

# Investigation Three – Terrariums/Aquariums

<b>Standard II</b> Students will understand that organisms depend on living and non-living things within their environment.
<b>Objective 2</b> Describe the interactions between living and non-living things in a small environment.
<b>Intended Learning Outcomes</b> 1. Use science process and thinking skills 4. Communicate effectively using science language and reasoning.

**Standard II**  

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**Objective 1**

## Background Information

Your students will become excited and engaged as they observe and care for small creatures such as crickets, meal worms, pill bugs, earth worms, snails, fish, etc. Many of these fascinating creatures can be easily obtained and kept in the classroom. Information and suggestions for some of these creatures are provided on the Creature Information Pages. Read through these sheets and choose a creature for your classroom.

Terrariums and aquariums can be made in many different ways using a variety of materials. See the Terrariums and Aquariums pages for ideas on using terrariums and aquariums with your class.

## Pre-Assessment/Invitation to Learn

This activity can be a brief observation of small organisms, or it could be expanded and developed into a much longer discovery activity (see Background Information and Curriculum Extensions).

Choose a small creature for your students to observe. One creature for each pair of students works well. The whole class could observe the same kind of creature or different creatures could be provided for each team. Some creatures, such as crickets, may need to be placed in a zip-lock bag or a clear plastic petri dish. If using a zip-lock bag, use a straw to inflate the bag and then seal it closed.

Have students use a hand lens to make close observations of their creatures. Students should use a ruler to make measurements and carefully record their observations using notes and drawings. Encourage students to write down what they think they know about their creature and what they would like to learn (see Creature Observations Page). Ask students to think about what non-living things and living things their creature will need in its environment to survive. List their ideas on the board and discuss ways of providing those needs for their creatures.

### Materials

- Small creatures
- Hand lens

## Instructional Procedure

### Materials

- Container for terrarium
- Soil
- Plants
- Seeds
- Stones and sticks
- Leaf litter
- Spray bottle

1. Before beginning, choose a method for making terrariums or aquariums (see Terrariums and Aquariums pages) and obtain materials.
2. Tell the class that they will be constructing an environment for the creatures they observed in the “Invitation Learn” activity.
3. Teams of 3-5 should work together to make one terrarium or aquarium. Depending on what kind of creatures are available you may choose to have each team make a different type of environment or each team could make the same kind of environment.
4. Ask the class to suggest what kinds of things they will need to put in the environments so that their creature will be able to survive. Have them think about what kinds of things are in the creature’s natural environment. You may want to take the class outside and look for places they think their creature might live. Students may also collect a few items such as sticks, rocks, plants, leaf litter, or soil to put in their environments.
5. Demonstrate methods you would like students to use in constructing their environments. You may want to consider having students work outside. This will make clean up much easier if dirt happens to get spilled. Otherwise, spread newspaper to protect student’s work surfaces.
6. After the terrariums are planted have students water them using a spray bottle. Make sure the soil is damp, but not soggy or muddy. If the soil is too wet, leave the lid open for a day or two to let it dry out.
7. Place a few dry leaves or leaf litter in the terrarium along with small stones and a few small sticks.
8. Place the completed terrariums under grow lights or in a bright place in the room. Do not place the terrariums in direct sunlight as they may overheat and harm the plants.
9. In a few days, after the terrariums have stabilized, it’s time to add the creatures. Before adding creatures, make sure all openings that may be used as escape routes are closed.
10. During the following weeks teams should make and record observations (see Terrariums and Aquarium Observation page). Allow teams to share their observations about the interactions between the living and non-living things with the class. Discuss what is happening in the environments. If creatures are dying, try to discover why. Are they not getting the right kind of food? Is it too wet? Too dry?
11. Environments will need to be monitored and watered and provided with food. Additional creatures may be added to establish food chains such as grasshoppers and praying mantises.
12. At the conclusion of the activity, return any items that were collected to their natural environment and clean out the containers.

## Curriculum Extensions

*Math –*

- Students will use measurement to learn the size of their small creatures. (*Standard IV, Objective 2*)

*Language Arts –*

- Have students ask, “I wonder” questions, such as “I wonder if worms can crawl backwards?” or “I wonder if pill bugs like light or dark places?” Next, have them do activities or research to find out the answers to the questions. (*Standard VII, Objective 3*)

## Assessment Suggestions

- Use student observation sheets to determine if they understand what is happening in their terrariums.

## Resources

*Web sites:*

- [www.worldwildlife.org/](http://www.worldwildlife.org/)

## Homework & Family Connections

- Have the students make terrariums at home. Let them put plants and any small animals they want in them. Have the students write down any observations they notice happening in their terrariums each day.
- Some students may want to make an aquarium. They can put any fish and water creatures in they would like. Have the students write down any observations they notice about the fish and water creatures each day.

# Creature Observations

Name \_\_\_\_\_ Team \_\_\_\_\_

Creature Observed \_\_\_\_\_

Questions to think about as you observe your creature:

- What does it eat?
- How does it eat?
- How does it move?
- Where does it live?
- How does it reproduce?
- Is it harmful or helpful?

List the things you already know about your creature.

List the things you can learn by observing your creature.

What do you wonder about your creature?

What living things do you think the creature needs in its environment to stay alive?

What non-living things do you think the creature needs in its environment to stay alive?

Draw your creature. Measure your creature and record its size.

## Terrarium or Aquarium Observations

<b>Date</b>	<b>Plants</b> How many? How do they look?	<b>Animals</b> How many? Are there any baby animals?	<b>Changes</b> Was food or water added? Were more plants or animals added?	<b>Drawings</b>

# Creature Information

## **EARTHWORMS:**

To house a dozen or so earthworms for a few days, place them in a cottage cheese carton or similar container half filled with moist soil. A lid with a small hole punched in it will keep the worms from escaping. Earthworms like cool temperatures. If kept in the refrigerator, they will live for several weeks. (Just be sure to label the container.)

A breeding colony can be maintained in a larger container, such as a plastic tub, an aquarium, or even a large bucket. Soil mixed with leaf litter, compost, peat, sawdust, or cow manure makes a good medium for worms. Water the soil to keep it moist, but do not over water. Place two or three dozen earthworms on the surface and they will burrow into the soil. Add a thin layer of leaf litter or shredded newspaper to help reduce moisture loss.

Small amounts of food should be added to the surface. Earthworms will consume almost any kind of organic debris. They can be fed shredded bits of grass, dried leaves, lettuce, and apple or potato peels. Keep the earthworms in the coolest place in the room.

## **LAND SNAILS**

Snails can be found in leaf litter, under rocks or logs, and in other damp locations. They can be kept in transparent plastic shoeboxes or aquariums arranged to simulate the natural environment. Containers will need to be covered to maintain the necessary humidity and to keep snails from escaping, but will also need some ventilation. Soil on the bottom of the container will help to maintain the humidity.

Captive snails will consume a variety of foods: lettuce, carrots, apples, or celery will meet their needs.

## **TERRESTRIAL ISOPODS (pill bugs, potato bugs):**

Land isopods live in dark moist places. They are easily collected by turning over rotting logs, boards, bricks, or rocks. To keep classroom isopods, put 3 cm of potting soil in a plastic sweater box or terrarium. Provide a dark place by setting a piece of corrugated cardboard on a few pebbles. Add a few pieces of decaying bark or wood. Sprinkle the container with water, making sure the habitat is damp but not saturated.

Feed the isopods a slice of potato, carrot, lettuce, or ripe fruit. Remove food that begins to mold. Cover the habitat with a lid that allows ventilation. You should see young in three to four weeks.

## **MEALWORMS:**

Mealworms can be purchased at pet stores and bait shops. They can be kept in a ventilated, non-cardboard container. Mealworms come with a supply of food but will need to be given additional food if they are going to be kept for a long time. Any dry cereal will work as food, either flakes, oatmeal, or bran. Your mealworms will also need a source of water. Water can be provided by placing a slice of apple, carrot, or potato in with the mealworms. Mealworms spend most of their lives in the larval stage, typically six to eight months.

## **CRICKETS**

Crickets can be purchased from most pet stores. To keep crickets for a short time in the classroom, place 2-4 cm of soil or sand in a jar or other container with a ventilated lid. Add a crumpled paper towel for the crickets to climb on and to provide hiding places. Crickets will eat a variety of foods; a slice of apple, carrot, or potato are good short-term foods and will provide the crickets with the moisture they need. Food should be replaced every day or two so it will not decay or mold.

## **FOR MORE INFORMATION**

*Classroom Creature Culture Algae to Anoles* by Carol D. Hampton; David C. Kramer (NSTA Publications)

*Animals in the Classroom* by David C. Kramer (Addison-Wesley Publishing Company)

*Terrarium Habitats* by Kimi Hosoume with Jacqueline Barber (University of California)

*The Practical Entomologist* by Rick Imes (Simon & Schuster Inc.)

*National Science Education Standard* National Research Council (National Academy Press)

# Terrariums and Aquariums

## Terrariums

### Containers

Terrariums can be made in many types of containers. Plastic peanut butter jars or similar clear plastic storage jars, clear plastic deli containers, or clear 2-3 liter pop bottles can all be used for small terrariums. Larger terrariums can be constructed in glass aquariums or plastic animal cages. To make it easy to set up and maintain, containers should have a large removable lid. A screen or glass lid for a glass aquarium works well.

### Soil

Any good potting soil can be used. Local soils may also be used. Collecting local soil for the terrarium can add a little extra in the form of seeds and creatures collected with the soil. A mixture of  $\frac{1}{2}$  potting soil and  $\frac{1}{2}$  local soil usually works well. In larger terrariums, it is helpful to add a layer of small gravel such as aquarium gravel, to the bottom of the terrarium before adding the soil. The gravel will allow extra water to drain from the soil.

### Plants

Many types of plants can be used in terrariums. The type of plants you choose will depend on what kind of light is available. If grow-lights are used, sun-loving plants such as grasses and alfalfa can be grown. If only ambient room light is available, shade loving plants will do better. Violets, strawberries and many kinds of houseplants will grow well in most room light.

Plants may either be started by planting seeds or transplanting already established plants. A good method is to collect some local plants, such as violets or strawberries, and will begin to grow and may be used as a good source by creatures that are added. Students may want to collect some seeds from local weeds and other plants to sow in their terrariums. To plant seeds, scatter them on the surface of the soil and then cover the seeds with a thin layer of soil.

### Water

The soil in the terrarium should be kept moist but not muddy. If the terrarium is not vented, very little water should need to be added. If a screen lid is used, regular watering will need to be done. Watering the terrarium with a spray bottle is easy and will leave water drops on the leaves of plants that can be used by any creatures that call the terrarium home.

### **Other**

Adding small stones and sticks can add interest to terrariums and will give creatures a place to hid and climb. Allow students to collect items to place in their terrariums. Leaf litter is also good to have in the terrarium. Many creatures, such as pill bugs, worms, and snails, will hide in the litter. Students will be able to observe the litter decompose as it is eaten by these small creatures.

### **Aquariums**

Aquariums can also be large or small and can be used to provide a home for many interesting creatures.

#### **Pond**

If you are close to a pond, or other natural, wet environments, it is simple to collect enough water and organisms to set up a pond aquarium in the classroom. About a gallon of water is sufficient. Be sure to get some of the mud off the bottom and some of the local aquatic plants and algae. If possible, collect water snails, minnows or other creatures for your aquarium. Additional water may be needed as water in the aquarium evaporates. Untreated well or spring water can be added directly to the aquarium. If tap water is being used, let it sit for 24 hours to allow the chlorine to dissipate before adding it to the aquarium.