

Name \_\_\_\_\_

# STEM Bonsai

## ***What does a bonsai need to survive?***

**Objectives:** Students will:

- Explain the process of photosynthesis.
- Hypothesize how environment affects plants.
- Create a bonsai tree sculpture.

## **Introduction**

All living organisms have basic needs that need to be met in order to survive: water, light, air, nutrients, and space to grow. Bonsai trees need all of these elements to survive, yet they do so in a very limited space. Today with your class, you will explore the differences and similarities between full-sized trees and bonsai trees.

## **Activities**

1. Find an example of a bonsai and look at it carefully. Any plant with a woody trunk can become a bonsai, yet certain species are preferred over others. For the species listed below, do you notice any patterns or trends? Do trees from the same species look the same or different? Think of size, shape, species, etc.

	<b>Patterns among trees?</b>	<b>If so, explain what patterns you saw</b>	<b>Other observations</b>
<b>Junipers</b>			
<b>Pines</b>			

<b>Maples</b>			
<b>Yews</b>			

**2. Full-sized Trees vs. Bonsai Trees**

Find a bonsai that is a species you are familiar with. Does the bonsai version of the tree look similar to the full-size tree?

Species:

Similarities:

Drawing of the bonsai:

**3. Full-sized Leaves vs. Bonsai Leaves**

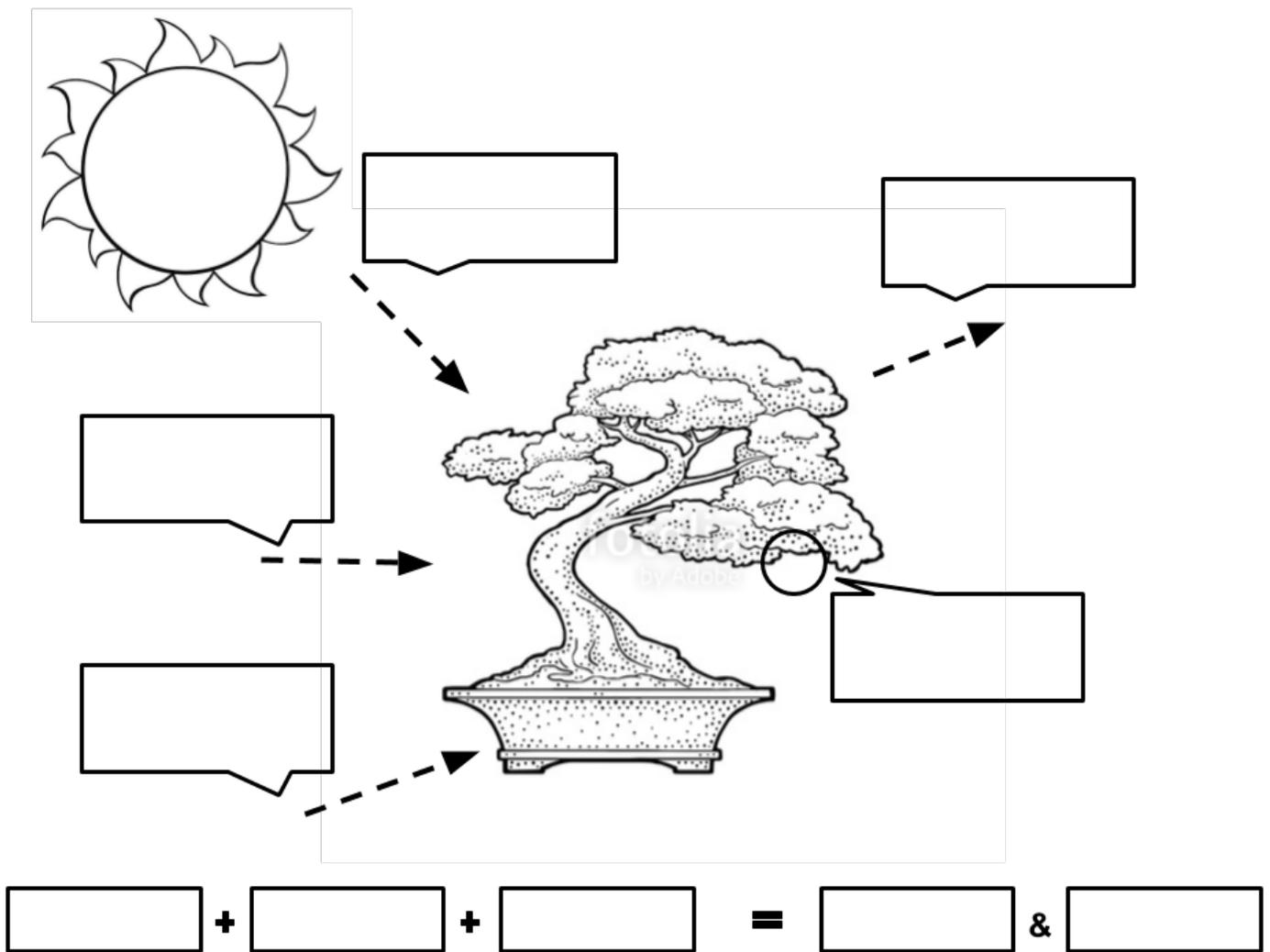
Using photos of bonsai and regular trees, compare leaves of full-sized trees to bonsai. How are they the same? How are they different?

**Similarities:**

**Differences:**

**4. Photosynthesis**

Bonsai, like all plants, use photosynthesis to make food. Label the diagram below to show how a bonsai creates food using photosynthesis. Use the Word Bank to fill in the diagram. All words should be used once in the diagram and once in the equation.



**Word Bank**

**Sunlight    Carbon Dioxide    Water & Nutrients    Sugar    Oxygen**

## **5. Water**

How does a tree in nature get water?

How does a bonsai tree get all the water it needs to survive?

## **6. Nutrients**

How does a tree in nature get nutrients?

How do you think a bonsai gets all the nutrients it needs? Talk to a museum staff member or look for evidence of how the bonsai plants get more nutrients.

## **7. Conclusion**

How are the basic needs of a bonsai similar to a tree found in the wild? How are they different?

## Teacher's Resources

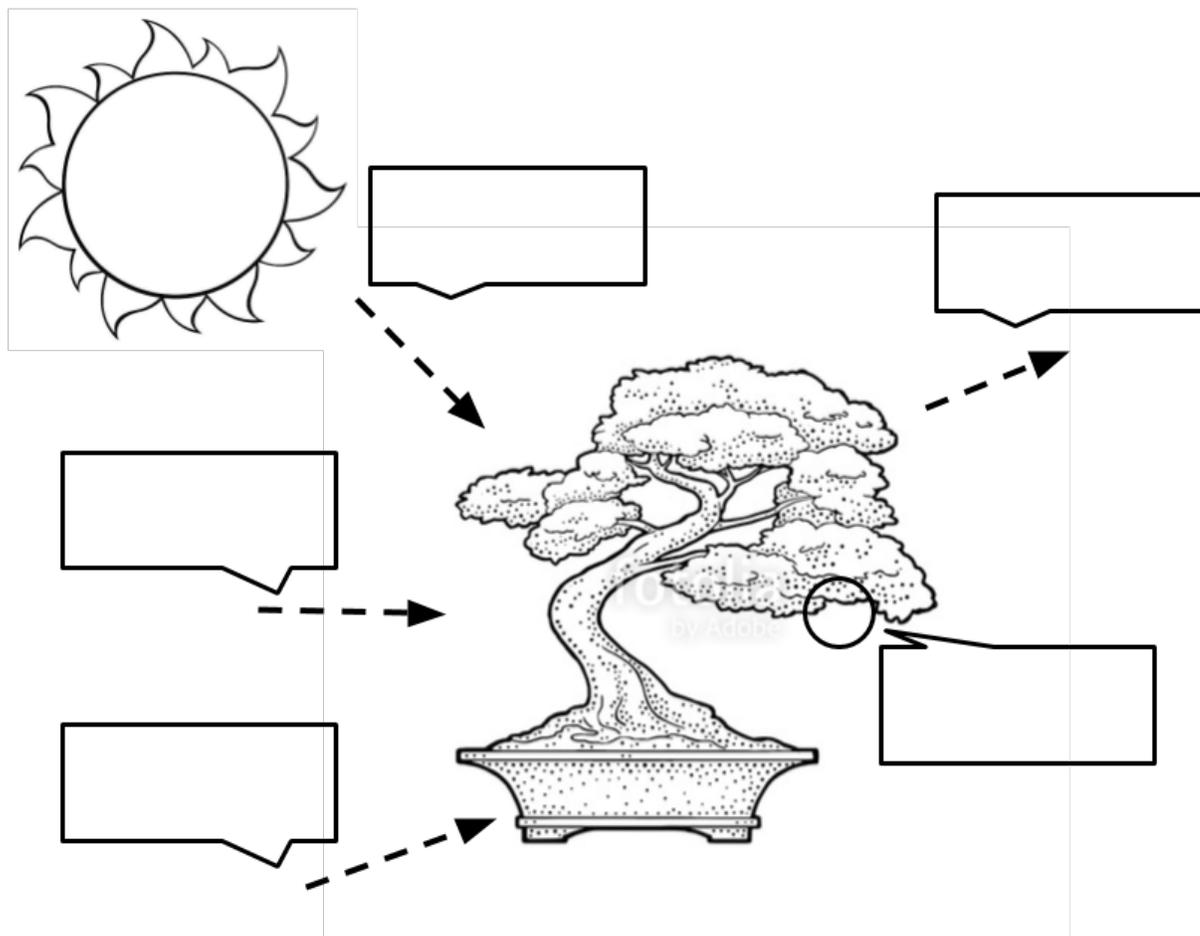
Field trips at Pacific Bonsai Museum are self-guided. Students and their chaperones can move at their own pace. We recommend that teacher's review all activities in advance to determine what is best for their students. The tasks on this worksheet build on skills learned in the classroom, such as:

- Photosynthesis
- Effects of environment on plants

## Post-Visit Activity

### Supplies Needed

- Poster paper



[ ] + [ ] + [ ] = [ ] & [ ]

- Markers

## **Activity**

In groups, reflect on your visit to Pacific Bonsai Museum. Create a poster that shows:

- Similarities between bonsai and full-sized trees.
- Differences between bonsai and full-sized trees.
- How living in a pot affects a tree.
- What a plant needs the most to survive and why.

## **Standards**

### **NGSS**

- 3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.
- 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- 5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.

### **Common Core State Standards**

#### **ELA/Literacy**

- RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS4-3)
- RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-3)
- RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS4-3)
- W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS4-3)
- W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-3)
- SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS4-3)
- RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-LS1-1)
- RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1)

- W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1)