Healthy Ecosystems
Teacher Facilitation Notes

In General . . .

- Project the slide deck in edit mode–do not show it as a slideshow.
- Hide the speaker notes before projecting. (View/Show Speaker Notes)
- Hide the filmstrip to the left. (View/Hide Filmstrip.)
- Hide the toolbar. (Click on the up arrow at the right end of the tool bar.)
- Call on students to read the various content shown on slides.

Materials Needed Per Group:

Gallery Walk

Card Stock (optional)
Images 1-6

Sheet Protectors (optional)

Other Materials

Student Recording Sheets
Student Summative Evaluation

Pencils
Science notebooks

Advanced Preparations

- Duplicate the gallery walk images on card stock. Laminate or place in sheet protectors. (OPTIONAL)

Healthy Ecosystems
Teacher Facilitation Notes, p. 2

Gallery Walk

- Read and discuss the student expectation.
- Have students participate in a See-Think-Wonder Gallery Walk. Tell the students there will be no talking or discussion during the gallery walk.
  - Option 1: Display the duplicated images around the classroom. Have students number off from 1 to 6. All of the number 1s form a group, the number 2s a group, and so on. Assign a starting image for each group. Have groups study the image at their assigned spot for 3-5 minutes, recording what they see in the image, what they think is happening in the image, and what they are wondering about the image. Give a signal for the students to move to the next station, with the group at image 6 moving to image 1. Continue until every group has observed all of the images.
  - Option 2: Display the images from the slide show 1 at a time. Students record what they see in the image, what they think is happening in the image, and what they are wondering about the image. Continue until all of the images have been observed.
- After students have had time to record their observations, their thoughts, and their wonderings for each image, allow time for discussion. Remind them that this lesson is about ecosystems and how they change. Ask questions such as the following:
  - What do see in this image?
  - What changes might have occurred recently in this ecosystem?
  - Which of these changes were caused by humans?
  - Why do humans change ecosystem?
  - Are all changes made to ecosystems by humans bad? Are all changes made to ecosystems made by humans good?
  - Why do humans keep changing ecosystems even if they damage and destroy the habitats of the organisms living there?

*NOTE: You may create a whole class SEE-THINK-WONDER anchor chart to display in the classroom for this activity.

Healthy Ecosystems
Teacher Facilitation Notes, p. 3

Key Question #1: How do human activities affect ecosystems?

- Introduce Key Question #1. Have students brainstorm ways they think humans may change the environment.
- If desired, click on the picture of the gravel pit and read about how mining for gravel changes the ecosystem in which it is located.
- Read and discuss the four types of human activities that will be studied during this part of the lesson.
- As you read about each of the four types of human activity, have students fill in their note-taking sheet. For example, for habitat loss, list the terms construction, deforestation, mining, and drilling in the key vocabulary term column. They may also list any other terms they think are important to habitat loss. Have them record important ideas in the note-taking column. Assist as necessary. (You may list ideas on the board as students call them out.)
- Clicking on the thumbnail pictures in each column will take you to a larger photograph with more explanation.
- Following each of the slides explaining the four human activities is a case study of how that particular activity might affect an ecosystem.
- For the last two slides in this section, call on volunteers to tell where each puzzle piece will belong.

Key Question #2: What Happens to Organisms if Their Ecosystem Changes?

- Read and discuss Key Question #2 and its explanation.
- Read and discuss the case study of the black-footed ferret. Call on a volunteer to answer the question. (Any time you see the green check-mark, click on it to go to the answer page, if desired.)
- Read and predict the changes that might occur in an ecosystem on the next two slides. Drag and drop the arrows from cause to effect. (Optional, have students complete the data sheet before discussing this as a class. They will read the change and draw a line from the last word to the dot before the effect they think will occur.)
- Go through the pictures. Call on volunteers to predict how the ecosystems may be affected by the changes listed on each picture.
- Discuss as desired.

Healthy Ecosystems
Teacher Facilitation Notes, p. 3

Key Question #3: What can humans do to protect and conserve ecosystems?

- Read and discuss the opening slide of this section. Remind students that humans can have both negative and positive effects on ecosystems. They have been examining human activities with negative effects. Now they will be looking at ways humans can have positive effects on ecosystems.
- Watch the video. Discuss the changes that occurred in the forest ecosystem and how the animals worked together to make it better. (If desired, discuss the characteristics of the video that make it a fable.)
- Read through and discuss the remainder of the slides detailing how humans (and students!) can work together to protect and conserve Earth's ecosystems.

Evaluate

- Have students complete the quiz independently.
- Discuss as desired.

Healthy Ecosystems

Name: KEY

Evaluation

1. A new plant is introduced into a park where it grows very well. This plant grows and reproduces faster than the other plants in the park. The new plant is also different from the current plants because none of the animals in the park can eat it. What is the most likely result of the introduction of the new plant to the park?

   A The new plant will soon die out because it is food for so many of the animals in the park.

   B All the plants in the park will begin to grow and reproduce faster because of mutations between them and the new plant.

   C The population of the new plant will increase and replace the other plants, whose populations will decrease.

   D The animals in the park will begin to die out or move away because of toxic chemicals in the new plant.

2. A property owner cut down a large number of trees and planted grass in his backyard. What would most likely happen to the squirrels that lived in the trees that were cut down? The squirrels would most likely–

   F build their nests in the grass instead of trees

   G move to another area where there are trees

   H bury seeds and nuts so more trees would grow

   J live in the dead trees left lying on the ground

3. Which of these human activities would benefit a forest ecosystem?

   A Clearing all of the plants in the forest to build new homes

   B Building a large highway through the middle of the forest

   C Planting new trees when old ones die or are cut down

   D Cutting down many trees so crops can be planted instead

Healthy Ecosystems

Name: KEY

Evaluation

4. The illustrations show how a road was built through a forest.

Before

After

This change to the ecosystem would be most harmful to animals that–

F fly through the air to capture insects for food

G hide from predators in shallow water

H feed on dead animals and wastes

J travel through the forest on the ground

5. A new manufacturing facility was recently built near a river. After a few months the plants in the river began to die. Scientists concluded that the plants died due to pollution from the manufacturing facility. Pollution that kills the plant life in a river will most likely result in the fish population–

A increasing, because there would be less competition for oxygen

B increasing, because there would be lee competition for food

C decreasing, because there would be less food for the fish to eat

D decreasing because there would not be enough light in the water

Healthy Ecosystems

Name: KEY

Evaluation

6. The flow of energy in a prairie ecosystem is described below.

- Grass is eaten by grasshoppers, rabbits, and crickets.
- Leaves and nuts are eaten by squirrels and beetles.
- Grasshoppers, beetles, and crickets are all eaten by birds.
- Squirrels, birds, and rabbits are all eaten by both foxes and coyotes.

Some farmers treat the fields surrounding the prairie with pesticides that kill most of the beetle population. Which of the following would most likely be caused by the use of pesticides in the ecosystem?

F A decrease in the bird population

G An increase in the bird population

H A decrease in the rabbit population

J An increase in the fox population

7. Some students decided to create a garden in a vacant lot that was filled with trash. They collected the trash and recycled the glass, paper, and plastic that they found. Which observation is the best evidence that their efforts had a positive impact on the ecosystem on area?

A Bees that had not been seen in the ecosystem for many years returned to collect pollen from the flowers in the garden.

B A local paper did an article about the students and how they created a community garden.

C More people stop by the garden and take pictures of the beautiful flowers there.

D The students got extra credit on their science grades for the year due to their community service work.

Healthy Ecosystems

Name: KEY

Evaluation

The picture shows a farmer plowing a field to plant a food crop. Use the picture to answer questions 8 and 9.

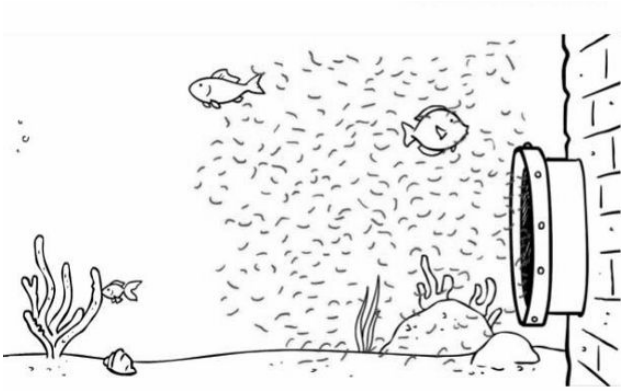
8. What is one negative effect the plowing of the field might have on the ecosystem?

Answers will vary but may include: more soil erosion; loss of habitat for some organisms; etc.

9. What is one positive effect the plowing of the field might have on the ecosystem?

Answers will vary but may include: plowing breaks up the soil; increases decomposition; etc.

10. The illustration shows a pipe from a plastic factory releasing waste water and tiny pieces of plastic into a nearby pond. Explain what is happening in the picture and what effect it might have on this aquatic ecosystem.



Answers will vary but may include: The plastic factory is polluting the pond by releasing the tiny pieces into the water. The fish may eat the plastic and die. If enough pieces are released into the water, they might block the sunlight, causing the plants to become ill. etc.

Healthy Ecosystems

Name: _____

Gallery Walk

Image	SEE	THINK	WONDER
1			
2			
3			
4			
5			
6			

Healthy Ecosystems
Gallery Walk Image #1

Healthy Ecosystems
Gallery Walk Image #2

Healthy Ecosystems
Gallery Walk Image #3

Healthy Ecosystems
Gallery Walk Image #4

Healthy Ecosystems
Gallery Walk Image #5

Healthy Ecosystems
Gallery Walk Image #6

Healthy Ecosystems

Name: _____

How do human activities affect ecosystems?

Habitat Loss	**Key Vocabulary Terms**	**Notes**
Land/Water Use	**Key Vocabulary Terms**	**Notes**
Introduction of Invasive Species	**Key Vocabulary Terms**	**Notes**
Pollution	**Key Vocabulary Terms**	**Notes**

Healthy Ecosystems

Name: _____

What happens to organisms if their ecosystems change?

A non-native plant that grows taller and faster than native plants is introduced	• The variety of native plants in the area will decrease • The variety of native plants in the area will increase
A group of very aggressive predators that are not native to an area are released	• Other animal populations that eat the same food will decrease • Other animal populations that eat the same food will increase.
A population's food supply increases a log	• The population will decrease. • The population will increase.
Overpopulation of a particular species leads to overgrazing in an ecosystem	• The population of plants that these grazers eat will increase, • The population of predators that eat these grazers will increase.
Pollutants in the area decrease the number of herbivores in the ecosystem	• The populations of plants that these herbivores eat will decrease • The number of predators that eat the herbivores will decrease
Humans disrupt an organism's habitat by building a road through the area where it hides from predators	• The populations of different organisms in the area will decrease • The variety of native plants and animals in the area will increase
Snakes eat mice. Mice eat grain. There is a lot more grain in the fields this year than last year.	• The mouse population will decrease. • The snake population will increase.
Kudzu is introduced into an ecosystem. (Kudzu is an invasive species that can cover all the other plants in an area.)	• The variety of native populations decreases. • The water supply in the area increases due to less native plants.

Healthy Ecosystems

Name: _____

What happens to organisms if their ecosystems change?

1. Boars (wild hogs) are an invasive species in some areas. They dig up the tree roots, trample down grass and young trees, and overpopulate an ecosystem. They eat all types of vegetation, including tree nuts. How would wild hogs be harmful to an ecosystem?

   A Wild hogs eat too much of the foods that deer eat.

   B Wild hogs keep new vegetation from growing by eating seeds.

   C Wild hogs dig up trees, leading to an increase of carbon dioxide in the ecosystem.

   D All of the above

2. Tree-eating beetles eat the leaves of trees and make their nests in the tree trunks. Using the trunk for nests for a long period of time causes the tree to die. What change might occur in an ecosystem having an overpopulation of tree-eating beetles?

   F The beetles die out in a few months.

   G Many trees are harmed and slowly die.

   H The beetles begin to eat other insects.

   J The trees overpopulate the ecosystem.

3. Pollutants, such as motor oil, are sometimes leaked onto roads by cars and trucks. How do these pollutants most likely spread to affect the ecosystem where they leak?

   A Storms wash the pollutants into nearby lakes.

   B Animals lick the pollutants off the road and get sick.

   C Insects and other small animals get stuck in the pollutants.

   D Wind blows the pollutants to the side of the road and harms the soil.

Healthy Ecosystems

Name: _____

Evaluation

1. A new plant is introduced into a park where it grows very well. This plant grows and reproduces faster than the other plants in the park. The new plant is also different from the current plants because none of the animals in the park can eat it. What is the most likely result of the introduction of the new plant to the park?

   A The new plant will soon die out because it is food for so many of the animals in the park.

   B All the plants in the park will begin to grow and reproduce faster because of mutations between them and the new plant.

   C The population of the new plant will increase and replace the other plants, whose populations will decrease.

   D The animals in the park will begin to die out or move away because of toxic chemicals in the new plant.

2. A property owner cut down a large number of trees and planted grass in his backyard. What would most likely happen to the squirrels that lived in the trees that were cut down? The squirrels would most likely–

   F build their nests in the grass instead of trees

   G move to another area where there are trees

   H bury seeds and nuts so more trees would grow

   J live in the dead trees left lying on the ground

3. Which of these human activities would benefit a forest ecosystem?

   A Clearing all of the plants in the forest to build new homes

   B Building a large highway through the middle of the forest

   C Planting new trees when old ones die or are cut down

   D Cutting down many trees so crops can be planted instead

Healthy Ecosystems

Name: _____

Evaluation

4. The illustrations show how a road was built through a forest.

Before

After

This change to the ecosystem would be most harmful to animals that–

F fly through the air to capture insects for food

G hide from predators in shallow water

H feed on dead animals and wastes

J travel through the forest on the ground

5. A new manufacturing facility was recently built near a river. After a few months the plants in the river began to die. Scientists concluded that the plants died due to pollution from the manufacturing facility. Pollution that kills the plant life in a river will most likely result in the fish population–

A increasing, because there would be less competition for oxygen

B increasing, because there would be lee competition for food

C decreasing, because there would be less food for the fish to eat

D decreasing because there would not be enough light in the water

Healthy Ecosystems

Name: _____

Evaluation

6. The flow of energy in a prairie ecosystem is described below.

- Grass is eaten by grasshoppers, rabbits, and crickets.
- Leaves and nuts are eaten by squirrels and beetles.
- Grasshoppers, beetles, and crickets are all eaten by birds.
- Squirrels, birds, and rabbits are all eaten by both foxes and coyotes.

Some farmers treat the fields surrounding the prairie with pesticides that kill most of the beetle population. What effect would the pesticides most likely have on the rest of the ecosystem?

F A decrease in the bird population

G An increase in the bird population

H A decrease in the rabbit population

J An increase in the fox population

7. Some students decided to create a garden in a vacant lot that was filled with trash. They collected the trash and recycled the glass, paper, and plastic that they found. Which observation is the best evidence that their efforts had a positive impact on the ecosystem on area?

A Bees that had not been seen in the ecosystem for many years returned to collect pollen from the flowers in the garden.

B A local paper did an article about the students and how they created a community garden.

C More people stop by the garden and take pictures of the beautiful flowers there.

D The students got extra credit on their science grades for the year due to their community service work.

Healthy Ecosystems

Name: _____

Evaluation

The picture shows a farmer plowing a field to plant a food crop. Use the picture to answer questions 8 and 9.

8. What is one negative effect the plowing of the field might have on the ecosystem?

_____

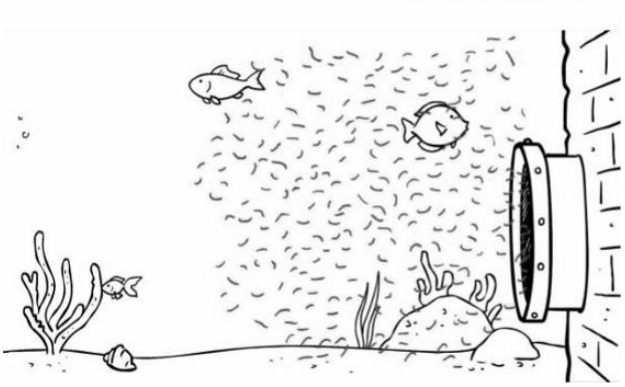
_____

9. What is one positive effect the plowing of the field might have on the ecosystem?

_____

_____

10. The illustration shows a pipe from a plastic factory releasing waste water and tiny pieces of plastic into a nearby pond. Explain what is happening in the picture and what effect it might have on this aquatic ecosystem.



_____

_____

_____

_____

_____

_____

_____