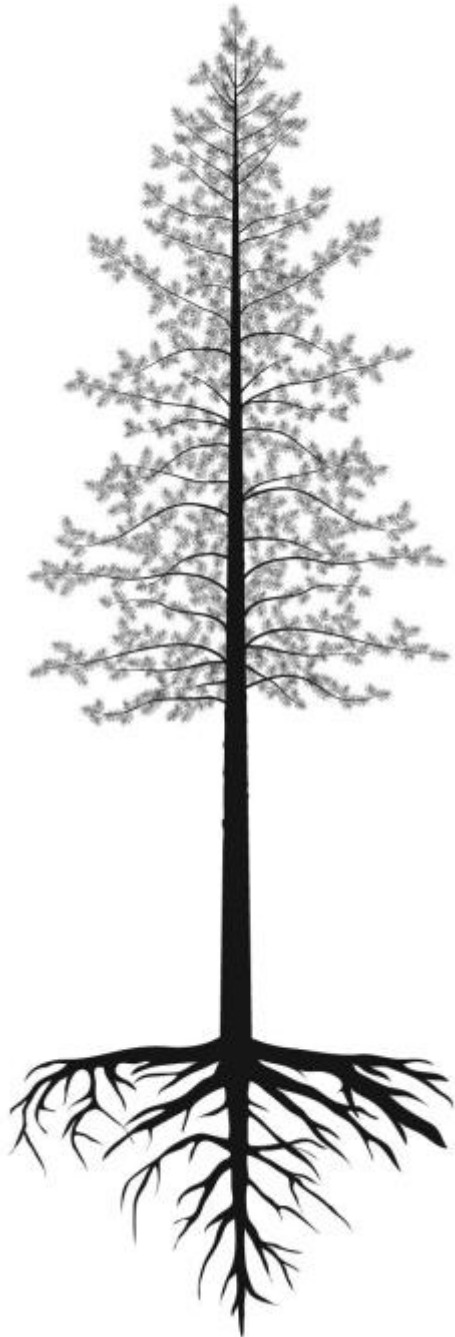


## Activity 6.1: Lodgepole Pine Worksheet

Draw and label arrows that represent the molecules that carbon atoms are in as they move into, through and out of the Lodgepole Pine as it moves and grows.

Label each arrow to show the kind of molecules that the carbon atoms are in: large organic molecules (LOM), small organic molecules (SOM), or carbon dioxide (CO<sub>2</sub>).



Four things that Lodgepole Pines need to live and grow are water, soil nutrients, air, and sunlight.

What happens to *water* inside the pine:

What happens to *soil nutrients* inside the pine:

What happens to *air* inside the pine:

What happens to *sunlight* inside the pine:

## A. Investigating how Lodgepole Pines grow and function

A class is investigating how Lodgepole Pines grow. The teacher asks the students, "Where does most of the mass of a Lodgepole Pine come from?"

a. Three students shared their ideas about what happened. Do you agree or disagree with what each student claims?

Agree	Disagree	Trevor: "I think a growing Lodgepole Pine gains most of its mass from nutrients in the soil."
Agree	Disagree	Jasmine: "I think a Lodgepole Pine gains most of its mass from gases in the air."
Agree	Disagree	Jin: "I think a Lodgepole Pine gains most of its mass from the sunlight."

b. Provide an explanation. Why did you agree or disagree with each student's claim that you did?

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c. The class does an experiment to investigate how Lodgepole Pines grow. They started by selecting six **identical** pines. Three of those pines were grown in regular soil. The other three plants had extra soil nutrients added to the soil in the pots. They put all six pines under **identical** conditions (i.e., the same light conditions, the same watering conditions) and let them continue growing for one month. At the end of the month, the class weighed each of the six Lodgepole Pines and recorded their weights in the table below. They also recorded the weight of the soil nutrients added to three of the pots.

Lodgepole Pines with regular soil		
Plant	Mass of nutrients added (grams)	Mass gained by plant (grams)
1	0	86
2	0	85
3	0	84
<b>Average</b>	<b>0</b>	<b>85</b>

Lodgepole Pines with regular soil plus soil nutrients		
Plant	Mass of nutrients added (grams)	Mass gained by plant (grams)
4	3	138
5	3	131
6	3	137
<b>Average</b>	<b>3</b>	<b>135</b>

Whose idea do you think is best supported by the data? (Circle one choice.)

- a. Trevor's
- b. Jasmine's
- c. Jin's

Explain how the patterns in the data support the claim that you chose.

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d. What additional evidence would you collect to help you show that the claim you chose is the best claim?

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**B. A question about how Lodgepole Pines grow and function**

The dry wood from a large Lodgepole Pine can weigh 11,000 pounds. Where do you think the dry wood of a Lodgepole Pine comes from? Select True or False for the following statements:

- T F Some of the dry wood is *created by the tree*.
- T F Some of the dry wood *comes from the air*.
- T F Some of the dry wood *comes from sunlight*.
- T F Some of the dry wood *comes from water*.
- T F Some of the dry wood *comes from soil nutrients*.

Which ONE of the following do you think provides the MOST mass to the dry wood of the Lodgepole Pine?

- a. Wood created by the tree
- b. Air
- c. Sunlight
- d. Water
- e. Soil nutrients

Explain your choices. Where do you think the dry wood of a Lodgepole Pine comes from?

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How do you think MOST of the matter got into the Lodgepole Pine? Select ONE of the following:

- a. Most of the matter came in through the tree's roots.
- b. Most of the matter came in through the tree's leaves/needles
- c. The growing tree made most of the matter when its cells divided to make new cells.

Explain your choice. Why did you choose the answer you did about how most of the matter got in the Lodgepole Pine?

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**C. Something interesting about Lodgepole Pine**

What is something interesting that you learned about the Lodgepole Pine that makes this plant different from the radish plants you grew?

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