

Lesson Plan: Bunny Burrows

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Target Grade: Kindergarten

Lesson Time: 90 minutes over 4 days (20-30 min/day)

Learning Goals:

- Students will use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

NGSS:

- K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area *
- K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- Science and Engineering Practice
 - #6 - Constructing Explanations (for science) and Designing Solutions (for engineering)
- Disciplinary Core Ideas
 - PS3.B: Conservation of Energy and Energy Transfer
- Cross Cutting Concepts
 - #1 - Patterns

Background information:

- Prior to this lesson students should have had experiences going outdoors to feel the warming effect of sunlight versus shade. In addition, students should complete their unit on animal habitats and animal adaptations.

Materials Needed:

- **Bunnies:**
 - U/V sensitive beads (30 beads for every 2-3 students, available on Amazon https://www.amazon.com/Goodlucky-Scientific-Changing-Reactive-Plastic/dp/B01LZF17AF/ref=sr_1_2?ie=UTF8&qid=1497559306&sr=8-2&keywords=uv+sensitive+beads)
 - cotton balls, wiggle eyes and gems optional (BUT SO WORTH THE TIME)
 - glue gun (low temp)
 - white pipe cleaners (1 for every 2-3 students)
- **Burrows:**
 - Kid's shoeboxes (donated from Payless Shoes)
 - styrene sheets 5x7" (thin plexi-glass sheets, one for every 2-3 students, available on Amazon) https://www.amazon.com/s/ref=nb_sb_noss?url=search-alias%3Daps&field-keywords=styrene+sheets+5x7
Optional: burrows can be made with overhead transparencies instead though they will not be as sturdy.
 - clear packing tape
 - Xacto Knife
 - masking tape (foot long strips for all groups except sunscreen)
 - painters tape (foot long strips for sunscreen groups)
 - clear transparency sheets (for sunscreen option)
 - aluminum foil (approximately 3 10x12 in sheets)
 - wax paper (approximately 3 10x12 in sheets)
 - tissues (3 or 4 Kleenex tissues)
 - small tube of waterproof lotion sunscreen (Waterbabies spf 50 or greater)
 - one set of material cards; cut apart
 - stay white, change a little, change a lot cards; cut apart

Teacher Prep:

- Print out and cut materials allocation cards to assign the groups the material they will be using.
- Print out and cut cards: stay white, change a little, change a lot.
- Build bunny burrows 1 per 2-3 students
 - cut out a 4x6 rectangle in the top of the shoebox lid
 - tape the polystyrene sheet to the underside of the lid using clear packing tape.
 - cut a “door” into the side of the shoe box (approx. 2x3” rectangle)
- Build UV bead bunnies
 - slide 8 beads on pipe cleaner near one end and twist to mak one ear (repeat for second ear)
 - slide 3 more beads on to open end to create center of the bunny’s forehead and twist up to join with the ears. Slide 9 beads on open end and create a circle that will be the outline of the bunny’s head. (see step by step below)
 - OPTIONAL: hot glue a small piece of cotton ball for bunny’s muzzle with a gem on top for the nose and two wiggle eyes.











Outer-view of bunny burrow:



Inside-view of bunny burrow:



Step by step directions for making UV bead bunnies.

<p>1.</p> <p>String 8 beads for first ear.</p> 	<p>2.</p> <p>Twist to seal first ear.</p> 	<p>3.</p> <p>Slide 8 beads For next ear.</p> 	<p>4.</p> <p>Twist to seal second ear.</p> 	<p>5.</p> <p>Add 3 beads for bunny face and twist.</p> 
<p>6.</p> <p>Add nine beads for face outline.</p> 	<p>7.</p> <p>Begin twisting upward to create face outline.</p> 	<p>8.</p> <p>Wrap excess pipe cleaner around just below ears.</p> 	<p>9.</p> <p>Twist off excess to seal.</p> 	<p>10.</p> <p>Optional: decorate bunny's face.</p> 

Lesson Sequence

20 minutes	Bunny Burrows Day One <ul style="list-style-type: none">• Have students seated in groups of 2-3.• Project or show one bunny inside his clear-roofed burrow to group.• Ask students what are some problems for the bunny with this burrow.• Have a discussion about the problems. Write student responses on the board.• Pass out <i>Bunny Burrows Day One Worksheet</i>• Have students draw a picture of the problem and fill out sentence frame about what the problem is and how to solve it.• Show students' pictures on a document camera and discuss.
20 minutes	Bunny Burrows Day Two (ON A SUNNY DAY) <ul style="list-style-type: none">• Pass out the second page of the <i>Bunny Burrows Day Two Worksheet</i>• Assign a burrow to each group of 2-3 students• Have students line up in a line IN THE SHADE!• Instruct all groups to step into the sun simultaneously holding their bunny burrows• Make observations of the effect of the sun. (Beads will change colors.)• Come inside to have students draw and label a model of what the sun did to the bunny on the <i>Bunny Burrows Day Two Worksheet</i>.
20 minutes	Bunny Burrows Day Three <ul style="list-style-type: none">• Show students each of the materials that they will have access to when building their shade structure.• Have students choose a materials card (one per group) out of a bag.• Ask them if they think the bunny will change a little, change a lot or stay white, and why.• Give instructions on how to fill out the <i>Bunny Burrows Day Three Worksheet</i> and have students draw a picture of burro with shade material.
30 minutes	Bunny Burrows Day Four (ON A SUNNY DAY) <ul style="list-style-type: none">• Build shade structures by attaching their materials to the burrow using painters tape (for sunscreen, tape a transparency sheet to the box using masking tape to smear sunscreen on so that boxes may be reused in the future).• Have groups come outside with their burrow and stand in a line IN THE SHADE• Have one group at a time enter the sun making sure the burrow is in full sun. Have all students count to 10. Optional: You can also have groups of the same shade material go at the same time and step back into the shade to compare results.• Have the group testing immediately return to the shade to remove their bunny and check results. (This process needs to happen quickly and in the shade because the beads will change back to white rather quickly)• Have everyone chant the response to the question, "What happened to the bunny?" They respond either, "It changed a lot!" or "It changed a little!" or "It stayed white!"• Repeat this for each group.• Return to class placing burrows in a line on a table.• Ask students to label your burrow with 'stay white, change a little, change a lot' cards• Parade by all the projects to look for patterns.• Pass out <i>Bunny Burrow Day Four Worksheet</i>• Have groups return to their table groups to complete <i>Bunny Burrow Day Four</i> results.• Come back together as a class and answer discussion questions.