

Whiskeytown Environmental School
Clear Creek Field Lab Experience for Kindergarten
Pond Exploration

Revised Fall 2008

Unit Overview:

In this unit, students will work on observation skills using their five senses and compare living things according to differences and similarities. The first three classroom lessons will prepare the students for the field experience, and the last classroom lesson will serve as a class assessment.

Classroom Lesson 1: *Meet a Tree and Looking At Levels*

The students will learn to use their five senses to observe living things outdoors, then they will record and classify this information. They will use a similar technique during their pond field trip.

Classroom Lesson 2: *Comparing Three Live Animals*

Students will observe and make comparative statements about two or three live animals. Observation and proper treatment of live animals is a very important prerequisite for the field experience.

Classroom Lesson 3: *Dream a Pond and Individual Drawing*

As an introduction to the pond ecosystem, the students will discuss what they might see at the pond and where they may find different plants and animals. Students will draw a picture of what they expect to see at the pond as a final preparation for the field experience

Field Lab Lesson 4: (Taught by WES staff at Clear Creek)

Activity One: *All about the Ecosystem/living and non-living*

Activity Two: *Plant rubbings and sharing*

Activity Three: *Pond Exploration and observation/the five senses*

Classroom Lesson 5: Follow Up/ Assessment

Students will demonstrate their knowledge by adding their rubbings and pictures to the mural in their classroom.

Science Content Standards - Kindergarten

State of California, State Board of Education

Life Sciences

2. Different types of plants and animals inhabit the Earth. As a basis for understanding this concept, students will know the following:

- a. how to observe and describe similarities and differences in the appearance and behavior of plants and animals

Investigation and Experimentation

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

- a. observe common objects using the five senses
- b. describe the properties of common objects
- c. describe the relative position of objects using one reference(e.g., above or below)
- d. compare and sort common objects based on one physical attribute
- e. communicate observations orally and in drawings

My Science Journal

Name _____

Lesson 1: *Meet A Tree and Looking At Levels*

MEET A TREE

Objective

Using their five senses, students observe, compare, and describe trees.

CA Science Standards – 2a, 4a, 4b, 4d, 4e

Time/ Setting

45 minutes; outside near grove of trees

Materials

Bell, whistle, or some other signal to indicate when to regroup

Subjects

Science, math, language arts

Vocabulary

Alive, not alive

Background Information

Small children may not understand that plants are alive since plants don't behave like people and animals. This discrepancy can be a starting point for discussion that allows you to explore developmental difference in your students' thinking.

Advance Preparation

This activity may be most effective if only half the class participates at a time. The activity could be done concurrently with the activity "**Looking at Levels.**" For both activities you will need to find a grove of trees (three or more) on or near the school grounds.

A day or two before this lesson, ask parents to help students identify and list all of the living things found in their homes. Students should bring their lists to class the following day.

Procedure

1. Discuss the list the students brought in from home. Remember for future reference if any students mention plants as living things.
2. Take the class outside to the grove of trees. Give students five minutes or longer to use their senses of smell, touch, hearing, and sight to "get acquainted" with at least three trees. Encourage students to observe individual trees in different ways. (For example, ask, "How does the tree look when you are sitting? When you are lying on your side? When you are lying on your back?" Unless appropriate, do not let students climb in the trees.)
3. Have the class regroup. Ask students if anyone would like to volunteer to choose a particular tree and describe it using comparative statements. You may want to structure students' comments by asking students to complete the sentence, "The tree is _____."
4. Measure each tree by seeing how many students, holding hands, it takes to form a tight circle around the tree. Compare the measurements of the trees.
5. Ask students whether they think the tree is alive. Do not refute their responses, but ask students to "prove" their answers by telling how they know whether the tree is alive.

Discussion Questions

What did you notice about your trees?
How were your trees alike? Different?
Are trees alive? Why or why not?
Are other plants alive?

Evaluation

Use the discussion questions to assess students' thinking.

Source of Activity

Adapted from:
The California State Environmental Education Guide
Carolie Sly, Coordinator
Alameda County Office of Education
313 West Winton Avenue
Hayward, CA 94544-1198

LOOKING AT LEVELS

Objective

Students observe, record, and classify living things outdoors

Time/ Setting

45 minute; outdoors and classroom

Materials

Butcher paper
Crayons
Tree Observation page for science journal

Subjects

Math, Science, Art

Vocabulary

Sky scanners, eye-level lookers, ground crawlers

Background Information

Students may be surprised to find an abundance of living things around the school. Even an urban school can be a rich laboratory for studying animals in their natural environments. This activity allows students to observe and record living things that live near the classroom.

Some students are not used to learning outdoors. They need structured observation time to help them focus. That is one of the purposes of this activity. By practicing these skills ahead of time, they will have a richer educational experience in the field lab.

Advanced Preparation

Choose a route around the school grounds or the immediate neighborhood. The route should take students about 10 minutes to walk.

Prepare a large piece (4ft long) of butcher paper as follows:

Sky scanners

Eye-level lookers

Ground crawlers

Procedure

1. If *Meet a Tree* was done the previous day, remind students that yesterday they looked at trees and thought about how trees are alike and different.
2. Explain that students will be going on a short walk to see different kinds of living things that live around their school. Tell students that to make sure they are good observers, you will divide the class into three groups. Each group will be expected to look for living things at one particular level along the way.
3. Assign one-third of the class to be “ground crawlers.” The students are to look for living things on the ground. (Make it clear that students do not really crawl, but they are to look for living things that live on or close to the ground.) Assign one-third of the group to be “eye-level” lookers. These students will look for living things at eye-level. Assign one-third of the group to be “sky-scanners.” This group will look for living things in the sky. Ask students to give an example of the living things they might see at each level.
4. Take the class on a walk around the school grounds. It is not crucial that students look only at their assigned level, but remind them to focus on that level and to remember what they observe. If possible, have an adult with each group and keep the groups slightly separate so they can focus on their assigned level.
5. Back in the classroom, post the butcher paper with the three levels. Ask students to give examples of living things they observed at their assigned levels. Have students draw pictures of these things on the butcher paper. This may be managed most easily if you cut the levels apart horizontally and let each group draw in a different area of the room. Afterwards, tape the levels back together for discussion.

Discussion Questions

What animals did you see at each level?

Were there any animals that were seen at every level? Two levels?

Looking at the whole chart, what animal did we see the most of? The least of?

What kinds of things were animals doing when you observed them?

Did anyone include plants (or anything else) as living things? Where did you see them?

Evaluation

Give the students the page "Tree Observations." Tell them to draw one to three animals that were seen at each level on the walk around the school and to show what the animals were doing. Encourage students to include any plants that were observed. If this page is not already a part of the science journal, add it when the students are finished.

Source of Activity

Adapted from:

The California State Environmental Education Guide

Carolie Sly, Coordinator

Alameda County Office of Education

313 West Winton Avenue

Hayward, CA 94544-1198

Lesson 2: Comparing Three Live Animals

Objective

Students observe and make comparative statements about three live animals.

CA Science Standards – 2a, 4a, 4b

Time/Setting

45 minutes; Classroom

Materials

Earthworm for each pair of students

Mealworm for each pair of students

Snail for each pair of students

Small styrofoam meat tray or a milk carton cut to half its size for each pair of students

Petri dish for each pair of students (optional)

Hand lenses (optional)

Subjects

Science, language arts, fine arts

Vocabulary

Mealworm, earthworm, snail, alike, different

Background Information

Students have compared living things according to similarities and differences. In order for students to apply what they have learned to the natural world, they need experiences with real animals. In this activity students compare animals using those attributes that arouse their curiosity.

Advanced Preparation

Earthworms, snails, and mealworms can be purchased at bait shops or found in most gardens. Mealworms are also sold at most pet stores. Collect or purchase an earthworm, a snail, and a mealworm for each pair of students.

Procedure

1. Have students gather around the live animals. Demonstrate how to handle each of the animals carefully, keeping hands slightly moist for handling the snail and the earthworm. Tell students that they must share animals with their partners, that they are not to move the animals from the designated work area, and that when the observation period is over you will ask students to share what they have discovered about their animal.
2. Divide students into pairs and assign each pair a work area. For comparative purposes, it is usually best to distribute all three animals at the same time to each pair of students. You may decide, however, given the nature of your students, that distributing one animal at a time is wiser. Allow students time to observe their animal.
3. *Optional*--set up a learning station with magnifying lenses, petri dishes, and meat trays. Students can use this equipment to learn more about the animals. When students have studied the animals further, challenge students to move like an earthworm, mealworm, and snail.
4. Have students stop and share what they have discovered. (You may want them to move to another area of the room.) Record words or phrases that summarize or generalize their statements. Discuss their observations. (See the discussion questions).
5. After the lab, have students help clean up. Students should also return the animals to the appropriate environment in the classroom.

Discussion Questions

What did you find out about these three animals?

How does the earthworm feel?

How does the snail move?

How does the mealworm act when you pick it up?

In what ways are the three animals alike?

In what ways are they different?

In what ways are any or all of the animals like you?

Evaluation

Have students draw a picture of one of the animals in their science journal. Students can then dictate a statement that describes an observation they made.

Source of Activity

Adapted from:

The California State Environmental Education Guide

Carolie Sly, Coordinator

Alameda County Office of Education

313 West Winton Avenue

Hayward, CA 94544-1198

Lesson 3 – Dream a Pond

Objective

Students will discuss what they might see at the pond and where they may find different plants and animals. Students will draw a picture of what they expect to see at the pond as a final preparation for the field lab.

CA Science Standards – 2a, 4b, 4e

Time/Setting

45 minutes; classroom

Materials

4'x6' paper for bulletin board

What I think I will see on the Field Trip page for science journal (next page)

Subjects

Science, language arts, art

Vocabulary

Pond, surface film, water's edge, open water, bottom

Background information

See *Life in the Still Waters* under Background Information at the end of this lesson.

Advanced Preparation

Prepare a space for the bulletin board (approximately 4'x6'). Draw the outline of a pond on the paper and add a few physical features (rocks, clouds) to get the students started. Make copies of the science journal page *What I Think I Will See on the Field Trip*. If you have a book about ponds or pond life, read it to the students as an introduction.

Procedure

1. All children should sit in a circle, close their eyes, and imagine themselves at a pond. What does it look like? What does it sound like? What plants might they see? What animals might they see? List the names of the plants and animals on the board.
2. Ask the children to look at the pond and think about the different areas (habitats) and the special features of each. Discuss briefly the differences among the surface film, the open water, the water's edge, and the bottom. (See background information.)

3. Ask the children to take a look at the list of animals and plants on the board. Let them guess which animals/plants will live in each of the areas.
4. Have the students draw pictures of what they think they will see on their field trip in their journal.

Background Information - continued

Life in Still Waters

A pond might be described as a shallow body of standing water in which enough sunlight reaches the bottom to allow rooted plants to grow from shore to shore. Another definition suggests relatively uniform water temperatures throughout, and a third describes a pond as small enough so that the wind does not have much impact on any of its shores.

Although a pond may have distinct and different habitats within it, all ponds share some common characteristics. Most important, of course, is that a pond contains water. As a life-giving substance, this water includes dissolved oxygen and other gases, plus nutrients that have flowed into or decomposed in it. The ability to adapt to this unique environment—to breathe, to move about, and to find nourishment—is what determines who lives in a pond.

Temperature also helps to determine what pond life can survive because it influences the rates of growth and **decomposition** as well as the amount of oxygen in the water.

(Warmer water normally contains less oxygen.) Annual changes in temperature are especially significant. Because water is heaviest at 39° F, surface water sinks when autumn temperatures cool it to 39° and sinks again when spring temperatures warm it to 39°F. These fall and spring overturns are vital to insure the mixing and dispersal of oxygen and nutrients throughout the pond at least twice a year.

To appreciate the diversity in a pond, it is helpful to divide it into four distinct habitats: open water, the water's edge, the surface film, and the bottom. Open water is the area in the center of the pond where rooted plants do not extend to the surface of the water. Life consists of large, free-swimming animals, such as fish and turtles, and small microscopic plants and animals that drift suspended in the water.

The water's edge is where the land meets the water. Rooted plants of great variety are found growing here. Frogs, fish, insects, worms, snails, and a variety of microscopic animals find shelter among the plants.

The surface film is the habitat of many of the creatures that get their oxygen directly from the air, such as water striders, which walk on top of the film provided by the water's **surface tension**, and the mosquito **larvae**, which hang on the underside of it.

The pond bottom is the area of decomposition where bacteria help to recycle nutrients by attacking dead organisms that sink to the bottom. Many insects, especially those in their larval form, hide from predators here. Worms, crayfish, clams, and nymphs of mayflies, dragonflies, and damselflies burrow into the bottom mud.

There are many kinds of green plants in a pond that are not immediately evident. Fresh water algae are the most important, serving as food for snails, polliwogs, water fleas, and mosquito larvae. There are also **submergent** plants whose leaves and flowers do not grow above the surface of the water, invisible to the shore-bound pond observer. They are often referred to as pondweeds. Many pondweeds also have floating leaves, such as water lilies. Then there are the emergent plants, which are easier to notice because their

stems, leaves, and flowers rise out of the water. Plant life in a pond is as varied and fascinating as animal life, but children can rarely be diverted from their encounters with frogs, newts, and insects long enough to study it.

There are a number of **predators** in a pond. In both the larval and adult forms the dragonfly is predatory, as are the water strider, whirligig beetle, water boatman, and predaceous diving beetle, whose larvae are aptly named water tigers. Some of their favorite foods might include frog eggs, tadpoles, and insects. The red-spotted newt, as well as many species of frogs, turtles and snakes are all animals that eat other animals in the pond.

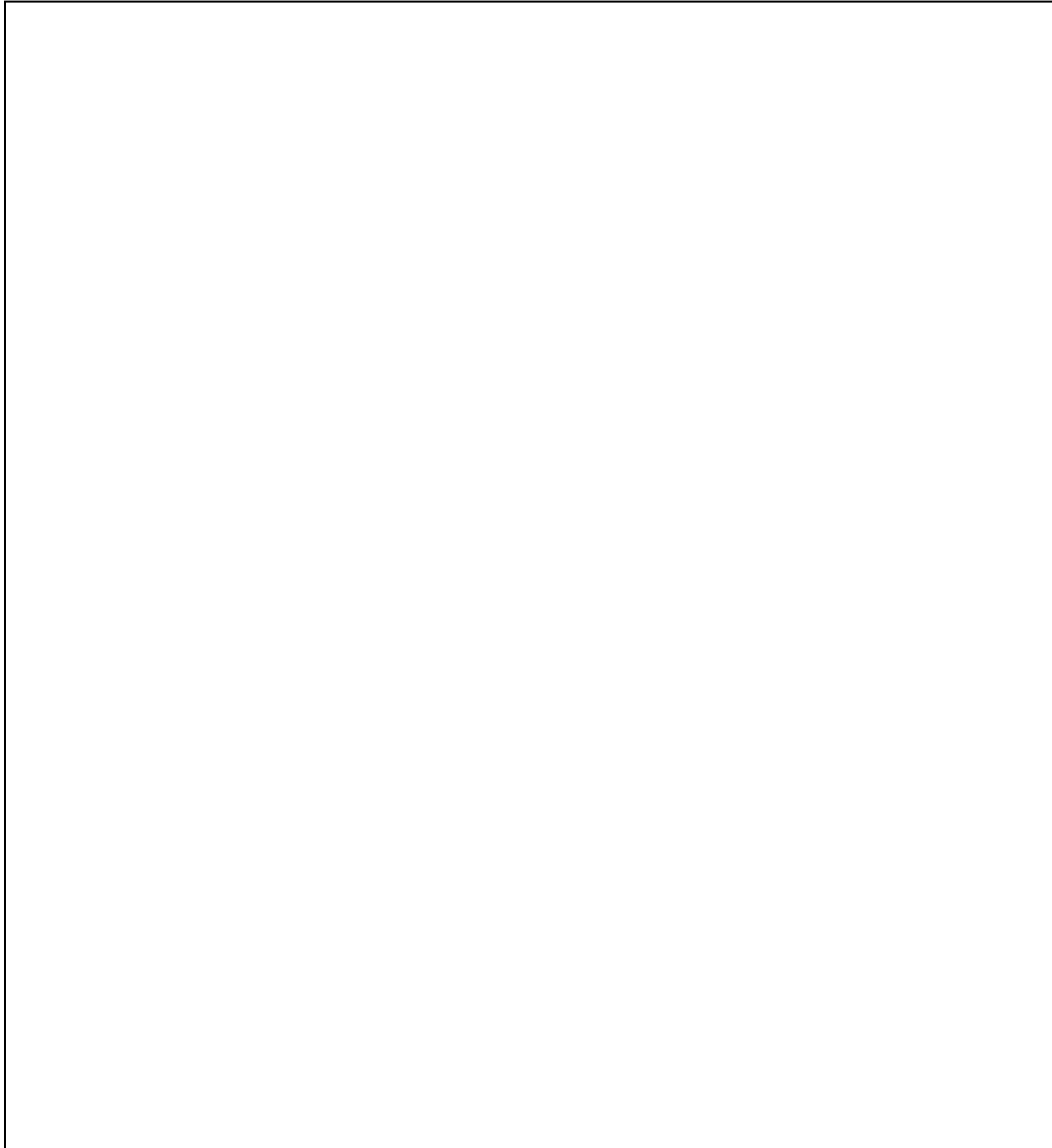
Pond-dwelling creatures have amazing adaptations to underwater life. Air-breathing adaptations take many forms. Gills serve to obtain air from the water. Fish gills are familiar, but dragonfly nymphs also have gills, along their rectal lining. While the damselfly's gills protrude like three feathers from the ends of its body, the stonefly's are tucked at the base of each leg. The whirligig beetle carries a bubble of air under its abdomen when it submerges, using this bubble as an oxygen tank. Some beetle larvae bore into plant stems to get their oxygen. Mosquitoes, in their pre-adult stage, and water scorpions breathe through tubes that penetrate the water's surface. Most salamanders use air that diffuses through their skin.

There are many methods for moving through the water. Turtles and beavers use webbed hind feet for paddling, and fish swim with swift, undulating movements. Some insects, like the predaceous diving beetles, have oar-like feet for paddling along. Most exotic are the dragonfly nymphs that draw water into their rectal gill chambers and then shoot it forcefully out of the anal pore, a kind of jet propulsion.

The pond is a special place, with suitable habitats for many kinds of plants and animals. A pond is also a beautiful place to sit in silence, to listen and to watch.

What I Think I Will See on the Field Trip

Draw pictures of the things you expect to see on the field trip in the box

A large, empty rectangular box with a thin black border, intended for students to draw their expectations for a field trip.

Lesson 4: Field Experience (Taught by WES staff at Clear Creek)

Activity One: All about the Ecosystem/living and non-living

Activity Two: Plant rubbings and sharing

Activity Three: Pond Exploration and observation/the five senses

Objectives:

1. Introduction to the Ecosystem and the difference between living and non-living things.
Participation in a hunt for the different categories in an Ecosystem.
2. Exploration of surrounding area for leaves to create leaf rubbings.
3. Observe the pond and its inhabitants using three of the five senses.

Time

30 minutes – Ecosystem talk and hunt

20 minutes – Plant rubbings and sharing

10 minutes – Picture the Pond with your ears

40 minutes – Poking Around the Pond

There are more activities than time so that the naturalist/ teacher has options for the Field Lab

Materials

White tubs

Small nets

Large kick net

Two way viewers

Large bucket

Crayons, clipboards, and paper for rubbings

Handkerchief and items for "Duplication"

Advanced Preparation

Collect the items for Activity Two "Duplication" (see below) and put the tubs, nets, magnifiers down by the pond.

Procedure

The WES naturalist/teacher will lead the 4 following activities.

Activity One – Ecosystem talk and hunt

The children will sit in a circle and the naturalist will explain the four categories involved in creating an ecosystem. The naturalist will show four different materials that go into each category. The children will then go off in groups (with an adult leader) to find one item to put into each group.

Activity Two-- Plant Rubbings

Give the students paper and crayons for making rubbings of rocks, grasses, ferns, sticks, etc. Demonstrate how to make the rubbings by placing the paper over the rock, stick, or plant leaf and rubbing the crayon on the paper. You will need a hard surface underneath leaves, needles, or other soft materials in order to do the rubbings. Each student should do at least three rubbings using a variety of objects. If students are absent from the trip, have adults or children make extra rubbings for those who are absent to include in the class mural. Have the students or the adults write their name on the back of their rubbing, then collect all rubbings.

ACTIVITY Three – Picture a Pond with Your Ears

Upon arrival at the pond, all should sit quietly together, close their eyes, and concentrate on listening. Hold up one finger for each different sound heard. When most children have five fingers up, tell them to open their eyes. Discuss the sounds, identify them if you wish, and why they were or were not typical pond sounds. Which sound did they like the most/the least?

ACTIVITY Four – Pond Exploration

Start out by carefully explaining your “oks” and “not oks” at the pond. Give out one bucket to each group of children and instruct them to fill it with pond water. Then, within your preset limits, they should find, observe, and possibly collect pond animals from each of the four habitats and put them in the bucket. Watch to see if the collected creatures stay on the surface, swim through the water, or walk along the bottom. Using a pond guide, you and the children could try to identify what was collected.

Optional

If the class has already studied the classification of animals (fish, amphibians, mammals, birds, reptiles, insects), the naturalist may have the students record all the animals they can see or hear and place them in one of the categories.

What I Saw on the Field Trip

Draw pictures of the things you actually saw on the field trip



Lesson 5: *Assessment/Review*

Objective

Students will demonstrate their knowledge by adding their drawings and rubbings to the mural in class.

Time/Setting

30 to 45 minutes; Classroom

Materials

Mural
Scissors
Crayons or marking pens

Subjects

Science, language, art

Vocabulary

Pond, open water, surface film

Advanced Preparation

If the students were unable to do activity four and five on the field trip, have them share their experiences and complete their journal in class.

Procedure

1. Have the students roughly cut out their rubbings that they made on the field trip.
2. Add the large features of the pond you visited to the mural on the bulletin board (things the students could not have made rubbings of such as the hillside, large trees, water, clouds, sun, etc.). Tell them that the bulletin board is a representation of the pond they visited. Ask them to identify the things you have added to the picture and label them.
3. Remind students that they have taken rubbings of some other things found around their pond. Ask them what those things are. As students respond, have them hold up their rubbings of the things that have been identified. Ask one student at a time to bring his/her rubbing(s) up to the bulletin board and decide where it/they should go in the pond mural. Staple the rubbings to the bulletin board.
4. Have the students list all the animals that they saw at the pond and make a list on the board. Have each student pick an animal and draw it on a half sheet of paper. When they are finished, ask them where the animal was found in the pond (surface, edge, bottom, open water). Add these to the mural.
5. If there is time, let the students draw a picture of the pond with their favorite pond animal or plant in the appropriate location. This picture can be added to their journal.

My Favorite Animal

Draw a picture of the pond with one or more of your favorite animals.

