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# Cool Crazy Cones

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## Purpose:

- In this activity, students will be introduced to cones commonly found on the forest floors of Oregon and California.

## Objectives:

### Students will:

- Label the parts of a conifer cone.
- Identify at least six cones commonly found throughout Oregon and northern California.
- Draw pictures and write descriptive characteristics of cones that are helpful for identification.
- Use a dichotomous key (Optional).
- Explain why some cones have the structures that they do after researching a specific native conifer tree (extension activity).

## Materials:

Not provided in this kit:

- Brown crayons or other coloring utensils

Provided in this kit:

- Cone scale and seed resin mold
- 2 laminated parts of a conifer cone diagram
- Box of Labeled cones (13)
- Box of Unlabeled (Numbered) cones (13)
- 1 labeled Sugar Pine cone
- 1 unlabeled (numbered) Sugar Pine cone
- Laminated answer key
- Laminated dichotomous keys (12)
- Cool Crazy Cones Student Worksheet (template for copying)

**Time Required:** 2 hours

**Appropriate grades:** 3<sup>rd</sup> – 8th

**NGSS and Common Core Standards:**

**W.3.2:** Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

**4-LS1-1:** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Supporting:

**MS-LS1-4:** Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

**W.4.1:** Write opinion pieces on topics or texts, supporting a point of view with reasons and information.



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## Activity:

<b>Introduction</b>	<p>Place the <b>unlabeled (numbered)</b> conifer cones around the room at separate stations.</p> <p>For more advanced classes/students, also place a <b>dichotomous key</b> at each station.</p> <p>Make copies of the <b>student worksheet</b> for each student or pair.</p> <p>Imagine you were a tree living in Oregon's cold, long winters with snow, and warm hot, humid summers. While most trees lose their leaves each winter (deciduous), conifer trees are green year round to maximize on resources they need to survive. Oregon is home to 30 native conifer species! This diversity can be attributed to the state's varying elevation, temperature, wind, rainfall and soil composition. Today we are going to learn about some of Oregon's conifer species, and how to identify them by their cones.</p> <p>Have a 10-minute discussion about what a conifer tree is. Ask the students the following questions to help guide the conversation (answers can be found in the background section):</p> <ol style="list-style-type: none"><li>1) How is a conifer tree different from a deciduous tree?</li><li>2) Does Oregon have more conifer trees or deciduous trees? Why do you think that is?</li><li>3) Do you know any kinds of conifer trees? If not that is ok, you will learn some in this activity.</li><li>4) What do you think the purpose of a conifer cone is?</li></ol> <p>Show them the <b>laminated parts of a conifer cone</b> diagram.</p> <p>The <b>dichotomous key</b> is for upper grades. If using the <b>dichotomous key</b>, explain to students how to use a dichotomous key.</p> <ol style="list-style-type: none"><li>1) Have everyone in the class raise their hand. Explain that you will ask a series of yes/no questions, and students should put their hand down if the answer is no.</li><li>2) Ask questions like: Do you have curly hair? Do you have brown eyes? Do you have a pet dog? Does your name start with an "A"? Continue asking questions until only one student has their hand up.</li><li>3) Explain that this line of questioning singled out one student – this is the only student in the class that answered "yes" to all of the questions. If we wanted to, we could design a string of questions that corresponded to each individual student in the class. This is an actual method that</li></ol>
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	<p>scientists use to classify plants or animals that they find. Scientists call this questioning tool a “dichotomous key.”</p> <p>Together as a class, go through the dichotomous key for one of the cones to demonstrate how dichotomous keys work. Remind students that it’s okay if they don’t figure it out correctly on the first try. Using dichotomous keys can be tricky!</p>
<b>Body</b>	<p>Break the students up into pairs and provide them with a worksheet and drawing utensil.</p> <p>Explain to the students that they will be going around to at least six cone stations. At each station they should:</p> <ol style="list-style-type: none"> <li>1) Label their worksheet with the number that is written on the cone they are studying.</li> <li>2) Use the dichotomous key to try to identify what type of conifer tree the cone came from. (If not using the dichotomous key skip this step).</li> <li>3) If they used the dichotomous key they should label their worksheet with the name of the conifer tree.</li> <li>4) Draw a picture of, and label the parts of the cone and write down three trait or marking they think would help them differentiate that cone from another cone. They are encouraged to draw specific traits outlined in the dichotomous key.</li> </ol> <p>Give the students a few minutes at each station. There are many cone samples so you can decide if you want students to visit more than 6 stations.</p> <p><b>* Stress the importance of labeling their worksheets with the #s that are on the cones. These numbers will be needed for identification later on in the activity.</b></p> <p>After they have visited cone stations, collect the numbered cones. Place the <b>labeled</b> cones around the room in no particular order (put them in different locations than their matching numbered cones).</p> <p>Explain to the students that they will now be using their drawings and chosen traits/markings to go around the room and see if they can locate the cones they observed, and check if they correctly identified the cones using a dichotomous key.</p> <p>If you did not use a dichotomous key for the activity, students can still go around the room to see if they can find the name of the cones they observed by using their drawings and chosen traits/markings.</p> <p>Have them circle the trait/marking that most helped them identify their cone.</p>
<b>Closure</b>	<p>Come together as a class and have a discussion on what a conifer cone is. Have students think-pair-share with a neighbor what a conifer cone is. Have them also share what traits/markings were most helpful for them.</p>



	Why do they think the cone has these traits/markings? What purposes do the parts of the cone serve? Was the dichotomous key helpful?
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## Extension:

Have each student research one conifer tree they are interested in learning more about. Using field guides, the internet, and other resources, have them research questions such as: Where does my tree species live? What habitat does my tree thrive in? What adaptations does the cone have to survive? What purposes did the traits/markings of the cones serve? What other characteristics does my tree have? (needles per bundle, needle length, bark texture, bud shape, etc.). Have the students write a paper and draw a photo of their tree.



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