Science Concept: Ecosystems  
Unit Title: Ecosystems  
Grade Level: Third  
Time: Total of 2 hours over three days

PURPOSE: The purpose of the unit is to teach the students the basic components of an ecosystem and why living things survive in some ecosystems and not others.

DRIVING QUESTION: What is an ecosystem and why living things only survive in certain ecosystems?

UNIT OBJECTIVES:  
The student will:  
• Identify what an ecosystem is and what makes up an ecosystem.  
• Collect data representative of living and nonliving things in our ecosystem.  
• Observe and characterize behaviors of beetles to decide where they may live.  
• Look at organism characteristics to determine the ecosystem suitable for an organism.

STANDARDS:  
National Standards  
A. Science as Inquiry  
• Abilities necessary to do scientific inquiry  
• Ask a question about objects, organisms, and events in the environment.  
• Plan and conduct a simple investigation.  
• Employ simple equipment and tools to gather data and extend the senses.  
• Understanding about scientific inquiry

C. Life Science  
• Characteristics of organisms  
• Organisms and environments

State Standards  
3.2. Inquiry and Design
4.C Recognize and use the elements of scientific inquiry to solve problems.
   • Generate questions about objects, organisms, and/or events that can be answered through scientific investigation.
   • Conduct an experiment.
   • State conclusion that is consistent with the information.

3.3. Biological Sciences
4.A Know the similarities and differences of living things.
   • Identify life processes of living things (e.g. growth, digestion, reaction to environment)
   • Know that some organisms have similar external characteristics; and that similarities and differences are related to environmental habitat.
   • Describe basic needs of plants and animals.

4.C Know that characteristics are inherited and thus, offspring closely resemble their parents.
   • Identify characteristics for animal and plant survival in different climates.

LESSON ACTIVITIES:

Day 1 (60 minutes)
Materials
• Clipboards and pencils
• Collection bags
• Question and sample exploration sheet
• Exploration sheet
• Living and nonliving things handout

ENGAGE

The PST will:
1. Tell the students to take a clipboard and have a seat on a designated area on the floor.
2. Explain to the students that we are going to be learning about ecosystems in the next few days. Tell them that today we are going to explore their ecosystem.
3. Pass out bags. Ask students to prepare to go outside. They will need their coats, clipboards, question and data sheets, collection bags, and a pencil.
4. Place the students in pre-assigned groups of three.
5. Lead the class to designated area in the woods outside the school at the edge of the playground.
6. Tell the students to collect items from the surrounding ecosystem or area and record them on their sheet. Tell them they may refer to the sample handout for recording data.
7. Circulate between groups to direct, if needed, and assess data collection.
8. Take pictures of ecosystem and the students exploring it.
9. Call students to a designated area to examine the data they collected.
10. Ask students to separate living and nonliving things.
11. Ask what makes items a living and nonliving thing. Ask for characteristics of living and nonliving things. Conclude that the differences between living and nonliving things are that living things or organisms grow, develop, and reproduce or make more of their own kind. Nonliving things do not do these things.
12. Ask why they think living and nonliving things need to interact or work together. Ask the students how living and nonliving things interact or work together in this area. (Answers should be directed to describe how living things need water to survive, trees for homes, plants and other organisms to eat, plants need soil to grow, etcetera.)
13. Ask the students what they think an ecosystem is. Remind them to look at all the data they have collected in one area.
14. Ask what a habitat is (a living thing or organisms home).
15. Ask if the students have ever witnessed a lot of the same organisms in an area? Give examples such as colony of ants, herd of deer, or a flock of geese. Explain that they are called a population.
16. Ask what makes up their community? Ask if a tree can be a community? Ask for examples of things that live in a tree. (Want students to present examples of single organisms; a squirrel, and populations; ants.) Conclude that a community is made up of all the living things in an area.
17. Return collected items to the wooded area then return to the classroom.
18. Distribute the Living and Nonliving Things sheet and the Mealworm Beetle information sheet. Assign for homework: Find 5 or more living and nonliving things around your home and read the Beetle information sheet.

DAY 2 (30 minutes)

Materials
- 9 Petri dishes
- 9 dark clothes
- 18 mealworm beetles
- 18 beetle cut outs
- 18 soft tip paint brushes
- A piece of dark and light felt
EXPLORE

The PST will:
2. Place students in pairs. (The students beside each other)
3. Tell students that we are going to be observing or watching mealworm beetles.
4. Distribute 1 Petri dish with 2 beetles in it to each pair.
5. Allow the students to observe the beetles for a moment.
6. Demonstrate to the students how to gently use a paint brush to touch and stimulate beetles. Distribute paintbrushes to students.
7. Ask the students what the reaction of the beetles is when stimulated. (Want students to conclude that they like to run and want to hide.)
8. Ask students when they play hide and seek, where the best hiding spots are. (Characterize that the best places are dark.)
9. Ask the students how we could find out if beetles would rather hide in the light or dark.

EXPLAIN
1. Ask the students how we can test whether the beetles like to be in the light or dark. (Want to lead students to respond that covering half of the dish with something.)
2. Ask two students to distribute a piece of dark cloth, the dark/light handout, and 2 paper beetles to each pair.
3. As the students are distributing the materials, hang up the dark and light cloth.
4. Explain that they are to record by writing on a piece of paper whether their beetle is in the light or the dark every twenty seconds for the length of one minute. Make sure the student understands to write dark if the beetle is under the cloth or light if it is out in the light or not under the cloth.
5. Tell the students to cover half the Petri dish with the dark cloth and observe their beetle’s behavior. When the PST says “time” record where the beetle is located. (write down light or dark)
6. Tell the students to move the cloth to the other side of the Petri dish. Record the position of the beetle when the PST says “time”.
7. Repeat step 6.
8. Ask the students to look at their data and determine where their beetle prefers to be; in the light or the dark. If they are not sure, tell the students to decide by the number of dark and light words they have written. The word written most often will give them the information needed.
9. Have the students place their paper beetles on the felt that represents what their data has told them or what their beetle prefers.
10. Ask the students what kind of habitat the beetles would benefit from or survive best in based on the evidence compiled or collected.
11. Ask why living things live where they do. If time allows, ask students to give other examples of a living thing’s characteristics and what type of ecosystem is best for it.
12. Distribute the ecosystem handout listing the characteristics of a desert, wetland, rain forest, and oak forest. Assign reading the handout for homework.

DAY 3 (30 minutes)

Materials:
• 5 poster boards containing pictures of a rain forest, oak forest, wetland, and desert
• Handout with living things and their characteristics
• Scissors
• Glue

ELABORATE

The PST will:
1. Place the students in pre-assigned groups of 3. (Teacher’s pre-assigned groups)
2. Distribute to each group a poster board with pictures of 4 ecosystems and the handouts with pictures and characteristics of living things.
3. Ask the students to cut out a picture from the Living Thing’s handout, discuss its characteristics, decide which ecosystem it belongs in, and paste it to that ecosystem.
4. Remind the students that group work means that everyone in the group contributes or participates in the assignment.
5. Circulate around the room to assess the student work and offer assistance when needed.

EVALUATE

Pre-assessment – The concept interview concluded that the students were familiar with the subject but not the terms. The students interviewed knew the term habitat but not ecosystem.

Formative Assessment – The materials selected and how the student separates them into living and nonliving piles. The students’ conclusions based on the
experiment of mealworm beetles will demonstrate their understanding of why organisms live in a certain habitat or ecosystem.

Summative Assessment – The placement of the cut out organisms in the final activity will demonstrate their understanding of the characteristics needed in an ecosystem for a living thing to survive in it.

Resources:
Handouts (included)
Mealworm habitat