

Grade: K

Learning to Explore Nature



Exploring relationships among living organisms.

Teacher Background Reading

Science understanding begins with exploration through the senses. When children learn to use their senses effectively to gather information, they have taken the first step in becoming scientists. Noticing details of pattern, texture, shape, color, size, thickness, and even the smell of things in nature - plant parts such as bark, leaves and seeds, as well as soil - can give important clues about how things in nature work together and how organisms survive in a given environment.

Leaves use the sun's energy to produce food for plant growth. Pines and other conifers have needles. Most urban trees are deciduous and lose their leaves in the winter. These trees have flat leaves, with shapes that give clues to the tree's identity. Leaves may have smooth margins or may have indentations or teeth. They may be shiny or waxy, or have hairs on the underside.

Looking closely at soil, students can see how composition, color, texture, and the grain size of soil vary from place to place. Some types of soil are better for growing certain types of plants. Soil that holds moisture for long periods of time is better for plants that grow in vegetable gardens; while sandy soil, for example, allows water to pass through, which is better for succulents. Plants that are native to San Diego's chaparral ecosystems are adapted to hard, decomposed granite or fine-grained, clay soils. Trees that grow along creeks and rivers drop leaves and enrich the soil.

Find a spot in nature you can use for the lessons - either in the schoolyard or in a park nearby with trees or bushes. Check for any hazards. Describe the boundaries of the outdoor area that you will be using for the lessons and explain acceptable and unacceptable behaviors outdoors. Much of the class discussion, etc. can also be done outside. ■



Grade K/Lesson 1:

Getting a Sense of Nature

Students will use their senses to explore the environment, and will develop their sensory vocabulary to describe what they see around them in nature.

Learning Outcomes

Students will use their sense of touch to explore trees and other natural objects, developing vocabulary and descriptive writing skills in the process.

MATERIALS:

- Natural items that have a smell that students can easily detect. Have 3 - 4 of each item. Ideas include cinnamon sticks or cinnamon powder, orange rind, mint leaves, rose petals, soil, perfume on cotton balls (check allergies of students).
- Natural objects collected from schoolyard or park, such as leaves, bark, branches, flowers, acorns, other seeds, feathers, wood chips, sand, and rocks.
- Poster paper

Getting Ready

Review the Teacher Background Reading.

Write "Word Bank" on the board to record students' descriptions.

Collect natural objects such as pine cones, acorns, leaves, pine needles, bark, rocks, fur, moss, feathers, and sticks. Look for things that are rough, fuzzy, soft, smooth, hard, prickly, feathery, stiff, etc. You will also want to be sure to collect objects with fragrance from your household (cinnamon sticks, orange or lemon rind, petals, mint, other spices etc.) Remind the students not to break, injure, or tear any living thing when examining and exploring. If possible, each object you collect should be from a tree. But if that is not possible, any natural object is acceptable. Collect about 25-30 objects.

ENGAGE:

Ask students how a baby learns about his/her environment (senses, especially touch). Ask how a scientist learns about science (senses, plus reading, thinking, testing, etc.). Explain that both types of learning start with the five senses and that today they will be practicing using their senses.

In or out of the classroom, present students with a tray full of textured objects. Teacher chooses 2 or 3 objects and models some descriptive sensory words that describe color, shape, or texture adjectives. Then have students come up one at a time, pick an object, and share one descriptive word about the object. Add these words to the class word bank. Continue until each student has had a turn and a sensory word has been written for each object.

EXPLORE:

Take students to a spot near something in nature in the school yard - either a tree or a bush - or take them to a nearby park. Have them sit in a half circle facing you, close their eyes, and use their sense of hearing to tell you what they notice about this spot in the school yard. Give them one minute to listen, and then ask them to share what they heard (birds, wind, traffic, children). What sense were you using when you picked up these sounds? (hearing) Have students cup their hands to their ears and compare the difference. Why might a deer's ear be shaped like this?

Now we will use our nose to see how we can learn about our environment. Sitting outside, pass around collected objects that have a fragrance/smell that students can experience. Have multiples (3-4) of each item so that students do not have to wait too long to experience the smell. Ideas include cinnamon sticks or cinnamon powder, orange rind, lemon rind, mint leaves, rose petals, soil, etc. What sense did we use our nose for? (smell)

We can also learn about nature by feeling things. We are going to explore the schoolyard by seeing how things feel. What sense will we be using? (touch)

EXPLAIN:

Have students explore the playground and use their hands to touch a large variety of items. (Model this with a few objects-soil, different kinds of leaves, bark, rocks, feathers, flowers.) Use words like smooth, hard, sticky, rough, soft, sharp, etc. Instruct students not to pick or collect anything for this lesson.

Have students sit in an area outside and ask them how the objects they saw or touched relate to where that organism lives. Why do the plants with the leaves they found live where they do? (They need sun and soil and water) Why does grass only grow in certain areas? (It needs sun, space, soil and not to be trampled) Were there any animals or insects where they were looking? Why were they there? (To find food and shelter)

ELABORATE:

How can we use our senses to learn about nature?

Elicit answers to the following questions and record on the board:

Ears: What are some sounds we can hear in nature ?
(wind, birds, other animals, leaves rubbing together)

Eyes: What are some things we can see in nature?
(sky, trees, seeds, animals, birds, soil, plants)?

Nose: What are some things we can smell in nature?
(fruit, plants, grass, soil)

Fingers: What can we feel in nature?
(bark, soft fur, leaves, seeds, soil)

Which of these things relate to plants and which relate to animals? How does each one relate to a plant or animal?

Record students answers and next to their answer write what it relates to and how. Transfer this information to the board and discuss back in the classroom.

EVALUATE:

Divide into 4 groups.

Give each group a large piece of poster paper, with one of these symbols drawn on it: eye, ear, nose, hand. Teacher approaches each group with separate questions:

Group 1 - What can we see in nature?

Group 2 - What can we hear in nature?

Group 3 - What can we smell in nature?

Group 4 - What can we touch in nature?

Assign students to a group for each sense and have them draw pictures of things in nature that they find using that sense.

Once they have drawn and written about what they found, have them connect the organisms that relate or need one another. For example: a beetle might use a tree to find food in the bark - the students could draw an arrow or line and write food between the drawings. They could draw a tree and sun showing the tree or plant needs sun to grow and that's why it's in the open area of the school yard.

The goal is to have them make connections between why they found certain organisms in specific areas of the school yard.

EXTENSION:

Write a class poem using the names of the objects and the sensory words about them. For example:

Pine Tree Poem

Pokey twigs

Piney smell

Scratchy bark

Rounded cone

Sticky sap

Big green leaves

Soft brown dirt

REFERENCES:

American Forest Foundation (2012). Getting in Touch With Trees. In *Project learning tree: Pre K-8 environmental education activity guide* (6th ed., pp. 20-22). Washington, DC: Author.

American Forest Foundation (2012). Poet Tree. In *Project learning tree: Pre K-8 environmental education activity guide* (6th ed., pp. 31-33). Washington, DC: Author.

Grade K/Lesson 2:

Soil Stories

Students will observe different types of soil and will develop an understanding of how different types of soil support different types of plants.

Learning Outcomes

Students will use their senses to discover qualities of different types of soil: moisture retention and content, composition, particle size.

MATERIALS

- Magnifying glasses – 1 per student
- Dropper – 1 for teacher to distribute water to groups (or spray/water bottle)
- 11 x 17 cardboard pieces or trays – 1 per pair
- 2 small yogurt containers or cups per pair
- A large metal spoon or spade per pair
- A small bag of potting soil
- A small container of sandy soil or sand from the sandbox, schoolyard or beach
- Pencils – 1 per student
- 1 small (2 inch) potted plant for each group of 4-5 students - can be any type of plant
- Small houseplant (4 to 6 inch) for discussion

Getting Ready

Review the Teacher Background Reading.

Identify at least two areas of the schoolyard where students can observe soil closely - sand, garden soil, or ordinary soil, from schoolyard. If it is difficult to find different soils then spend some time on the ground analyzing the soil in two different locations, even if the soil seems to be the same. Or chose a place that gets regular water and another place that does not and note difference.

Put one tray/cardboard piece, two yogurt containers or small cups, pencils, and one spoon/spade on tables for each pair of students.

Prepare two other small soil samples for each group in small cups or containers that will later be transferred to the trays: one of sandy soil from a sandbox, schoolyard or beach, and one of potting soil.

ENGAGE:

Take students to an area of the schoolyard with trees and shrubs. Ask students what these particular plants around the schoolyard are growing in (dirt/soil/sand). Ask them why soil is important for plants. Why do plants need soil? (for space and for their roots to grow - which collect nutrients and hold the tree up)

Soil Sampling: Divide the students into groups of 4, search the schoolyard and find at least two different types of soil. Use the spade or spoon to dig up at least one cup of each type of soil, put it in a bag or yogurt container, and bring back to class (or examine in the schoolyard). Ask students to identify at least two qualities of soil. Gather together, share out, and record (by teacher on board).

Possible answers: dry, wet, sandy, squishy, moist, rough.

When soils are so different, what does that mean for plants? (different types of plants can grow in them)

EXPLORE:

Place the two prepared soil samples on each group's cardboard "tray", and have students carry to an outdoor area, or set them up before class.

Give each group one or two magnifying glasses to examine the soils.

Make a chart on the board listing the two types of soil at the top and leaving room to write in the descriptions underneath.

After students examined the soils, have them give you words to describe each soil. (sand, little rocks, bark, leaves, loose, hard, chunky or rocky)

Allow the students to feel the soils and continue to describe them.

EXPLAIN:

Discuss the qualities of soil that students noticed and record on the board what the soil looked like, how it felt, and what it's made of.

How would the soil affect the plants being able to get water? (if the sandy soil lets the water run right through, the plants can't get to it, but if the potting soil holds water, then the plants can easily get the water they need to grow)

ELABORATE:

Give small potted plants (2in) to each group. Ask them to take the plant out of the pot and place on the tray that they used to look at soil. Have them separate the soil from the roots carefully to be sure not to hurt the plant.

Ask them to describe what the roots look like. Write their descriptions on the board.

Ask them how they roots might help the plant get nutrients from the soil.

EVALUATE:

Have students draw a couple of plants that they saw with the soil, roots, leaves and all, then draw some animals or insects that they saw. With the students' input, list resources that each plant and animal needs to live (water, air, soil, nutrients/food). Ask them to connect the plant and animal or insect to the resources that it needs to survive.

EXTENSION:

Classroom planting project: Keep several potted plants in your classroom. These can be the replanted plants that the students used to look at root systems. Assign student or groups to water soil when it feels dry. No more than twice a week. For students with cactus or other succulent plants, let the soil dry out, and water only every two weeks.

REFERENCES:

American Forest Foundation (2012). Soil Stories. In *Project learning tree: Pre K-8 environmental education activity guide* (6th ed., pp. 297-302). Washington, DC: Author.

Grade K/Lesson 3:

Leaf Sorting

Students will use their senses and vocabulary to describe different leaves. They will organize their leaves according to one characteristic (size) and then sort into groups based on two features.

Learning Outcomes

Students use their organizational skills of comparing and contrasting to sort leaves.

MATERIALS

- Leaf collecting bags (brown lunch bags) – 1 per group of 4-5
- Grouping circles (hula hoops or yarn)
- Rulers
- Magnifying glasses – 1 per group of 4-5
- Pruners – if there are no leaves on the ground
- 1 Houseplant (4 to 6 inch) per group of 4-5

Getting Ready

Review the Teacher Background Reading.

Part One: Find a tree on the schoolyard that has different-sized leaves that can be picked off tree or from the ground.

Part Two: Be prepared to conduct a guided safari to different trees in the schoolyard to collect leaves. They will then be sorted while students sit under a tree or a nice gathering spot outdoors.

Note: Give maintenance/landscaping some advance notice that you would like to have leaves available during a certain time frame so they are not all collected and taken away.

ENGAGE:

Under the selected tree, have students each collect one leaf. Discuss characteristics and words that describe those features (color, shape, edge, feel). Group 4-5 students together and have each group arrange their leaves in order based on size. Rulers can be used by students if they want to measure.

EXPLORE:

With collection bags, have groups collect leaves from different trees and shrubs. One leaf from each plant. Meet back at the outdoor class site.

Discuss similarities and differences of some sample leaves by making grouping circles or Venn diagrams with yarn or hula hoops. Pass out magnifying glasses so students can study the details of the leaves. Groupings could include single traits such as green or brown, needle or flat, smooth or jagged edges, shiny or dull, rough or smooth surface.

The overlap should have both characteristics and the leaves that have neither are outside the circles.

Ask students what do leaves do for trees? (Leaves collect sunlight which is energy for the tree to grow)

EXPLAIN:

Based on how the students sorted their leaves, have them glue the leaves on paper and label the characteristics that they used to sort them.

Discuss as a class:

What do the leaves do for the plants? What do they provide that the plant needs to survive? Do other organisms need the same things? Do people need the same things? (Leaves change energy from the sun into food that the plant uses to grow. Other organisms and people get that energy from the plants or from other animals that eat plants)

ELABORATE:

Give a houseplant (4 to 6 inch) to each group. Have them look at the houseplants and ask them what the leaves are connected to. (The stem of the plant).

What are the roots connected to? (The stem of the plant).

Explain that water moves from the soil through the roots, to the stem, then to the leaves. Energy from the sun moves from the leaves through the stem to the roots.

EVALUATE:

Ask students how they were able to sort their leaves. What were useful characteristics for sorting? What traits did most, but not all leaves have?

EXTENSION:

Use magnifying glasses to look for more details in the leaves.

Make a leaf rubbing.

Materials: A hard surface such as table or clipboard, paper, and crayon.

Procedure: Place leaf on hard surface and cover with paper. Use the side of the crayon to rub over the leaf.

Display leaf rubbings on Bulletin Board or in a class book.

REFERENCES:

Adapted from *Primarily Plants* lesson, AIMS Education Foundation.

Standards Grade K:

Next Generation Science Standards

K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

California Science Standards

Life Science

2. Different types of plants and animals inhabit the earth. As a basis for understanding this concept:

- a. Students know how to observe and describe similarities and differences in the appearance and behavior of plants and animals (e.g., seed-bearing plants, birds, fish, insects).
- c. Students know how to identify major structures of common plants and animals (e.g., stems, leaves, roots, arms, wings, legs).

Investigation and Experimentation

4. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

- a. Observe common objects by using the five senses.
- b. Describe the properties of common objects.
- d. Compare and sort common objects by one physical attribute (e.g., color, shape, texture, size, weight).
- e. Communicate observations orally and through drawings.

Common Core Standards

Literacy: Writing

W.K.2 Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.

Literacy: Speaking and Listening

SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

SL.K.4 Describe familiar people, places, things, and events and, with prompting and support, provide additional detail.

SL.K.5 Add drawings or other visual displays to descriptions as desired to provide additional detail.

SL.K.6 Speak audibly and express thoughts, feelings, and ideas clearly.

Literacy: Language

L.K.1f Produce and expand complete sentences in shared language activities.

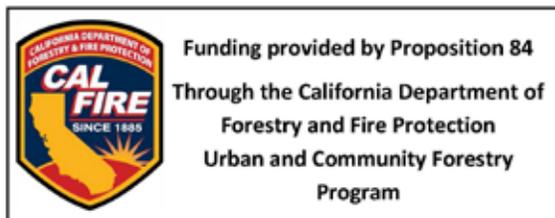
L.K.6 Use words and phrases acquired through conversations, reading and being read to, and responding to texts.

Math: Geometry

Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

1. Describe objects in the environment using names of shapes.
2. Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference.

Collaboration of



Additional resources for educators available at
www.sdchildrenandnature.org