Nature-Watch Activity Kit

Root Observation Station

(Nature Watch Kit 154)

Kit Contents

	Kit Size	
	25	***100***
Item:	*Qty.*	
Plastic Tubes & Caps	25	100
Seeds	50	200
Crystals	1 oz.	3 oz.
Circular Cards	25	100
Glue	1	2
Instructors Manual	1	1

This page includes the Next Generation Science Standards (NGSS) mapping for this kit and Science, Technology, Engineering, and Math (STEM) extensions (on back) to use in adapting and extending this activity to other subject areas.

See Back for STEM Extensions

Next Generation Science Standards Alignment

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are alike, but not exactly like, their parents.

2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.

2-ESS2-1. Compare multiple solutions designed to prevent wind or water from changing the shape of the land.

3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.

MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristics animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

This Nature Watch Activity Kit contains an Instructor Manual and materials to implement the curriculum. The kit was designed to be used with adult supervision only. Unsupervised use is not recommended.

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STEM Extensions

Science

Gather a host of seeds that can be easily found in a grocery store (from fruits and vegetables or just the seeds themselves). Dissect the seeds and discuss what kinds of properties, similarities, and differences you notice.

Tree roots play an important role in a growing tree's competition for resources. If a bunch of seeds germinate in one area, the roots from each seed compete against each other for the water and nutrients in the soil. Simulate this competition by acting like newly germinated seeds. Each child should choose a spot to stand – this is where they "germinated" and they cannot move from this spot because their roots are established. The teacher should then scatter "resources" (in the form of poker chips, paper clips, pennies, or other small objects) around the area. The "plants" then have a chance to gather as many of these resources as they can reach, but without moving their "roots" at all. Compare how many resources each plant got and discuss how competition can limit the number of seeds that become full-grown plants.

Make mystery bags with different plant parts in them and challenge your classmates to use only their sense of touch to figure out what's inside. Place some plant part into a brown paper lunch bag. Use either plant material that can be bought at the grocery store or parts of plants that can be found on the ground outside. Your classmates should guess what the object is and what type of plant part it is (for instance, a plum, which is a fruit; an acorn, which is a seed).

Track what you eat for a week, writing down any plant-based foods. What are you eating that is a root? A stem? A leaf? A fruit? A seed? A flower?

Technology

(Younger) Record time-lapse photography of the plant growing by taking a photo twice a day. Print the photos and make a flip book to "play back" the photos.

(Older) Record time-lapse photography of the plant growing by taking a photo twice a day. Play back the time-lapse photographs in PowerPoint or by simply clicking through them to see a "movie" of your plant growing. Experiment with different time intervals for snapping the photographs.

Engineering

Draw a diagram of a plant that has all the best possible features for successful growth. For example, if you want your plant to grow well, should the roots be long or short? Should the leaves be big or small? Should it have a few flowers or many? After you draw your plant, explain why you designed it the way you did. Does it look like any plants that you know of?

Make a model of a plant that can effectively get water and store it. First, think about how your plant should look in order to get enough water in its roots to support the stems and leaves. Use a large sponge to create your plant; cut the sponge into pieces that will become your roots, stems, and leaves. Then, attach the pieces together with string or staples. You can imitate desert plants by wrapping your stems and leaves with wax paper, which can represent the cuticle that keeps moisture in for desert plants. Place the roots of your sponge plant on a paper plate and pour a quarter cup of water onto the plate. After the sponge absorbs the water, move the sponge plant to a dry plate. The next day, check your sponge plant for water. Where is it dry? Where is it still wet? Compare your plant with your classmates' plants and discuss why some of the plants held water longer than others. How would you improve your model?

Math

Go outdoors to a park or another place with many trees. Find a tree with roots that you can see above ground, and measure them to see how far from the trunk of the tree they go. Also measure the circumference of the tree's trunk. Repeat this process with several trees. Is there a relationship between the circumference of the trunk and how far out the roots go? (For many tree species, the diameter of its root spread is roughly equal to its height, but since it would be difficult to measure a tree's height we are looking at the trunk size.)

As your plant is growing, measure the length of the shoots and the roots each day. Graph their growth and compare your graph to your classmates' graphs.