MSP Carbon Assessment [Form B]

Please answer these questions as carefully and completely as you can. If you are not sure of the answer, write about any ideas that you have. If you can help us to understand how you think about these questions, then we can do a better job of explaining science in ways that make sense to you.

Please put your initials (not your full name) in the boxes

First	Middle	Last

Date _____

Class _____ Teacher _____

1. A mature maple tree can have a mass of 1 ton or more (**dry** biomass, after removing the water), yet it starts from a seed that weighs less than 1 gram. Which of the following processes contributes the most to this huge increase in biomass that is **not** water? Choose the correct answer.

    a. absorption of mineral substances from the soil via the roots
    b. absorption of organic substances from the soil via the roots
    c. incorporation of carbon dioxide gas from the atmosphere into molecules by green leaves
    d. incorporation of water from the soil into molecules by green leaves
    e. absorption of solar radiation (sunlight) into the leaf

    Explain why your choice is best (If you think some of the other processesses above also contribute to the dry mass increase, explain how).

2. Which of the following is (are) the energy source(s) for plants? Choose either YES or NO for each of the following.

a.	Water	☐ YES ☐ NO
b.	Sunlight	☐ YES ☐ NO
c.	Air	☐ YES ☐ NO
d.	Nutrients in soil	☐ YES ☐ NO
e.	Plants make their own energy.	☐ YES ☐ NO

Explain ALL your answers, including why the things you have chosen NO for are NOT sources of energy for plants.

3. When light energy comes into a plant and goes through photosynthesis, what will happen to it? Choose what you think is the best answer in the following.

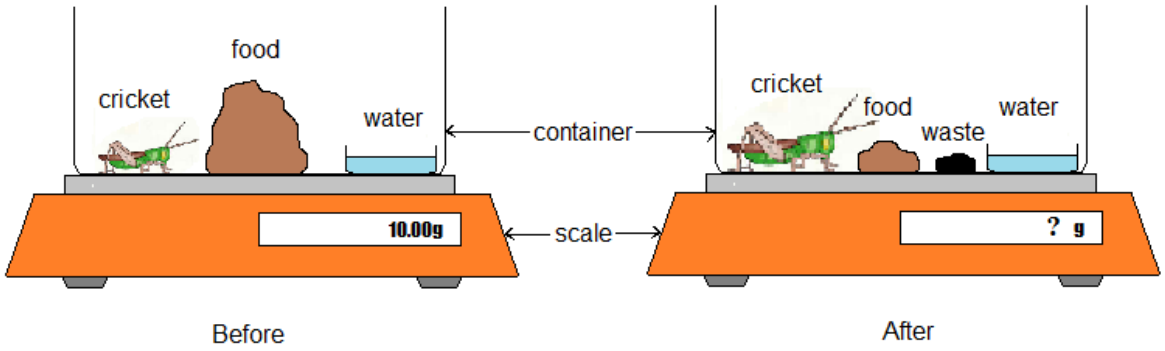
a. The energy will not exist because it is used up in photosynthesis.
b. The energy will leave the plant's body as energy.
c. The energy will change into a material or materials during photosynthesis and be stored in the plant's body.
d. The energy will change into another form of energy during photosynthesis and be stored in the plant's body.
e. None of the above. My answer is

_____

_____

Explain why your choice is best. In your explanation, you could include additional information such as the name of material or the form of energy.

4. The following is an experiment regarding animal growth.



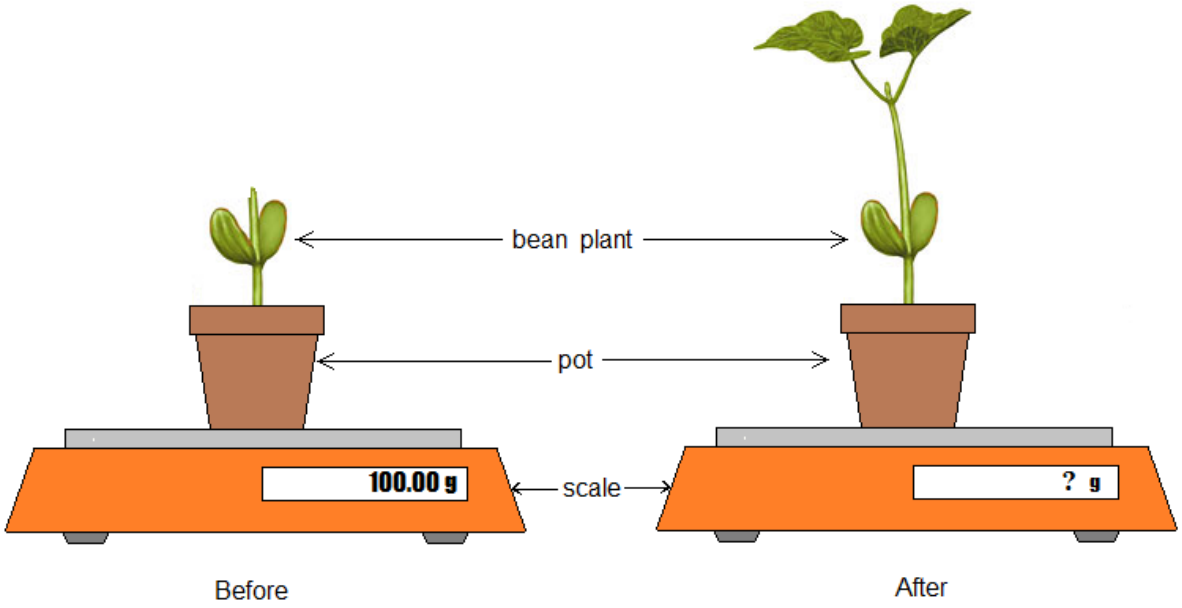
What is your prediction of the outcome of this experiment? Suppose we put a cricket in a container with plenty of food and make sure that it always has the same amount of water. Nothing can get in or out of the container except gases and water. At the beginning of the experiment, the container with cricket, water, and food weighs exactly 10 g.

At the end of the experiment, the cricket has eaten some of the food and gotten bigger. Some of the cricket's waste (feces or poop) is also in the container. How much would you expect the container (with cricket, food, water, and waste) to weigh?

a. More than 10 g.
b. Still exactly 10 g.
c. Less than 10 g.

Explain the reason for your prediction.

5. The following is an experiment regarding plant growth.



What is your prediction of the outcome of this experiment? Suppose we have a growing bean plant in a small pot with plenty of soil and make sure that it always has the same amount of water in the soil. Nothing can get in or out of the cup except gases and water. At the beginning of the experiment, the pot, plant, and soil weighed exactly 100 g.

At the end of the experiment, the plant has grown bigger. How much would you expect the pot, plant, and soil to weigh?

a. More than 100 g.
b. Still exactly 100 g.
c. Less than 100 g.

Explain the reason for your prediction.

6. Use the table below to explain where you think that carbon is found inside a tree and how it gets there.

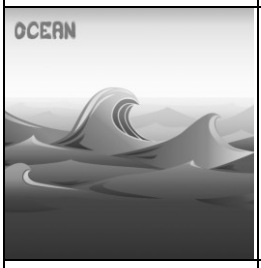
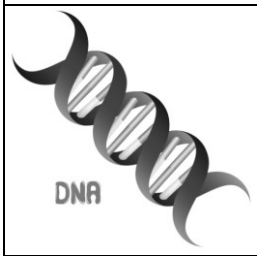
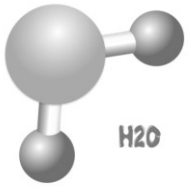
Location	Choose either YES or NO	If you chose YES, explain how the carbon gets to that location. Include molecules in your explanation if you can.
Does a tree have carbon in its **leaves**?	☐ YES ☐ NO	
Does a tree have carbon in its **wood**?	☐ YES ☐ NO	
Does a tree have carbon in its **roots**?	☐ YES ☐ NO	

7. Your body produces heat to maintain its normal temperature. Where does the heat mainly come from? Please choose ONE answer that you think is best.

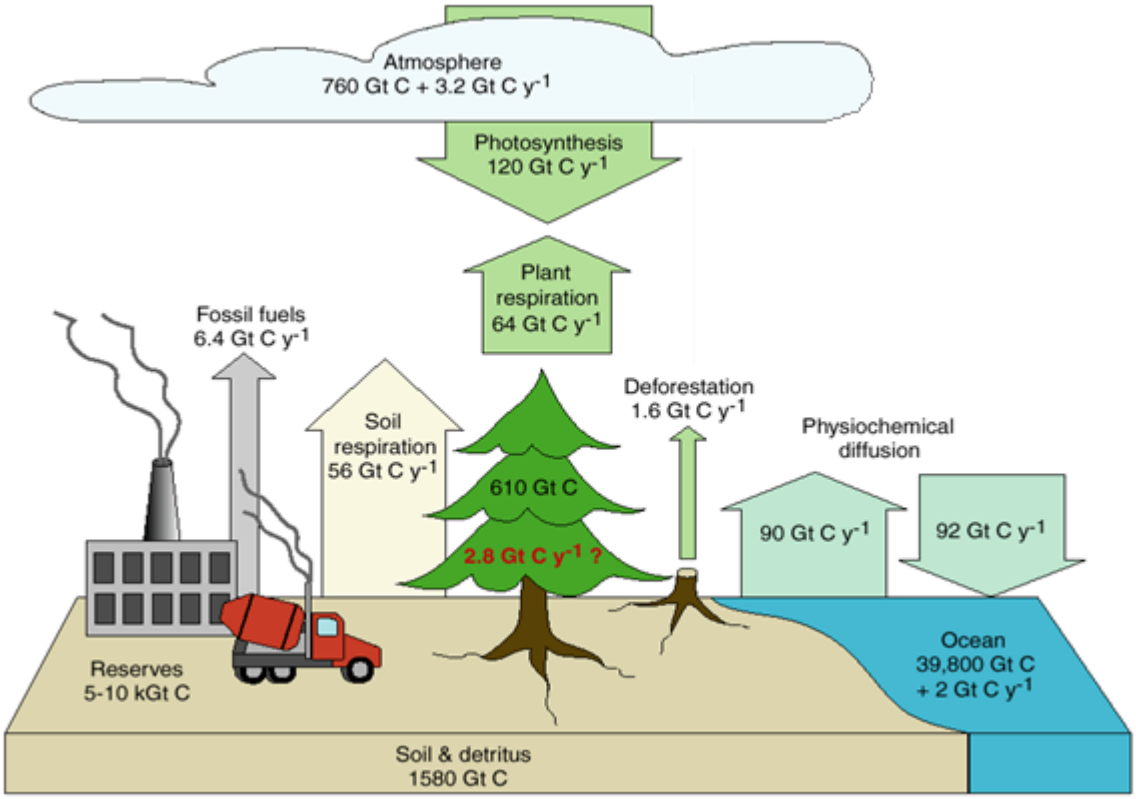
    a. The heat mainly comes from sunlight.
    b. The heat mainly comes from the clothes you are wearing.
    c. The heat mainly comes from the foods you eat.
    d. The heat mainly comes from your body when you are exercising.

Explain why you think that the answer you chose is better than the others. (If you think some of the other answers are also partially right, explain that, too.)

8. Look at the six items below and answer the questions.

Item	A. Does it contain carbon?	If you chose YES, answer the questions below.	
		B. Where is the carbon found inside this item?	C. Where was the carbon before it got inside this item?
	☐ YES ☐ NO		
	☐ YES ☐ NO		
	☐ YES ☐ NO		
	☐ YES ☐ NO		
	☐ YES ☐ NO		
	☐ YES ☐ NO		

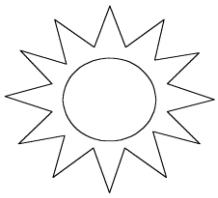
9. Look at the picture of a simple carbon cycle below, and answer the following questions. This diagram outlines the carbon cycle. Note: "Gt C" = gigatons of carbon, y^{-1} = 'per year', 'physiochemical diffusion' refers to CO_2 dissolving in and out of water.

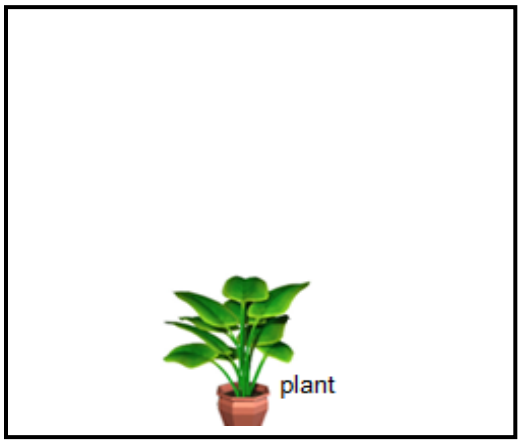


A. Can you tell from this diagram where the carbon on Earth is located, and where it can be found in the largest amounts? ☐ YES ☐ NO
If you answered YES, explain how you can tell.

B. Can you tell where carbon is moving from one area to another? ☐ YES ☐ NO
If you answered YES, explain how you know where carbon is moving, and explain two of the movements that seem most important to you in order to understand the diagram.

10. A small plant is put in a huge glass chamber with plenty of air. Three days later, what change will have happened to the mass of the air and the mass of the plant?





Glass Chamber

1) The mass of the AIR inside the chamber will _____.

a. increase b. decrease c. stay the same

Please explain the reason for your choice.

2) The mass of the plant inside the chamber will _____.

a. increase b. decrease c. stay the same

Please explain the reason for your choice.

10. Which of the following personal actions impact atmospheric carbon dioxide (CO_2) levels and climate change?

Personal action	Does it have an effect on climate change? Choose YES or NO.	If you chose YES, explain how the action would impact climate change. If you chose NO, explain why the action would not impact climate change.
Using cloth bags instead of plastic or paper bags at the grocery store	☐ YES ☐ NO	
Walking or riding your bike instead of taking car or bus	☐ YES ☐ NO	
Planting Trees	☐ YES ☐ NO	
Conserving energy	☐ YES ☐ NO	
Buying organic and local foods	☐ YES ☐ NO	

<The End. Thank You.>