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Initials

Environmental Literacy Biodiversity Assessment: --- High School Level ---

Forest and Farm

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

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First Middle Last

Date _____

Class _____ Teacher _____



Picture A (to the left) - The land area in this picture used to be only sand dunes. It did not have any beech or maple trees. Below, Pictures B , C, and D are close-ups of different parts of this land.

Picture B (below) – This is a close-up picture of the sand dunes.



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Picture C – This is a close-up picture of some grasses in the sand dunes close to the water.



Picture D – This is a close-up picture of the beech maple forest.

1. Pictures B, C, and D are close-ups of different parts of Picture A. Both grasses from the beach and trees from the forested area produce seeds that are carried by the wind and animals.

a. Some tree seeds land in the sand on the beach. But there are no trees growing close to the water (on the beach). Why do you think there are not trees growing on the beach?

b. Picture C shows some grass growing in the sand dunes. You find lots of grass growing in the sand dunes. But you do not find much grass growing in the forest, even though some grass seeds sprout under the trees (Picture D). Why do you think there is not much grass in the forest?

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1c. Picture D shows a beech maple forest. Why are there so many species of plants and trees in a beech maple forest? Why doesn't one or two species take over the entire area?

2. Beech and maple seedlings grow well in shade. Cottonwood seedlings, on the other hand, grow better with more sunlight. Here is a story of how the forest grew on the sand dunes.

Year 0: Beginning of forest growth. A part of the sand dunes became sheltered from the wind and waves. At first it had only beach grasses like in Picture C above and shrubs. Some cottonwood, maple, and beech seeds fell among the grasses and started to grow.

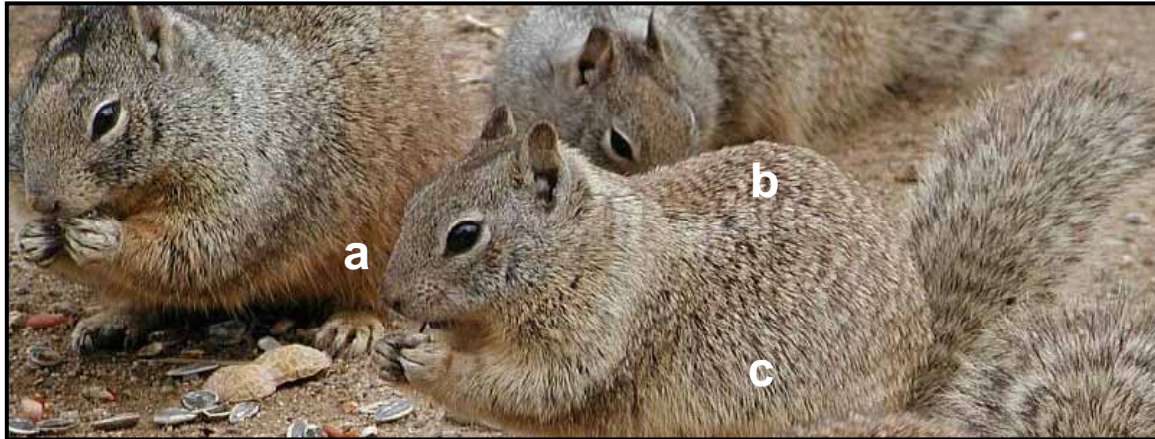
Year 20: Growing forest. The tallest trees were mostly cottonwoods around 20 years old. There were some beech and maple seedlings under the cottonwoods, but they were all small and less than 10 years old.

Year 100: Beech-maple forest. The forest looked like Picture D. The tallest trees were mostly beeches and maples. There were no cottonwood trees growing in the forest.

Use the information above to help you explain why after 20 years, the tallest trees were cottonwood, but after 100 years the tallest trees were beech and maples.

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Picture E – Squirrels that live in the beech maple forest

3. As the land in Picture A gradually changed from sand dunes to a forest, squirrels began to inhabit the forest.

a. Why do squirrels live in the forest and not in the sand dunes? What does the forest have that help the squirrels survive? What do the sand dunes not have that the squirrels need to survive?

b. Before it was a forest, chipmunks lived in the area. Now, there are fewer chipmunks and more squirrels. Why are there fewer chipmunks now? Why are there more squirrels?

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4. In the picture E, there are three squirrels a, b, and c that live in the forest and resemble one another. Suppose you are a scientist who is asked to determine how closely the squirrels are related to one another. Name two tests or observations that you could make to decide how closely the squirrels are related and what evidence you would look for in each one.

a. Suppose you could observe the squirrels, but not handle them. How could you test to see how closely they are related? What would you observe?

b. Suppose you had blood samples from the squirrels. How could you test the blood samples to find out how closely they are related? What could you test?

5. Squirrels have claws that they use to help them climb the bark of trees and jump from branch to branch. They had ancestors that did not have good claws, so they were not as good at climbing and jumping. Explain how modern day squirrels have claws that are good for climbing and jumping even though their ancestors did not.

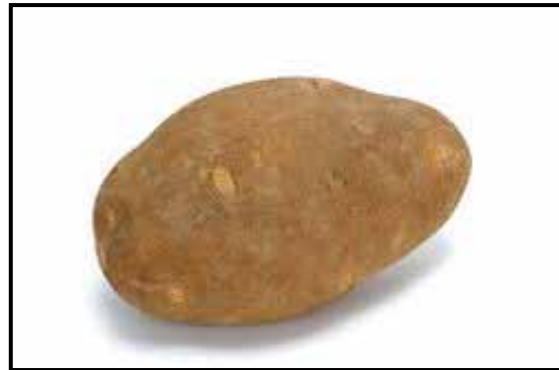
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6. When Europeans first came to Peru, they found that the Peruvians were growing a crop that they had never seen before: potatoes. Each Peruvian field contained many types of potatoes, as shown in the picture on the left. The Europeans worked hard to improve Peruvian potatoes. Eventually they developed potatoes like the one on the right—all bigger and providing more food than Peruvian potatoes.



Peruvian fields



European fields

6a. What do you think the Europeans did to get their big, uniform potatoes from smaller, more variable Peruvian potatoes?

6b In the mid 1800's, the potato blight killed most of the potato crop in Ireland, a European country, resulting in starvation and the death of about one million people. How was this related to their decision to plant only one type of potato?

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7. Farmers often spray their crops to help prevent bugs from eating their crops. Over time, the bugs slowly become resistant to these sprays, and so the farmers have to use different sprays to protect their crops. Tell a story about how the bugs become resistant to the sprays.






8. Farmers till the soil (stir it up with machines) to get rid of weeds. Why are weeds bad for crops?

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9. The pictures below show characteristics of some different plants and animals. Describe how the characteristics might help the plants or animals to survive and reproduce.

	Apples: Why are they round and sweet?
	Grass: Why does grass have long roots that grow deep into the ground?
	Cow Tongue: Why is it long and tough?

10a. This corn plant has been genetically modified so that it produces a toxin called BT that kills insects when they eat the corn plant. Why would a farmer choose to plant this genetically modified variety?



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10b. Genetically modified corn is banned in Europe. What is it about genetically modified organisms that Europeans might be worried about?

10c. All farmers plant special varieties of corn that have been developed by humans. What is the difference between genetically modified corn and those other special varieties?

11. To the right is a photo of flock of sheep. Which of the statements below best describes the group of sheep? Circle your answer below:

- a) The sheep are all identical to each other.
- b) The sheep are all identical on the inside, but have many differences in appearance.
- c) The sheep are all identical in appearance, but are all different on the inside.
- d) The sheep share many characteristics, but also vary in many features.
- e) The sheep are all completely unique and share no features with other sheep.



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Explain your answer. How are the sheep alike and how are they different?

Alike:

Different:



Photo A
Corn Field



Photo B
20 years later



Photo C
80 years later

12a. A farmer stopped planting his corn field. The photos above show what the corn field looks like 20 and 80 years after he stopped planting. During the 20 years after the farmer stopped planting, the number of plant species increases. Why do think this happens?

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12b. After 80 years, most of the smaller plants have been replaced by trees. Why do you think this happens?

13. Below is a picture of a Michigan forest next to a soybean field. A herd of deer live in the area. Why are the deer sometimes found in the forest and sometimes found in the field?

