
Initials

Environmental Literacy Carbon Assessment:
--- High School Level, Form B ---

Science is easier to understand if you can make connections between what you know now and the new ideas that you are studying. This is a test that will help us to understand what you know now. Please answer these questions as carefully and completely as you can. If you are not sure of the answer, please write about any thoughts 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. When you turn on a lamp, you can see the light. Where does the light energy come from? Trace the energy back as far as you can. You may or may not fill up all of the spaces in the table.

	What form of energy was it? Where was it?
	Light energy of the light
Before that…	
Before that…	
Before that…	
Before that…	
Before that…	
Before that…	

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2. NASA scientists invented the EcoSphere – inside a sealed glass container, there are air, water, gravel, and three living things – algae, shrimp, and bacteria. Usually, these three living things can stay alive in the container for two or three years until the shrimp become too old and die. The picture above shows an EcoSphere and its inside part. The EcoSphere is a *closed* ecosystem and has no exchange of matter with the outside environment.

a) Do you think the EcoSphere has energy exchange with the outside environment?

Circle one: YES / NO

b) If your answer is NO, how do the living things stay alive without energy exchange with the outside world?

c) If your answer is YES, what is the energy input of the EcoSphere? What is the energy output of the EcoSphere? Please explain your answer.

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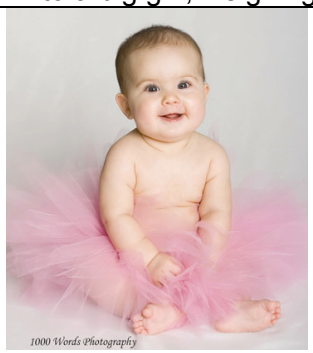
3. When the baby was five months old, she weighed 15 lb. After 7 years, the tiny baby has grown into a big girl, weighing 50 lb.

	
The baby weighed 15 lb when she was 5 months old.	The baby has grown into a big girl, weighing 50 lb.

a) The baby gained weight as she grew. Where did the matter that she is made of come from? Please circle Yes or No for each of the following and explain your choices.

a. Sunlight Yes / No
b. Water Yes / No
c. Air Yes / No
d. Food Yes / No
e. Exercise Yes / No

Please explain ALL your answers, including what happens inside the girl's body to each of the things that you circled "Yes."

4. How are these three events related to each other:

- a person plugs in an air conditioner in the US
- trees grow in the Amazon forest
- ice in Antarctica melts

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5. When you are riding in a car, the car burns gasoline to make it run. Eventually the gasoline tank becomes empty.

a) What happened to the **matter** the gasoline was made of?

b) When the gasoline tank becomes empty and the car stops, what happens to the **energy** of gasoline? Where does it go? Do you think the energy of gasoline still exists somewhere? Please explain your answers.

c) Do cars need air in order to run? Yes / No

Please explain your answer.

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A. Eating a hamburger	B. Filling up a car with gasoline	C. Watering plants

6. The pictures above show three things happening.

a) Are these three events alike or different? Please explain your answer.

b) A scientist says that A and B are similar events, but picture C is different from A and B. What reason do you think the scientist might have for saying that?

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7. Consider the three diagrams below. They represent three situations in which 100 kg of green plants serve as the original source of food for each of the food chains. In situation II, for example, cattle eat 100 kg of green plants and then people eat the beef that is produced by the cattle as a result of having eaten the plants.

I: 100 kg of green plants → insects → fish → person

II: 100 kg of green plants → cattle → person

III: 100 kg of green plants → person

In which of the three situations is the most energy available to the person?

a) I
b) II
c) III
d) Situations I and II will roughly tie for the most energy.
e) The same amount of energy will be available to the person in all three situations.

Please explain your answer.

8. Sunlight helps plants to grow. Where does light energy go when it is used by plants? Please choose the ONE answer that you think is best.

a. The light energy is converted into glucose of the plants.
b. The light energy is converted into ATP in the plants.
c. The light energy is used up to power the process of photosynthesis.
d. The light energy becomes chemical bond energy.
e. The light energy does not go into the plants' body.

Please 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, please explain that, too.)

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9. When an apple is left outside for a long time, it rots.

a) What causes the apple to rot?

b) The weight of the apple decreases as it rots. What do you think happens to the mass/stuff that was once in the apple?

c) Do you think that energy is involved when the apple rots? Yes / No
Please explain your answer.

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10. A small oak tree was planted in a meadow. After 20 years it has grown into a big tree, weighing 250 kg more than when it was planted.

the small oak tree

The big oak tree weighing 250 kg more than it was planted

a. Where did MOST of the extra 250 kg come from? Please circle the ONE source that contributed most to the tree's weight gain.

a. Soil
b. Air
c. Sunlight
d. Water
e. Minerals in soil
f. Other (Please list _____)

Explain why you think your choice contributed the most to the increase in mass. (If other processes also contributed to the mass, explain which ones they are, too.) Try to explain what happens inside the tree as it grows wood and leaves.

b. Where did the oak tree get energy to grow and change? Please circle Yes or No for each of the following and explain your choices.

a.	Air	Yes	/	No
b.	Sunlight	Yes	/	No
c.	Water	Yes	/	No
d.	Minerals in soil	Yes	/	No
e.	Nutrients in soil	Yes	/	No
f.	Plants make their own energy	Yes	/	No

Please explain ALL your answers, including why the ideas you circled "No" for are NOT sources of energy for the tree.

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11. Do you think that wood is a mixture of different things? (Circle one) YES / NO

Please explain your ideas about what materials or substances are in wood.

12. How is the air you breathe out different from the air you breathe in? Where does it change and how does it change?

13. An apple is eaten by a child and digested in his body.
a) What happens to the substances in the apple when it is digested?

b) How can the child's body use the substances in the apple to help his feet grow?