
Environmental Scientist

Overview:

This lesson and activity are designed engage and immerse students in amphibian monitoring protocols.

Grade: 3

TEKS

Math

3.2 (C)

3.13

Scientific processes

3.2 (A, B, C, D, E)

3.4 (A, B)

Science Concept

3.5 (A)

3.8 (A, B)

3.9 (B)

3.11 (A)

Literature

The Salamander Room

Vocabulary

Amphibian

Cover Board

Diversity

Drift Fence

Fraction

Materials

Discovery Book

Q-tips

Plaster of Paris

Thermometer

Field Guides

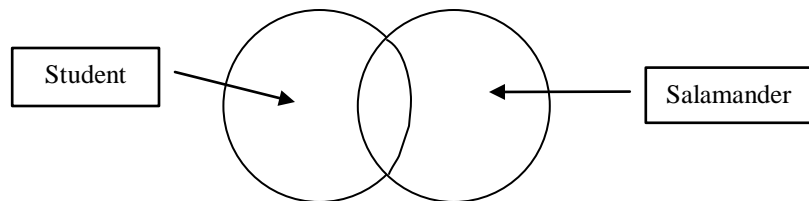
Ziploc Baggies

Toilet Paper Tubes

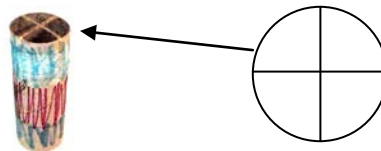
Hide and Seek

Classroom Activity

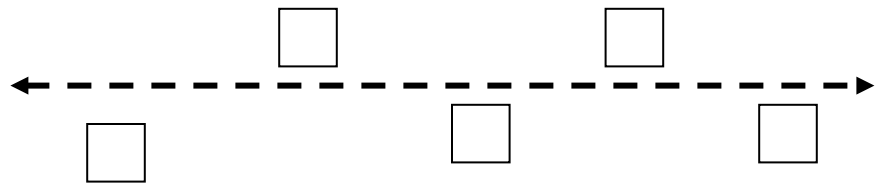
1. Begin this activity by reading Anne Mazer's *The Salamander Room*. Discuss with your students how Brian changed his room into a salamander habitat. Ask your students to make a list of all the changes Brian made to his room. On the overhead create a Venn diagram comparing and contrasting a student's habitat with that of a salamander. What resources do your students share with a salamander?



2. Write the word diversity on the overhead and discuss with your students the importance of diversity. What role does diversity play in an ecosystem?
3. Prior to investigating your local environment, your students will need a tool to help them determine the percentage of canopy cover. The "canopy tool" pictured below simply divides the view into fourths.



4. On the end of a toilet paper tube tape 2 pieces of string at right angles. Punch two holes on the opposite end and attach enough string to wear the "canopy tool" around your neck. Decorate and you are ready to begin evaluating your canopy cover.
5. There is a relationship between the percentage of canopy cover and the diversity of your environment. The "canopy tool" will help your students determine the percentage of canopy cover in your diversity study area. Use the analogy of 4 quarters equals one dollar to reinforce the concept of quarters. Three quarters equals 75 cents or 75 percent.
6. To use the "canopy tool", at a specific location in your study area point the tube toward the sky (caution students to not point toward the sun) and count the number of quadrants that contain canopy of surrounding trees. If 3 sections contain canopy and 1 section contains sky we conclude the location is 75 % covered by the canopy. Ask your students, "What is the relationship between percentage of canopy cover and the diversity of plants and animals in your local environment?" Try a "canopy walk" around your school. Stop at specific points and ask your students to determine the percentage of canopy cover. Use the Canopy Cover resource page at the end of this lesson to help your students understand the concept of percent.
7. Your local community (wooded parks, undeveloped land and riparian zones) contains many excellent places to monitor animals. The problem is many animals are nocturnal and they like to hide. The next five sections will illustrate inexpensive ways to monitor the diversity of animals in your local ecosystem.
8. Cover boards are one of the easiest ways to begin a monitoring project. A variety of materials will work as a cover board. Pictured below a 2' x 2' piece of plywood is used as a cover board. Remove any leaves and place the board directly in contact with the soil. This is an excellent method to use with elementary students. Select an area to monitor and set your boards in a specific pattern. For example, place your numbered cover boards along a line that crosses different habitats or concentrate your cover boards close to a small pond/creek. *Cover boards are an excellent way to monitor amphibian activity, but snakes like to hide under cover boards too. Be careful!*

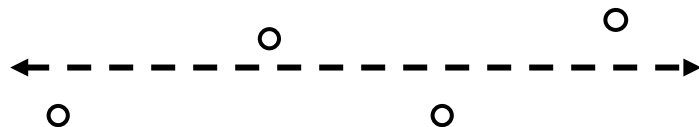


9. Regular inspection of the cover boards is not necessary and any animals under the boards will survive.
10. A drift fence is another technique used by scientists to monitor animals. However, this trapping method *does* require daily monitoring. Drill holes in the bottom of a 5-gallon plastic bucket and slots along the side to receive the boards. Notice in the picture below how the

boards extend into the bucket. Dig a hole deep enough so the bucket is level with the surface. Place a wet sponge in the bucket for any animals that fall into your trap. A drift fence in open sun will need a cover to shade any animals trapped inside the bucket.



- Tree frogs are another elusive amphibian. A short piece of PVC makes an excellent tool for monitoring. Purchase 8 feet of 1.5 diameter (Schedule 40) and cut in half. Like the cover boards, select a transect that covers several different habitats. Place a small piece of wood over the end of the PVC and drive the PVC into the ground about 1 foot. A small flash light will expose any animals hiding inside your PVC pipe. Record your observations. The absence of frogs is just as important as finding one too!



- A tracking pit is another excellent way to monitor the diversity of animals in your study area. Select a site and rake away the leaves to expose the soil. Build a frame to outline the perimeter of the tracking pit. The frame pictured below is built with 1"x 1" pine 3.5 feet long and assembled with drywall screws. Using screws makes it simple to assemble the frame in the field and easily disassemble at the end of your monitoring season. Pour the sack of "play sand" in the middle and level the sand. Soak a Q-tip in the juice from tuna fish and place in the center of the tracking pit. Return the next day to inspect the pit for animal tracks. Use Plaster of Paris to make a cast of your animal's track.



- Close the lesson by discussing with your students different experiments they can conduct using the different monitoring techniques discussed. Will we find more animals in areas with greater canopy cover? Which bait attracts more animals to the tracking pit? I idea is to get

your students asking a lot of questions. Write each question on the overhead. Help your students design an experiment for one or two of their questions. Below are several more questions to help your students start asking questions.

- Why should we monitor the diversity of our forests?
- Why are amphibians an important animal to monitor?
- What criteria do we use to determine the location of the traps?
- Why are accurate environmental records important?
- Why is it important to use a standard data collection procedure?
- How does "recorded" data help us better understand our environment?
- How do environmental scientists use observable environmental data?
- What amphibians and reptiles live close to our school?
- Does the shade make a difference?

In the Field

Hide and Seek

1. Prior to leaving your school make sure you have the following items. The day before your field trip, a parent or teacher will need to set-up the traps Eastman Nature and Wildlife Habitat Center.
 - Discovery Books
 - Ziploc Baggies (1 gallon size)
 - Pencils (inexpensive mechanical pencils are excellent)
 - Canopy Tool
 - Plaster of Paris
 - Water
 - First Aid Kit
 - Sack Lunch or light snack
 - Camera
 - Backpack
2. Before getting on the trail, remind students their observations and data collected will be used back in the classroom to create charts and graphs of their observations.
3. Set your behavior expectations before leaving the parking lot. Explain how students are to behave along the trail and in small groups. State specifically what behaviors you want to see along the trail. Remind students the higher their voices are the less likely they will see wildlife along the trail.
4. Distribute Discovery Books to students and record weather data observations. Teachers a gallon size ziploc baggie make an excellent container for pencils and Discovery Books during lunch or at the end of the day.
5. Walk through the gate and follow the trail. Remember to go slow and listen to your student's observations along the trail.
6. If you have enough adult supervision, divide your class into two groups. Have each group go in opposite directions along the trail. This will help reduce the noise level and also give your students an opportunity to share their observations when the class comes together at the halfway point. This is a good opportunity reinforce the idea that scientists share data too.

Post Eastman Activities

Hide and Seek

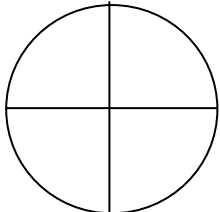
- Discuss your class' experiences at the Eastman Nature and Wildlife Habitat Center.
- Set up a monitoring area at your school and compare your data with the data collected at the Eastman Nature and Wildlife Habitat Center.
- Write a narrative about their experiences at the Eastman Nature and Wildlife Habitat Center.
- Have your students create charts and graphs of the data they collected while at the Eastman Nature and Wildlife Habitat Center. Compare the Eastman data with data collected at your school. Have your students draw conclusions about their observations.
- Invite a Biologist to visit your classroom and discuss the importance of monitoring amphibians.
- Students create an "Environmental Report" based on their Discovery Book observations.
- Write a Haiku about amphibians.
- Create bar graphs at home or in the Computer Lab. Use the data collected in the field to compare and contrast your school's environmental observations with that of the Eastman Nature and Wildlife Habitat Center 's.
- Student produced books about their observations.
- Set-up a monitoring station and monitor your school's diversity of animals for one year.

Canopy Cover

Look through the canopy tool and determine which quarters contain the tree's canopy. With a pencil, shade in the quarters containing canopy and convert to percent.

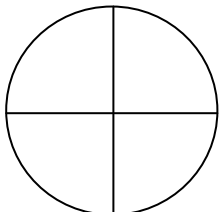
1 quarter = 25% 2 quarters = 50% 3 quarters = 75% 4 quarters = 100%

Site #1



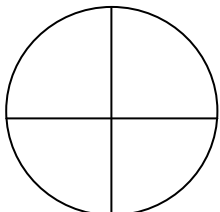
equal to _____ %

Site #2



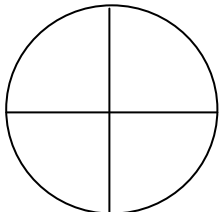
equal to _____ %

Site #3



equal to _____ %

Site #4



equal to _____ %

Resources

Publications

The Salamander Room by Anne Mazer

Peach and Blue by Sarah Kilborne

Field Guide for the Eastman Nature Trail by Eric L. Taylor, Ph.D

Nature Drawing: A Tool for Learning by Leslie Walker

Field Guide to Animal Tracks, by Olaus J. Murie from the Peterson Field Guide Series

Tracks and Trailcraft by Ellsworth Jaeger

Animal Tracks and Hunter Signs by Ernest Thompson

The Golden Nature Guide Series

Publisher: Golden Press, c/o Western Publishing Co., Racine, WI

- *Golden Guide to Birds*
- *Golden Guide to Reptiles*
- *Golden Guide to Mammals*
- *Golden Guide to Flowers*
- *Golden Guide to Trees*

Web Pages

Acorn Naturalists

<http://www.acornnaturalists.com/store/>

East Texas Herpetological

<http://www.eths.org/>

Frog and Toad Calls

<http://www.naturesound.com/frogs/frogs.html>

Herps of Texas

<http://www.herpsotexas.org/>

Herp Care

<http://anapsid.org/>

USGS

<http://www.usgs.gov/>

Tennessee Amphibian Monitoring

<http://www.state.tn.us/twra/tamp/tamp.html>

Texas Amphibian Watch

http://www.tpwd.state.tx.us/learning/texas_nature_trackers/amphibian_watch/