



3-5 Life Science

Southern Nevada Regional Professional Development Program

Bess Beetle Mini-Unit

INTRODUCTION

Young children love to get up close and learn about the animals in the world around them. Beetles are fascinating, low maintenance and safe to handle. One out of every four animals on this earth is a beetle! To begin this mini unit you simply need an inexpensive plastic container, soil, damp wood and a few beetles.

Beetles can be found in decaying logs from Texas to Florida and as far north as Canada; although they are not native to some areas in Nevada. These can be acquired through deltaeducation.com and enasco.com.

WHERE'S THE SCIENCE?

Bess beetles are part of the insect order Coleoptera, which includes over 350,000 species. They have been called by many other names such as Betsy beetle, bessbug, patent leather beetle, and passalid beetle. All beetles have hard shell-like forewings, **elytra**, which protect their soft abdomen and fragile hind wings when not in flight. The forewings are also used for protection when burrowing. Adult bess beetles are usually 4cm long, shiny black, with long grooves along the elytra, and three body parts with six legs. Bess beetles have a distinct small horn which protrudes from the head and a set of **antennae**. They have large **mandibles** used for chewing their food. They eat decaying wood, however, they prefer hardwood—oak, elm, and other deciduous trees. Beetles go through complete metamorphosis. They begin life as an egg, and then turn into a worm- like larva, then the pupa (resting) stage, and finally a hard shelled adult. When disturbed, they make a squeaking sound by rubbing their elytra against their abdomen. Bess beetles have a fascinating symbiotic relationship with a type of **mite** that acts as a

“hitchhiker” on the back of the beetle. Much is unknown about this relationship; however, there is no harm to the beetle.

MATERIALS

Student materials

- Hand lens (for observing beetles)
- Science notebook
- 2 beetles per group

Teacher materials:

- Chart paper
- Markers
- Paper towels

For classroom

- A plastic container for the bess beetle habitat containing soil, leaves, and decayed wood
- A small spray bottle filled with water
- Antibacterial soap or wipes if you don't have a sink for washing hands



PROCEDURES

Lesson One

1. Tell the students that today you have brought in an animal called a bess beetle for them to observe. Show the students the class **habitat** and ask them if they have ever seen a beetle before. Next ask them what they think they already know about beetles and chart responses.
2. Tell the students that today they will be observing a beetle closely to find out what it looks like. A beetle is an **insect**. How many legs does it have? Body parts?
3. Establish ground rules for proper handling.
4. Send students back to their tables and pass out the beetles. One beetle per group is fine, but if you can get enough beetles, two per group is much better as it allows students to compare differences among individuals.

5. As students observe, move from group to group asking the students what they're noticing. Remind them to record their observations in their science notebook. Ask them to compare the body structures on the two beetles that the group is observing. Once you have been to each group, ask them to return the beetles to the cups and leave at their group, wash their hands, and then return to the carpet or group area with their science notebook.
6. Once everyone is at the carpet area, discuss what the students noticed and add to the group chart using a different color marker to illustrate what they learned by observing. Remind them to go back to their science notebooks if they are having trouble participating in the discussion. You should also begin a question board charting any questions students generate.
7. Next introduce the book Beetles (see additional resources for ordering information) tell the students that today they were observing beetles to find out what they looked like. Open the book to the table of contents and point out the statement, "What they look like.", Tell the students that you are going to read that section and they should listen carefully to see if they can find the answers to any of our questions and also learn more about beetles. This will establish a purpose for listening.
8. When you are finished reading, discuss what they learned and add to the class chart and/or question board.

Lesson Two

1. Call the students to the carpet area and open today's lesson by reviewing what the students learned yesterday.
2. Next tell the students that they each will be recording a technical drawing of a beetle in their science notebooks. Demonstrate how to draw a beetle with the students using a large chart paper or the whiteboard. Ask the students, "If I want to draw a beetle, how many body sections do I need to draw?" Demonstrate how to draw the three main body parts that the appendages will protrude from. Ask them how many legs they observed and include these on the drawing.

Ask them if they noticed any other parts on the beetle that we did not yet include. Add the antennae, horn, and mandibles. Once complete, demonstrate how to label certain structures.

3. Instruct the students to return to their groups and begin their technical drawing. Remind them to refer back to the beetles in the cups at their groups.
4. Once everyone has completed their entry, have them date the entry at the top and write a heading such as: “What are the structures of a bess beetle?”
5. To close the lesson, ask the students to return to the carpet or group area with their science notebooks and instruct them to share with a buddy something that they learned about beetles today. Next share out whole group and add new learning to the class chart.

Lesson Three

1. Call the students to the carpet area and open today’s lesson by reviewing what the students learned yesterday.
2. Explain to students that today they observe **behaviors** of the bess beetle.
3. Instruct students to observe the **habitat** where the bess beetles are living. They should record what is in the habitat in their science notebooks. A simple sketch of the habitat might be useful for future reference. Once they are finished observing the habitat, call them to the carpet area with their science notebooks. Discuss what they noticed about the habitat. Where were the beetles when you were observing?
4. Tell the students that they will be observing the beetles in their habitat every day for one week. During this time they are to record in their science notebook where the beetles are and what they are doing. They should also include anything done to the habitat (misting to keep it moist). Sketches and further questions are also useful to include in the students’ notebooks.
5. After one week, gather the students together on the carpet and discuss their observations/findings. What have they learned about

the behaviors of bess beetles? How did the beetles interact with their habitat? What further questions do they have?

Note: Beetles are low maintenance organisms to keep in a classroom. Place the habitat in an area where students can observe daily. Beetles will reproduce by laying eggs for the children to discover; allowing them to observe the **life cycle** from the very beginning. Unfortunately, it is very difficult to maintain a reproducing colony. Beetles eat the decaying wood and plant material in their habitat. Fresh food should be placed in their habitat weekly. The soft decaying wood can be ordered through www.deltaeducation.com because it cannot be found in Southern Nevada. Beetles prefer a moist environment. You can mist the habitat daily, if needed, using the plastic spray bottle.

Extensions:

Sort questions from the class question board into three groups: questions they can investigate, questions they have to research and questions that can be answered either way. Let groups of students select a question from the class question board and set up an investigation or do research to find the answer. They can then report back to the entire class.

Additional Resources

Meadows, G. & Vial, C. (2003). *Beetles*. Carlsbad, CA: Dominie Press.
Llewellyn, C. & Watts, B. (2002). *Beetles*. Danbury, CT: Franklin Watts.

<http://fossweb.com/modules3-6/StructuresofLife/index.html>

Interactive website on organisms.

<http://lhsfoss.org/fossweb/teachers/materials/plantanimal/bessbeetle.htm>

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Information on bess beetles.

Plant and Animal Populations ISBN-10: 1-59242-524-0 Delta Science Readers

Vocabulary

Behavior: Things that animals do.

Habitat: Where an organism naturally lives.

Insect: An organism that has six legs, three body parts (a head, thorax, an abdomen), and antennae.

Life Cycle: The sequence of changes undergone by an organism as it develops from its earliest stage to the same stage in the next generation.

Mite: An organism that is often found riding along on a bess beetle.

Nevada State Standards

L5B1 Students know plants and animals have structures that enable them to grow, reproduce and survive. E/S

L5B2 Students know living things have predictable life cycles. E/S

L5C2 Students know organisms interact with each other and with the non-living parts of their ecosystem. E/S

L5C5 Students know plants and animals have adaptations allowing them to survive in specific ecosystems. E/S

L5D1 Students know animals and plants can be classified according to their observable characteristics. E/S

N5A1 Students know scientific progress is made by conducting careful investigations, recording data, and communicating the results in an accurate method. E/S

N5B3 Students know the benefits of working with a team and sharing findings. E/L

Safety Reminder:

Students must wash their hands after handling any live organism.