Overview:

Floods quickly change the appearance of Earth's surface.

Objectives:

The student will:

- illustrate and describe changes in the appearance of land as a result of flooding;
- make inferences about the changes in the appearance of land as a result of flooding; and
- make a Venn-diagram to compare/contrast the results of flooding on land with and without vegetation.

Targeted Alaska Grade Level Expectations:

Science

[3] SA1.1: The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.

[4] SD2.2: The student demonstrates an understanding of the forces that shape Earth by identifying causes (i.e., earthquakes, tsunamis, volcanoes, floods, landslides, and avalanches) of rapid changes of the surface.

Math

[2] S&P-1: The student demonstrates an ability to classify and organize data by collecting, recording, interpreting, and representing data in a variety of ways. (M6.1.1)

Vocabulary:

barren – growing only poor or few plants

flooding – to become covered or filled with water

landslide – the downward movement of earth and or rocks from a steep slope

rainfall – water, or a form of water, that falls to the earth

run-off – the draining of water from the surface of the land

soil – the top layer of material on the earth's surface in which plants have their roots

vegetation – plant life

Materials:

- 2'x3' (or bigger if space and materials are available) plywood board or other firm surface to use as a platform
- 5 gallon bucket of dirt/soil
- rocks/pebbles of various sizes to add to the top of the soil as well as below the surface of the soil to simulate bedrock
- watering can with a sprinkling head
- two to three gallons of water
- science journals (one per student)
- pictures showing a variety of hilly/mountainous regions, forested, grassy, barren, terraced, etc.
- magazines likely to contain pictures of mountainous landscapes (i. e., Alaska, Backpacker, Arizona Highways, National Geographic or Travel)
- grass seeds (about ¼ cup)
- sunflower seeds (or squash, pumpkin, melon)
- Harris, Caroline. **Kingfisher Voyagers: Wild Weather**. Boston: Kingfisher Publications Plc, 2005.
- Thomas, Rick. *Rising Waters: A Book About Floods*. Mankato: Picture Window Books, 2005. (NOTE: This is the best overall book for floods of the three listed.)
- Winget, Mary. *Floods*. Minneapolis: Lerner Publishing Group, Inc., 2009.
- "*Flash Floods: Deadly Downpour*." The Wrath of God. DVD. Executive Producer: Jonathan Towers by Towers Productions for the History Channel, A&E Television Networks, 2000.

- STUDENT WORKSHEET: "Venn Diagram"
- STUDENT WORKSHEET: "KWL Chart"
- STUDENT WORKSHEET: "Assessment Task"

Activity Preparation:

1. On a platform, partially construct a model of a mountain valley using the soil, sand, and rocks. Make two hills/mountains as equal as possible. Be sure to create some steep surfaces to enable landslides to develop. Also, bury rocks so that they are unseen or are mostly unseen. This will allow children to see the destructive power of the water as it removes the topsoil from the land. In the center of the valley create a riverbed with pebbles. If snow is available, a "mountain" could be topped with it. Create a realistic landscape. Plant one of the hills with grass and sunflower seeds. The sunflower plants will represent trees. When plants show a good deal of growth and when they have developed a good root system, it is time to start the lesson.

   NOTE: Construct the model approximately one month in advance to allow germination and root development on the planted hill.

2. Prepare a vocabulary list with definitions on chart paper.

Activity Procedure:

Gear Up

Process Skills: questioning, predicting, observing, describing, making generalizations, inferring and communicating.

1. Have each child complete his/her own KWL chart (only the K & W columns) asking about what a flood does to the land.
2. Share pictures of various land areas.
3. Show a movie or read a book about floods. Suggestions are listed under "Materials" in the lesson plan.
4. Review the vocabulary list and discuss definitions

Explore

Process Skills: questioning, predicting, observing, describing, making generalizations, inferring, and communicating

5. Bring one group of students at a time to help complete the mountain valley model.
6. Have students make notes/diagrams of the completed model in their science journals.
7. Have students predict in their journals what will happen to the land during a period of heavy rainfall. They may add a diagram for support of their answer.
8. Using a watering can with a sprinkler head, the teacher should produce a "heavy rainfall" over the land.
9. When the soil begins to become soaked, have students predict again what they think is going to happen. This is a good time to ask other questions such as: Where do you think the water is going to go if it continues raining?
10. Let it rain until major changes in the land can be seen.
11. Discuss the changes that were observed.

Generalize

Process Skills: questioning, predicting, describing, making generalizations, inferring, and communicating

12. As students the following questions as a class:
    a. What did you observe happening to the land as it rained?
    b. Where did the run-off go? Why?
    c. What happened when the soil was soaked?
    d. Which direction did the water move?
    e. What happened to the water as it ran down the slopes?
    f. What were the differences in the results of flooding between the barren land and the planted land?
    g. How do you think having plants and trees on the land might change how the land looks after a flood?
    h. Why do you think we should work to prevent the flooding of our land?
    i. Could this happen in our local area?
    j. Describe how the land would be changed if we had a flood locally.
13. Have students complete their individual KWL charts

Apply

Process Skills: communicating, making generalizations

14. Make an illustration of a mountain. This mountain just had a terrible fire that burned nearly all plant-life. Write three sentences describing how this mountain area might change if there is a heavy rainfall.

Extension Idea(s):

1. Are there any areas of barren land near your home? What changes might you find on that land as a result of heavy rains?
2. What would happen to the land if flooding occurred in a section of forest where the trees have all been cut down?

Assessment Task:

1. Using the attached worksheet, students will illustrate the effects of a flood on land with and without vegetation. They will write a descriptive caption for each illustration. On the worksheet, they will write at least two inferences that can be made about the effects of flooding being more severe on barren land than on land with vegetation.
2. Students will complete a Venn diagram comparing and contrasting the result of flooding on land with and without vegetation. Each section of the Venn diagram must contain two facts.

Scoring Rubric:

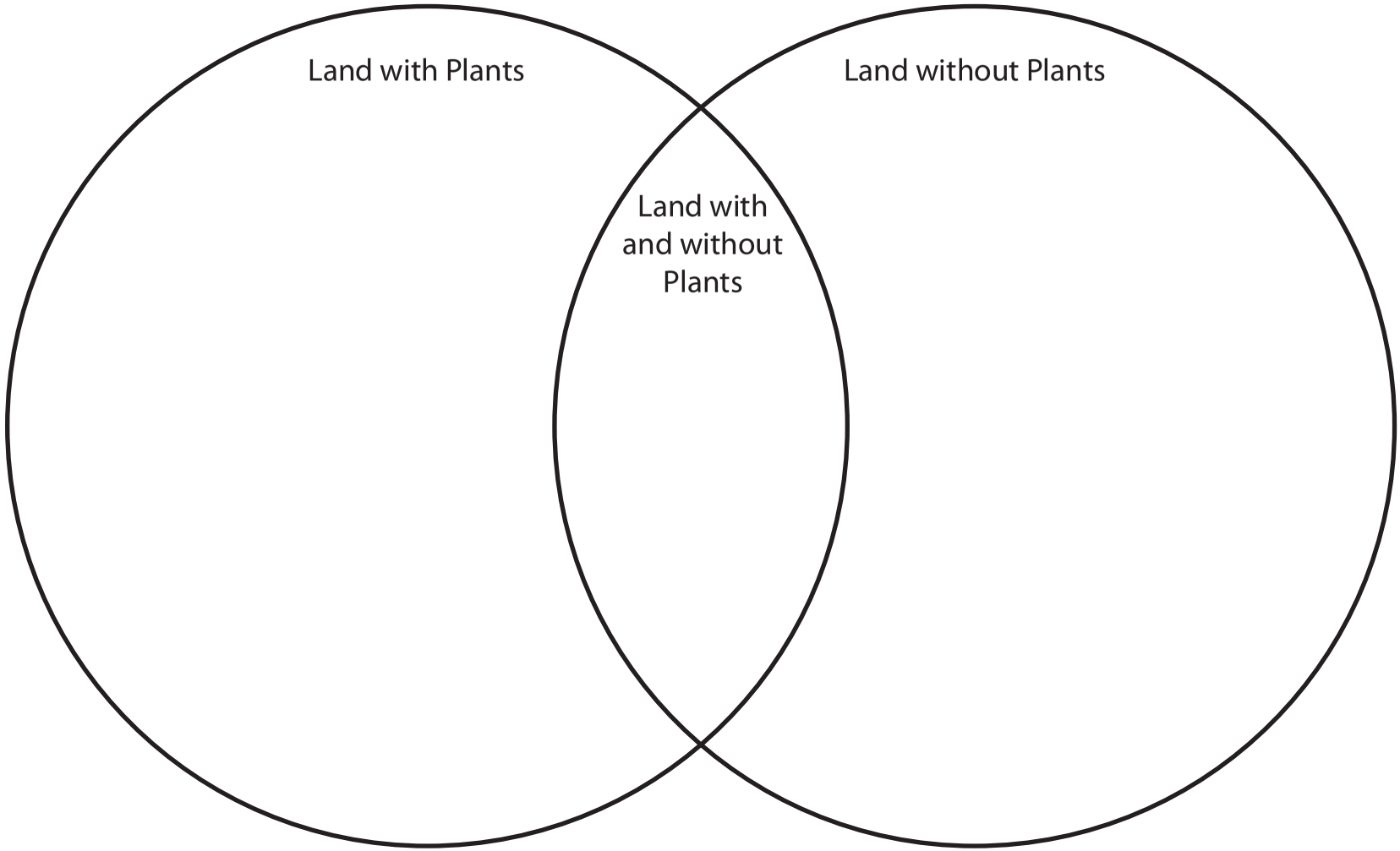
Objectives	GLEs	Below Proficient	Proficient	Above Proficient
The student will illustrate and describe changes in the appearance of land as a result of flooding.	[4]SD2.2	The student will illustrate and write a caption (before and after) describing zero to one changes seen in the appearance of the land after a flood.	The student will illustrate and write a caption (before and after) describing two changes seen in the appearance of the land after a flood.	The student will illustrate and write a caption (before and after) describing three or more changes seen in the appearance of the land after a flood
The student will make inferences about the changes in the appearance of land, with and without vegetation, as a result of flooding.	[3]SA1.1	The student will write zero or one inference telling why, after a heavy rainfall, changes in the appearance of land, with little or no plant life, is more severe than land with plant life.	The student will write two inferences telling why, after a heavy rainfall, changes in the appearance of land, with little or no plant life, is more severe than land with plant life.	The student will write three or more inferences telling why, after a heavy rainfall, changes in the appearance of the land, with little or no plant life, is more severe than land with plant life.
The student will make a Venn diagram to compare/contrast the outcome of flooding on land with and without vegetation	Math [3] S&P-1	The student will draw a Venn-diagram. It may or may not be labeled. Each part of the Venn-diagram will contain zero to one facts.	The student will draw a Venn-diagram with labels for each item being compared or contrasted. The Venn-diagram will contain at least two facts.	The student will draw a Venn-diagram with labels for each item being compared or contrasted. The Venn-diagram will contain three or more facts.

NAME: _____

STUDENT WORKSHEET

VENN DIAGRAM

Directions: Use the Venn diagram to compare and contrast the result of flooding on land with and without plants.



NAME: _____ STUDENT WORKSHEET

KWL CHART

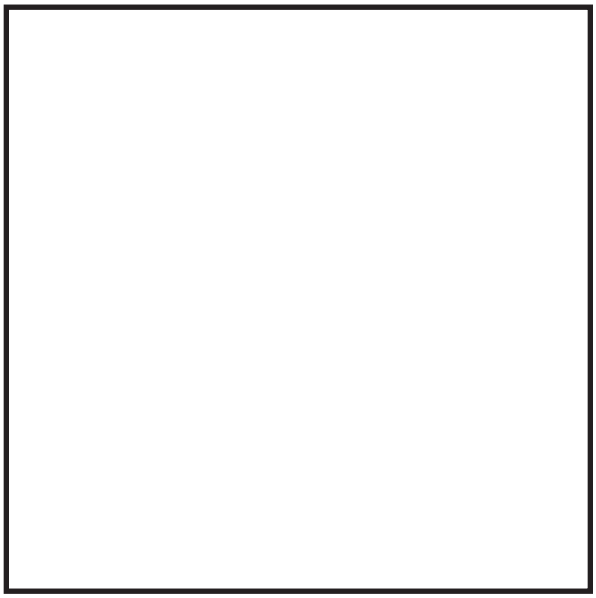
Floods Change Land:

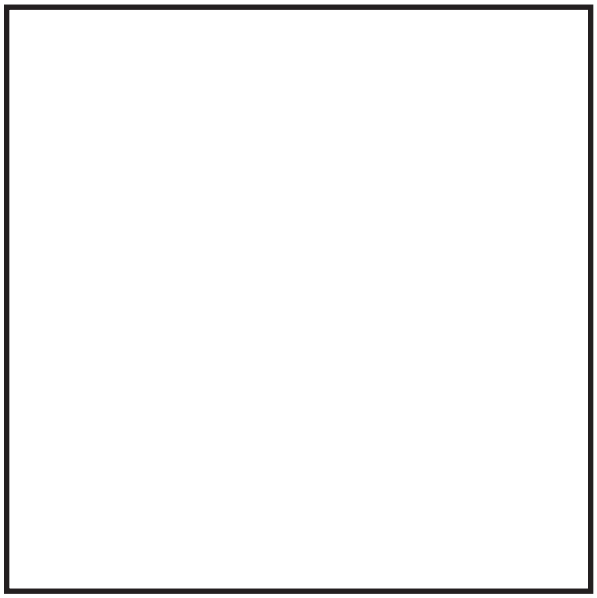
What I Know	What I Want to Know	What I Learned

NAME: _____ STUDENT WORKSHEET

ASSESSMENT TASK

Before





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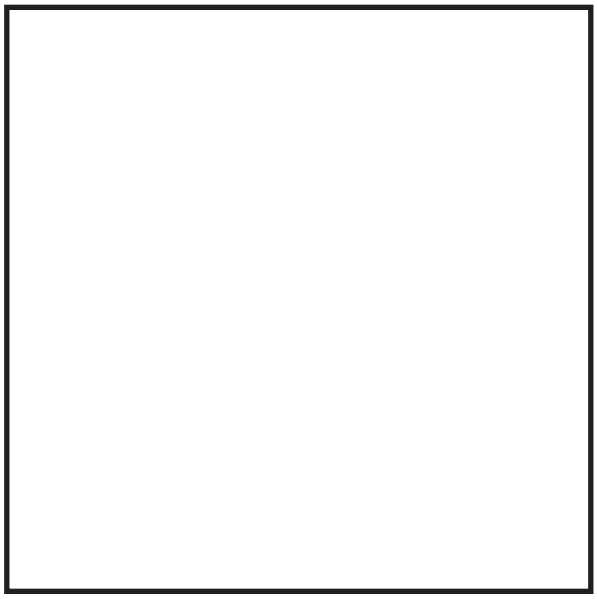
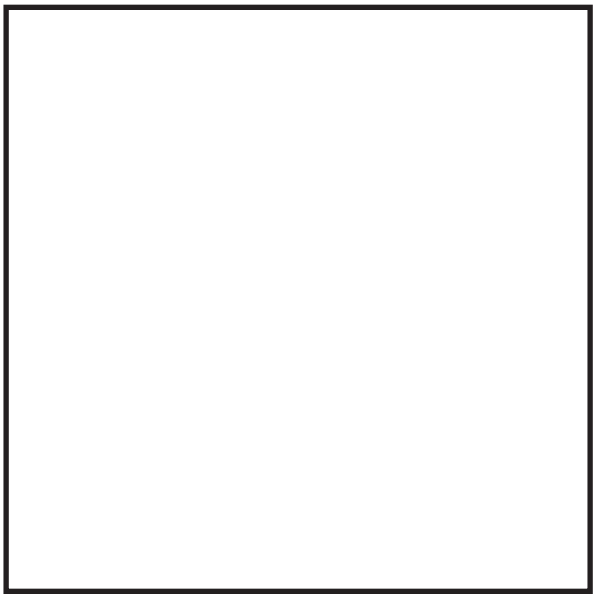
After





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