



**Town of Amherst**

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## **Lessons Taught in Your School Classroom**

PMEC educators will come to your school and teach science lessons to your class. A sampling of lessons is shown below. These lessons are currently being taught in the towns of Amherst and Mont Vernon. Typically, lessons taught in Grade K are approximately 30 minutes long, grades 1-6 approximately 45 minutes, and grades 7-12 at least 1 hour. Note that the lessons include a mix of demonstrations and hands-on strategies. All materials are provided by PMEC. Additionally, any science lesson can be customized to your local science standards, grades, and curricula. Note that suggested grade levels are provided. However, lessons can be adjusted to accommodate various ages and grades.

### **KEY:**

*Italics*      *Demonstrations*  
**Boldface**   **Hands-On Activities**

#### **Light and Energy**

#### **Grade K Up**

Define and discuss energy and how we use it and why we need the sun's light and heat. Emphasize that we never look directly at the sun. Discuss light, heat, and energy being produced in different ways.

*Demonstrate burning paper in a can. Have children rub the palms of their hands together.*

*Demonstrate how radiometer vanes turn when a light bulb shines on them. Show a paper spiral turning when held over a light bulb, Demonstrate light sticks, and a flashlight. Demonstrate electrical energy with a bell, battery, wires, and switch. Show how we get energy from water by turning a water wheel.*

#### **Seeds**

#### **Grade K Up**

Children define a seed and learn about the part of a plant that makes seeds. Show a photo of a bee pollinating a flower. **Observe seed varieties including coconuts and mustard seeds.** Discuss what a plant needs. *Cut open various fruits and vegetables to display the seeds. Plant seeds in containers and observe growth over the next few weeks.*

#### **Sink and Float**

#### **Grade K Up**

Children observe several items and predict what floats and sinks. **Try to sink a bag inflated with air (buoyancy). Observe displacement by submerging hands in containers of water. Observe fresh eggs in fresh and salt water. Observe how clay and aluminum foil can be shaped so that they can be made to sink or float.**

#### **Hibernation, Adaptation, Migration**

#### **Grade 1 Up**

Discuss how humans and animals adapt during the seasons. Talk about animal migration and hibernation. Ensure children know what makes a true hibernator. Discuss the three true hibernators in NH. **Assign children the name of an animal and then have children decide if it adapts during the seasons, or migrates, or hibernates, or is a true hibernator.**

## Soil

### Grade 1 Up

Discuss what we can find in soil including humus. Discuss weathering and erosion. **Observe topsoil using magnifiers.** *Show a piece of turf pointing out the topsoil layer and lower layers.* **Observe sand and gravel.** Discuss differences and compare sand and gravel with topsoil. **Divide the class into three groups and have each group plant the same kind of seed in soil, gravel, and sand. Predict the outcome and observe over the next few weeks.**

## Seasons

### Grade 1 Up

*Model how Earth revolves around the Sun.* Discuss why we need the Sun and Sun safety. Have children talk about the Sun's "changing position" in the sky. Define seasons. *With string/rope, show Earth's orbit on the floor and have a child holding the name of a season position themselves on the orbit.* **Match signs showing the name of the season with signs showing what happens during the season. Practice reading a thermometer. Make a tally chart showing the children's favorite season. Demonstrate how to make a snowflake catcher.**

## Moon

### Grade 1 Up

Discuss how footprints got on the Moon's surface. *Model how the Moon rotates and revolves around the Earth.* **Discuss how the Moon gets its light. Emphasize that the Moon is in the day sky just as often as it is in the night sky. Using Moon models (Styrofoam) and a strong beam of light, children will model why we see phases.**

## Plants

### Grade 1 Up

Discuss how people are like plants. Observe how artificial and real plants are different. *Observe the parts of a plant and discuss their function. Use a dandelion to display a plant life cycle.* Ask children to name leaves, flowers, stems, and roots that we eat. **Children in groups will place a celery stalk with leaves attached in different cups of colored water and observe over the next few days.**

## Birds

### Grade 1 Up

Children are shown photos of the largest and smallest birds. Using string, children will measure the wingspan of both. **Observe a preserved hawk and discuss bird anatomy. Observe different feathers using magnifiers. Using other preserved birds, observe beaks and talons.** Using photos, children will observe bird skeletons.

## Recycling

### Grade 2 Up

Each child receives an item (can, paper, plastic, etc.). They discuss if these items should be thrown away. **Ask children how each item can be reused.** Define recycling. Discuss how items can be recycled. Discuss the 3R's of recycling (reuse, recycle, reduce). Discuss the recycling symbol on the bottom of their plastic containers. Discuss recycling at school. Discuss the advantages of composting.

## Solids, Liquids, Gases

### Grade 2 Up

Discuss the meaning of the term "properties." Have children name solids, liquids, and gases. Introduce the term "states of matter." Ensure children know the differences between a solid, liquid, and a gas. *Demonstrate a solid with a cookie. Demonstrate a liquid by pouring water into different-shaped containers. Demonstrate a gas by blowing up a balloon. Produce carbon dioxide with baking soda and vinegar.* **Give children oobleck (starch and water) and have them list its properties.**

## Plant Classification

### Grade 2 Up

Children will name various plants and discuss their similarities and differences. We will define "classifying." Children will observe photos of Duckweed plants and a Sequoia. **Give children several kinds of seeds and have them group them by similarities.** *Children will observe a flowering plant, a cactus, a non-flowering plant, and a conifer. Children will be guided through constructing a two and three-stage classification system.*

## Water Cycle

### Grade 2 Up

Children are introduced to the chemical equation for water. *They observe water vapor rising from boiling water. Children will discuss evaporation. They will place water in a flat dish and observe the rate of evaporation over several days. Children will observe the formation of a cloud in a bottle.* Children will discuss the water cycle, transpiration, and forms of precipitation.

## Winter Weather

### Grade 2 Up

*Model the reason for seasons using a globe and flashlight. Demonstrate that air is all around us. Observe that air takes up space. Predict how much water remains when snow melts.* **Observe weather instruments. Learn how to read a national weather map. Discuss hibernation.**

## Thunderstorms

### Grade 3 Up

**(Note: Best taught during winter).**

*Children observe the effects of rubbing a balloon with wool and rubbing a balloon against their hair.* Discuss the parts of an atom and the movement of atoms. **Produce an observable spark. Use static electricity to light a bulb.** Discuss how thunderstorms form, how lightning is generated, the reason for thunder, and thunderstorm safety.

## Light

### Grade 3 Up

Children discuss the speed of light. *Observe how an incandescent bulb generates light.* Discuss how CFL's work. Discuss light traveling in a straight line. *Demonstrate reflection. Use a periscope. Observe refraction. Observe light using diffraction grating glasses.*

## Natural Selection

### Grade 3 Up

Discuss the fact that only wolves, not dogs, existed 15,000 years ago. Discuss dog breeds and how breeds began. Discuss selective breeding in animals and plants. Discuss natural selection and show how it is comparable to selective breeding. **Children will participate in an application of natural selection.** Children will observe that changes can occur even in the same species.

## Animal Adaptations

### Grade 3 Up

Children discuss how animals adapt to meet their needs. Discuss differences between carnivores, herbivores, and omnivores. Discuss how they obtain food. Discuss physical adaptations in various habitats. **Observe the role of blubber in mammal.** Observe photos of various animals and how they adapt to predators. Discuss behavioral adaptations. *Show a skunk pelt.*

## How Weather Affects Animals

### Grade 3 Up

Discuss habitats, the loss of habitats, and what animals need to survive. Identify populations and communities. Discuss differences between animals that hibernate and those that are dormant. Identify the three true hibernators in NH. Discuss bird migration and where insects go in winter. **Give children NH Fish and Game Animal Tracking Cards and discuss their use. Using animal track molds, children will each make a plaster of paris animal track.**

## Plant Adaptations

### Grade 4 Up

*Observe a dry resurrection plant (selaginella lepidophylla) and leave it in class with directions for use and observation.* Define and discuss land biomes. *Play a game of matching a biome name with a description of a biome.* Show photos of purple loosestrife (lythrum salicaria) and discuss why it is invasive. Show photos of a jade plant (crassula argentea) and discuss why it is a succulent plant. *Play a game of showing photos and identifying the biome.*

## **Rocks and Minerals**

### **Grade 4 Up**

Discuss and show photographs of igneous, sedimentary, and metamorphic rocks. **Pass around to each child at least 6 samples of each rock group along with a magnifier.** Discuss the rock cycle. Discuss the Mohs Hardness Scale. *Demonstrate why talc is the softest rock.* **List rock and mineral properties and pass around examples of each property: color (gold and pyrite), texture (pumice and talc), luster (galena), cleavage (mica), streak (hematite and galena), magnetic (magnetite), and crystalline (amethyst).** Leave children with a puzzle: How can rocks move, leave a trail, but not be pushed (racetrack playa)?

## **Fossils**

### **Grade 4 Up**

Define fossils, extinction, and paleontology. Discuss how we know what dinosaurs looked like. Show a sequence of photos of a T-Rex skeleton and photos of the same T-Rex with muscles and skin. Discuss dinosaur digs. **In groups, pass around imprint fossils and magnifiers. Pass around an example a fossil where material was replaced by minerals. Pass around an example of where living material was preserved in amber.** Discuss how fossils can also be casts. **Children will press shells in Playdough, pour in plaster of paris, and produce a cast of the shell.**

## **Herbivores, Carnivores, Omnivores, Insectivores**

### **Grade 4 Up**

Children wash hands. They will feel the tops of their teeth and identify them. Discuss that animals have the same three kinds of teeth. Discuss the purpose of each kind of teeth. Discuss herbivores, carnivores, omnivores, and insectivores. **In groups, children will circulate five different animal skulls and, based on the teeth, try to match them to a list of animals on the board (deer, opossum, weasel, skunk, coyote).**

## **Life in an Ecosystem**

### **Grade 4 Up**

Discuss and define an ecosystem, abiotic factors, and biotic factors. Ensure children understand habitats, populations, communities, and biomes. Discuss predators and prey in ecosystems, how plants and animals depend on each other, and problems in ecosystems. Discuss food webs and food chains. **Each child is given a card with the name of a plant, or animal, and one card with "sun." Then, using a ball of string or yarn, the game will show a food web.**

## **Renewable and Nonrenewable Resources**

### **Grade 4 Up**

Discuss and define natural resources, nonrenewable resources, and renewable resources. Discuss fossil fuels. **Pass around samples of coal and oil shale along with magnifiers.** Use photos to show how electricity can be generated. With photos, discuss alternate energy resources. Include geothermal, hydroelectric, *solar (demonstrate how a radiometer works)*, wind, and nuclear. Discuss ethanol and hybrid cars.