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ITEEA *STEL* LESSON PLAN

Lesson Title: Lesson 9. Underground Homes

STEL: Standards for Technological and Engineering Literacy: The Role of Technology and Engineering in STEM Education
KSB: Knowledge and Skill Builder

Author: EbD™

STEL Context(s): The Built Environment

Name of Course: *TEEMS Nxt Gen Kindergarten*

Intended for In-School or At-Home: In-School

Grade Level: Kindergarten

Lesson Overview: Through a hands-on experience students will gain an understanding of animals and their underground homes.

Big Idea/Purpose of Lesson: Rabbits live in warrens. Badgers live in setts. Moles live in burrows. All of these types of homes can be found underground. They keep large predators out and keep the residents safe from the weather. The habitat above the underground homes is just as important for the animals because it provides their food.

Instructional Time: One 45-minute class section

STANDARDS/BENCHMARKS

<table>
<tr><th colspan="2">Standards for Technological and Engineering Literacy (STEL)</th></tr>
<tr><td>STEL-2C.</td><td>Explain that materials are selected for use because they possess desirable properties and characteristics.
<table>
<tr><th>Cognitive</th><th>Affective</th><th>Psychomotor</th></tr>
<tr><td>Understand</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>STEL-5B.</td><td>Explore how technologies are developed to meet individual and societal needs and wants.
<table>
<tr><th>Cognitive</th><th>Affective</th><th>Psychomotor</th></tr>
<tr><td>Analyze</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>STEL-7A.</td><td>Apply design concepts, principles, and processes through play and exploration.
<table>
<tr><th>Cognitive</th><th>Affective</th><th>Psychomotor</th></tr>
<tr><td>Apply</td><td></td><td></td></tr>
</table></td></tr>
<tr><th colspan="2">Next Generation Science Standards (NGSS) Benchmarks</th></tr>
<tr><td>K-LS1-1.</td><td>Use observations to describe patterns of what plants and animals (including humans) need to survive.</td></tr>
<tr><td>K-ESS3-1:</td><td>Use a model to represent the relationship between the needs of different plants or animals and the places they live.</td></tr>
<tr><th colspan="2">Common Core Mathematics Standards (CCSS Math) Benchmarks</th></tr>
<tr><td>K.G.5.</td><td>Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.</td></tr>
</table>

Common Core English Language Arts Standards (CCSS-ELA) Benchmarks	
W7.	Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
SL4.	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and organization, development, and style are appropriate to task, purpose, and audience.

Applicable *STEL* Practices: Critical Thinking, Collaboration, Communication

Learning Objectives:

In this lesson, students will:

- Describe basic needs of plants and animals (e.g., air, water, nutrients, shelter, and light).
- Identify physical characteristics of the environment necessary for animal survival in different environments (e.g., wetland, tundra, desert, forest, ocean).
- Describe how the type of structure determines how the parts are put together (homes of different animals).
- Generate questions about objects, organisms, or events that can be answered through scientific investigations.
- Ask and answer questions about details in a text with prompting.
- Identify the main topic and retell details of a text with prompting.
- Ask and answer questions about unknown words with prompting.
- Describe familiar people, places, things, and events with relevant details and express ideas clearly (speaking).

6E MODEL LEARNING HIGHLIGHTS

eNGINEER: (apply, conceptualize, informed design, modeling, create)

Students will learn about underground animals homes. Teachers will discuss the environment, habitat creation, and scientific investigations. Students will build their own underground animal homes and share their ideas with their peers

TEACHER RESOURCES

Teacher Preparation/Procedures

1. General Classroom Prep: The laboratory should provide a flexible, resource-rich learning environment that includes areas for lecture and demonstrations, small group meetings, and research activities. The teacher will adapt the learning environment based on the requirements of the lesson. For this lesson, areas for lecture and demonstration, design, small group meetings, and fabrication activities should be readied.
2. Cut a hole in the bottom and top of a salad container making sure they are the size of a toilet paper roller. Close the lid. Insert a toilet paper roller through both holes. There should be about ¼" coming out of the top of the container and the rest should be coming out of the bottom of the container. Using a hot glue gun to secure the toilet paper roller in place at the bottom. The students will be putting dirt inside the container, so the teacher will want to make sure the glue covers any holes where the toilet paper roller was inserted. The top should be able to open and close. Do all salad containers in the same way.
3. Cut pieces of construction paper for students to use for their above habitats.
4. Cut pieces of craft foam for students to use for their animals.
5. Cut pieces of brown construction paper 12" x 9" for each student.
6. Divide the chart paper in half. Write the headings: "Aboveground Habitats—Animals"
7. Have students sit in the reading area. Ask the following questions:
    a. Have you ever seen a hole in the ground? (yes/no)
    b. Why do you think that hole was there? (answers will vary)
    c. Do you think any animals could live in the hole you've seen? (yes/no)
    d. What animals live underground? (moles, snakes, worms, ants, groundhogs, rabbits, prairie dogs, etc.)
    e. Why do you think they live underground? (protection from predators, weather, have their young)
    f. What are some natural-world items that are above ground, around those holes? (trees, grass, shrubs, rocks, etc.)
8. Ask students to look at the front cover of the book that has been selected. Have them tell you what they see on the cover. Have them make predictions about the book.
9. It is important for the teacher to asking guiding questions to help students understand what an underground home is, how it is made, what animals live there, why certain animals make soil their home, and what the different names of underground homes are (sett, burrow, warren, etc.)
10. Once you have completed the book the teacher should have the students recall the animals that live underground so the teacher can list the names on the chart paper.
11. The students should also be asked to recall what the habitats above the underground homes look like.
12. The teacher should show the students one of the salad containers with the toilet paper roller in the inside. Ask the students the following questions:
    a. What do you think the toilet paper roller could represent.? (tunnel/home for an animal)
    b. If it was an underground home, what would need to be added around it? (soil)
    c. What goes above the underground soil? (trees, shrubs, animals, etc.)
13. Explain to the students they will be adding soil around the tunnel, creating a habitat above ground, and making an animal to live in their underground home.

14. Show the students a piece of brown construction paper. Ask them what they think the piece will represent and where it will go (represent the ground above the soil). Remind them the container and toilet paper roller will represent what is underground. Once you have adequate responses place it on top of the container. Show the students how the piece covers the hole. Have the students tell you what they will need to do to uncover the hole. Show them how they will take a toilet paper roller and draw a circle in the middle of the paper then cut it out. Place the piece on top of the container. Ask them to tell you what could be made to create the habitat above the underground home. As students tell you, write their responses on a piece of chart paper. Say, "I see someone said a tree could be in the aboveground habitat. I want to make a tree, what pieces of construction paper will I need?" The teacher should make two trees of different sizes. The purpose is to demonstrate how larger trees will fall over and not stand as well as shorter trees. The "leaves" should not be larger than the "trunk." The teacher should also demonstrate how to fold the bottom of the tree and glue it to the piece of brown construction.
15. Ask the students to recall what kinds of animals live in underground homes. Write their responses on the chart paper, also. Show the students a straw and tape something onto it. Place the straw in the "tunnel" and pop it up to the top so they can see how their animals will come above ground into the habitat. Ask students why the habitat above the ground is important to the animal that lives in the underground home.
16. Have students take out their STEM notebooks and pencils. The students should write the date. Once they have written the date ask them to draw a picture of what their above the ground habitat will look like. After they have completed that ask them to draw a picture of the animal they will make to live underground.
17. Pass out the pieces of brown construction paper, extra toilet paper rollers, construction paper for habitats, scissors, and glue. As some students trace the circles on the brown construction paper, others can be making their trees, shrubs, plants, etc. While students are making their items, the teacher can have students put soil in their containers. When students are finished, have them set their habitats aside to dry. Have them clean up.
18. Pass out the foam sheets/shapes. Review the shapes. Pick up a circle and ask what part of the body it could be for their animals. Allow time for the students to make their animals. Hand out fine point permanent markers to students so they can draw the faces. As students finish up, attach their animals to straws with a glue gun.
19. Have students share their underground homes with their peers. Make sure they explain what natural-world items they made in their aboveground habitats, the name of their animal, and the one natural world item that was actually used and why it's important to underground animals. Ask students to name specific names of the types of underground homes as they are presenting (setts, burrows, warrens, anthills).

Required Tools/Materials/Equipment:

- Soil
- Toilet paper rollers—one for each child plus a couple extra ones for tracers
- Small salad bar plastic containers—one for each student
- Hot glue gun
- Glue sticks
- X-Acto knife
- Construction paper
- Straws—one for each student
- Craft foam—sheets and pre-cut shapes
- 6–8 permanent markers—fine point
- Glue
- Scissors
- Chart paper
- Marker
- Pencils
- Book—one that is about underground homes and the animals that live there
- STEM notebooks

Lab/Classroom Safety and Conduct:

- Students should use all tools and equipment safely while maintaining appropriate levels of activity for themselves and others.
- Students should demonstrate respect and courtesy for the ideas expressed by others in the class.
- Students should show respect and appreciation for the efforts of others in the class.

Student Resources:

- STEM Notebook

Enrichment/Extension

1. Read books on underground homes.
2. Read books on animals that live underground.
3. Take a nature walk and see if any signs can be found of animals living underground.

Learning Support

Work to support students who may not have well-developed speaking and writing skills by having them draw in their STEM Notebooks. They may want to describe to the teacher or learning support staff, whenever possible, what they are experiencing and understanding throughout the lesson. Provide continuous instruction in vocabulary, listening, and responding and other related speaking and writing skills. Encouragement from teachers, staff, and peers when learning new content is crucial. Provide visual and pictorial examples or include props when using new or unfamiliar vocabulary, songs, and sentence structures. Have a thematic or course Word Wall with pictures of each word beside the word. Use manipulatives an hands-on activities when introducing concepts whenever possible to reinforce topics and content. Encourage the buddy system and collaboration so that students do not feel singled out or alone when learning new concepts and content. Provide exposure to language through the continual practice and use of vocabulary, teacher read aloud, teacher talk, and emphasis on understanding and using new vocabulary regularly (Gillander & Castro, 2011).

Assessments:

The teacher will use rubrics and observation throughout the lesson to gauge student learning:

- Student Discussion
- Student Observation
- Check for Understanding
- Engineering Design Journals
- STEM Notebooks

Pre-assessment
Discussion of how caves are formed in nature.

Formative Assessment

The information students provided during group time, what they recorded in their STEM notebooks, their caves and habitats, and their sharing time can be used as an informal assessment to determine the level of student understanding of the concept of cave homes. Review and check the STEM Notebooks.

Supporting Files:

Include attachments as both Word and PDF files.
Include a Design Brief