class during a group time.</li> <li>▪ Use painting programs to create a design and add text, e.g., if the children wanted to invite parents to school for a special event they could design an invitation on the computer.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Make use of learning opportunities in the local community to explore different forms of communication, such as visiting a newspaper branch, radio station, book publisher, etc.</li> <li>▪ Design prop boxes from different field trips where children can role-play and integrate information gained from these experiences, such as, set up a television station prop box with interview forms, old microphones, dress up clothes, a "video camera" made from recyclables, etc.</li> </ul>

## SCIENCE AND TECHNOLOGY

### 3.6 Technology Education (continued)

Content for Kindergarten	Examples	Supportive Practices
<p>E. Identify steps in erecting a building</p>	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Identify all the possible community helpers that visit the school on a regular basis or that were involved in the building of a school, playground or classroom.</li> <li>▪ Visit a project under construction or watch a video of something being built or manufactured. List the steps observed.</li> <li>▪ Use toys and manipulatives to recreate the project and illustrate the different components being coordinated, such as, children could use blocks, pipe cleaners, toy vehicles to recreate the construction of a bridge or use legos to build a miniature grocery store, delivery trucks, etc.</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Identify field trips and other resources for making this information as concrete as possible so that children can experience the concepts through active exploration, e.g., bring in a real-life example of a blue-print, invite an architect to visit the classroom.</li> <li>▪ Ask thought provoking questions during the children's explorations, "How do you suppose the water reached the new hospital? Do you think it was already there? If not, what community workers were needed? What tools would they have needed to do the work?"</li> <li>▪ Set up a learning activity or station where children can simulate a real-life construction project using toys, manipulatives, recyclables, etc. Engage the children in the numerous processes of a project, such as, brainstorming ideas together, creating a blue print for the design, gathering materials, ordering or purchasing additional materials with assistance.</li> </ul>
<p>F. Develop understanding of the nature of a project as having several components that need to be coordinated</p>	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Develop understanding of simple machines by engaging in concrete activities at a learning station. Afterwards identify examples of simple machines in the classroom and in their homes, e.g., levers, hinges, inclines, things that move on wheels, etc.</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Design a learning station where children will conduct concrete experiments to learn about simple machines, e.g., make a lever with blocks, use cylinder cans to roll an item from one end of the table to the other, use a pulley to move material, etc.</li> </ul>
<p>G. Experiment with simple machines</p>		
<p>H. Identify how materials might arrive at a work site</p>		

## SCIENCE AND TECHNOLOGY

### 3.7 Technological Devices

#### Fourth Grade Standards:

- Explore the use of basic tools, simple materials and techniques to safely solve problems.
- Select appropriate instruments to study materials.
- Identify basic computer operations and concepts.
- Use basic computer software.
- Identify basic computer communications systems.

Content for Kindergarten	Examples	Supportive Practices
A. Sort tools by their function	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Access appropriate tools to assist with a variety of situations, e.g., use a calculator to figure out how many of an item is needed for a project, use a ruler to measure how much fabric is needed to make a parachute for a toy, select a magnifying glass to observe an insect discovered on the playground, etc.</li> <li>▪ Engage in a class activity where children sort classroom tools according to shared functions or uses.</li> <li>▪ Play a matching game to identify which tool each community helper uses with their work or job.</li> <li>▪ Identify appropriate tools to put out for different classroom projects or science experiments.</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Rotate classroom tools in all areas to reflect a wide variety of tasks and functions, such as rulers, yardsticks, measuring tape, folding measuring devices, food scales, large scales, spring scales, balances, etc.</li> <li>▪ Provide a variety of tools for art or writing experiences, such as, hole punches, paper punches, embossers, sticker makers, crimping tools, crocodile scissors, regular scissors, plastic needles, etc.</li> <li>▪ Encourage children to utilize tools throughout the classroom and with all aspects of the curriculum.</li> <li>▪ Utilize a wide variety of cooking utensils.</li> <li>▪ Utilize in-depth projects that encourage children to integrate use of tools—many of the projects listed in the science standards easily lend themselves to this approach.</li> </ul>
B. Select appropriate tools and materials to solve simple problems		
C. Develop simple skills to measure, record, cut and fasten		
D. Identify different instruments for measuring weight		
E. Select appropriate instruments for magnifying images to study detail including magnifying glasses and microscopes		



## SCIENCE AND TECHNOLOGY

### 3.7 Technological Devices (*continued*)

Content for Kindergarten	Examples	Supportive Practices
<p>F. Name major parts of the computer (screen, keyboard, mouse, disc drive, etc.)</p>	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ List and collect the tools needed to design a prop box for the classroom that reflects different aspects of life, such as, carpenter's tools, farmer's tools, medical tools, etc.</li> <li>▪ Make "play tools" when appropriate by studying pictures or real life items; for example, construct an imitation microscope to use in their play.</li> <li>▪ Use paper and markers to design an imaginary tool or device to do a chore or task in their life.</li> <li>▪ Have regular computer access during play and structured parts of the day.</li> <li>▪ Select from a variety of activities on the computer that interest him or her.</li> <li>▪ Use the computer to enhance other learning taking place in the classroom, such as, create an order form to use with a postal service prop box.</li> <li>▪ Send an e-mail to a parent, relative or friend with teacher assistance.</li> <li>▪ Use computer vocabulary while working at the computer.</li> <li>▪ Identifying topics to explore using a web browser with teacher support and using this information to solve a problem, augment a project, make a book, etc.</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Take tools outdoors for children to use for investigations with nature, planting a garden, building a composting box, setting up an outdoors game, etc.</li> <li>▪ Model the appropriate technological terms while working with children at the computer.</li> <li>▪ Guide children in learning the basic functions of the computer, such as, how to turn it on, how to find programs on the desktop, how to insert a disk properly, etc.</li> <li>▪ Utilize the computer to enhance other projects that are taking place in the classroom; e.g., Can data collected from a science experiment be inserted into computer generated charts or graphs?</li> <li>▪ Draw attention whenever appropriate to the many uses for computers in everyday life.</li> <li>▪ Point out the applications of computers while taking fieldtrips to various places.</li> </ul>
<p>G. Use computer in a variety of applications including beginning writing and graphics, teacher-guided internet research and basic instructional software</p>		
<p>H. Access information via a web browser with teacher support</p>		
<p>I. Explore personal communication via E-mail</p>		

WORKING DRAFT

# Science

## Environment and Ecology



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## ENVIRONMENT AND ECOLOGY

### 4.1 Watersheds and Wetlands

#### Fourth Grade Standards:

- Identify various types of water environments
- Explain the differences between moving and still water

Content for Kindergarten	Examples	Supportive Practices
<p>A. Identify different bodies of water (e.g., creeks, rivers, streams, ponds, lakes, swamps, ocean)</p> <p>B. Begin to understand the differences between moving and still water</p>	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Describe the differences between bodies of water, such as ocean, river, lake, puddle</li> <li>▪ Identify different bodies of water as seen in pictures and books.</li> <li>▪ Participate in experiments to determine how water moves</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Read fiction and non-fiction books to describe different bodies of water.</li> <li>▪ Provide photographs of different bodies of water.</li> <li>▪ Take class on field trips, whenever possible, to experience first hand different bodies of water .</li> <li>▪ Provide opportunities for learners to participate in experiments to understand the movement of water.</li> </ul>

## ENVIRONMENT AND ECOLOGY

### 4.2 Renewable and Nonrenewable Resources

**Fourth Grade Standards:**

- Identify needs of people (basic)
- Identify products derived from natural resources
- Know that some natural resources have limited life spans

**Content for Kindergarten**

**Examples**

**Supportive Practices**

**The learner will:**

**The teacher will:**

A. Identify needs of people (basic)

- Distinguish between people's needs and wants. Describe people's basic needs such as sleep and food.

- Facilitate class discussions to generate a listing of peoples' basic needs.

B. Identify products that come from nature

- Distinguish between something in its natural state and in its manufactured state.
- Listen to and discuss stories that describe where things come from, such as sheep's wool and sweater; milk and cheese; tree and paper/furniture; apples and applesauce.

- Talking with children about the origin of where things come from.
- Read related fiction and non-fiction books.

C. Identify ways to conserve

- Generate ways to conserve water at home, in school.
- Create illustrations, posters, and/or murals showing ways to save water.
- Describe effects of pollution, such as cars' pollution on air, water pollution on fish).
- Sort objects into those things that can be recycled and those that cannot.

- Facilitate discussions on the importance of water and ways to conserve it.
- Help learners understand what can be recycled and reused.
- Recycle materials in the classroom.
- Help learners understand the hows and whys of recycling.
- Take class on a field trip to visit a recycling center.
- Read related non-fiction and fiction books.
- Facilitate experiments that demonstrate the effects of pollution (oil spills, excessive noise).

# ENVIRONMENT AND ECOLOGY

## 4.3 Environmental Health

### Fourth Grade Standards:

- Know that plants, animals, and humans are dependent on air and water
- Identify how human actions affect environmental health

### Content for Kindergarten

### Examples

### Supportive Practices

#### The learner will:

- A. Know that all living things need air and water to survive

- Observe and describe plants growing in different experimental conditions.

#### The teacher will:

- Facilitate class discussions describing the need of all living things to have air and water.
- Provide opportunities for learners to observe and record the growth of plants with and without water and with and without air.
- Read related non-fiction and fiction books.

- B. Identify litter and its effect on the environment

- Create a list of things that litter the local environment.
- Take a walk around the school or school grounds and pick-up any litter.
- Participate in a discussion about the effects of litter on the environment.

- Read related non-fiction and fiction books.
- Facilitate class discussions about litter and its effect on the environment.

## ENVIRONMENT AND ECOLOGY

### 4.4 Agriculture and Society

#### Fourth Grade Standards

- Know the importance of agriculture to humans.
- Identify the role of the sciences in Pennsylvania agriculture.

#### Content for Kindergarten

#### Examples

<p>A. Understand the importance of agriculture</p>	<p><b>The learner will:</b></p> <ul style="list-style-type: none"> <li>▪ Make a picture of a farm and the animals that live there.</li> <li>▪ Identify activities done on a farm, such as planting, milking, shearing.</li> <li>▪ Identify products that come from a farm, such as wool, milk, eggs, corn</li> <li>▪ Visit a local farm and see the animals.</li> <li>▪ Use blocks and model animals to build a realistic farm.</li> <li>▪ Create and label illustrations that show farm products.</li> <li>▪ Interview a visiting farmer or master gardener about what they do.</li> </ul>	<p><b>The teacher will:</b></p> <ul style="list-style-type: none"> <li>▪ Provide concrete experiences and examples of how and where food comes from.</li> <li>▪ Take class on a trip to visit a local farm, dairy, and/or grocery store to see where food comes from.</li> <li>▪ Invite a guest farmer and/or master gardener to visit the classroom to share what they do.</li> <li>▪ Provide photographs of Pennsylvania farms.</li> <li>▪ Read related non-fiction and fiction books to expand and deepen background knowledge.</li> <li>▪ Show a video about farm animals.</li> </ul>
<p>B. Identify the components of the farming system, (farmer's role, animals, buildings, land).</p>		

## ENVIRONMENT AND ECOLOGY

### 4.6 Ecosystems and their Interactions

**Fourth Grade Standards:**

- Understand that living things are dependent on nonliving things in the environment for survival
- Understand the concept of cycles

**Content for Kindergarten**

A. Identify and categorize living and nonliving things

B. Begin to understand the concept of cycles

**Examples**

The learner will:

- Sort living and non-living things.
- Create a list of living and nonliving things.
- Describe ways in which living things are dependent on nonliving things for survival.
- Illustrate and/or describe the cycle of day and night.

**Supportive Practices**

The teacher will:

- Help learners understand what is living and what is nonliving.
- Facilitate conversations about the survival needs of living things- those that are living and those that are nonliving.
- Display living and non-living items, such as rocks, plants, pets, shells, insects.
- Read related non-fiction and fiction books.

## ENVIRONMENT AND ECOLOGY

### 4.7 Threatened, Endangered and Extinct Species

**Fourth Grade Standards:**

- Identify differences in living things
- Know that adaptations are important for survival

**Content for Kindergarten**

**Examples**

The learner will:

A. Identify differences in plants and animals

- Describe ways in which living things are alike and how they are different.
- Recognize and describe the differences between plants and animals.

**Supportive Practices**

The teacher will:

- Provide many opportunities for learners to observe, describe and compare animals and plants.
- Provide a variety of opportunities to classify, match, sort, and graph plants and animals.
- Read non-fiction to expand and deepen background knowledge.

B. Explain how specific adaptations can help a living organism to survive

- Describe how different animals and people adapt to the seasonal temperature changes.
- Describe the way in which the body structure of certain animals helps them survive in their environment (e.g., web feet, long neck of the giraffe, beaks).

- Help students understand how living things adapt in order to manage change in their environment and for their own survival.
- Help students understand the adaptive body structures of certain animals to their environment.
- Read non-fiction books to expand and deepen background knowledge.



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**ENVIRONMENT AND ECOLOGY**

**4.8 Humans and the Environment**

**Fourth Grade Standards:**

- Identify the biological requirements of humans
- Explain how human activities may change the environment

**Content for Kindergarten**

**The learner will:**

**The teacher will:**

A. Explain how humans can change their environment or their behavior to live

**The learner will:**

- Describe how peoples' clothing and specific activities change according to the different seasons.
- Draw and describe ways in which peoples' behaviors are different during the night and day.
- Describe safety precautions which are used in the dark.
- Describe protective clothing and shelter.

**The teacher will:**

- Facilitate class discussions about the range of opportunities humans have to alter their environment and/or behavior.
- Read literature to expand and deepen background knowledge.

B. Identify human activities that affect the environment

- Take care of a garden, plant flowers or trees, put up a bird house, start a compost pile, and/or begin a recycling effort in the school, etc. And describe the impact it has on the environment.

- Support learners in looking for and finding community improvement activities.
- Facilitate class discussions describing ongoing environmental changes.

# ENVIRONMENT AND ECOLOGY

## 4.9 Environmental Laws and Regulations

### Fourth Grade Standards

- Know that there are laws and regulations for the environment

The learner will:

- A. Understand how laws and regulations can protect the environment

Examples

The learner will:

- Discuss the importance of following rules.
- Describe ways in which the environmental laws and regulations are helpful.
- Discuss good environmental practice
- Describe how polluting waterways or air will impact natural resources (fish, crops, air).

Supportive Practices

The teacher will:

- Facilitate class discussions about the importance of having laws and regulations to ensure the well being of all.
- Facilitate class discussions specific to environmental laws and regulations.
- Invite people who hold jobs dealing with the environment (e.g., recycling and waste reduction) into the classroom to describe what they do and why it is important.