



Lesson Title: A Slice of Soil for Food!

Grade: 4-6

Duration of Lesson: 1 - 60 minute class

Materials:

- 1 – large apple
- 1 – paring knife
- 1 – color copy of pages 5 and 7
- 1 – black and white copy of page 6 for each student
- 1 – color copy of page 8 (optional)
- 1 – wheat plant (some students will never have seen how wheat grows)
- 1 – globe

Vocabulary

Natural resources
Soil
Plant
Herbivore
Omnivore
Carnivore

Standards/Objectives

ELA 4-6. Speaking and Listening

1. Comprehension and Collaboration: Engage effectively in a range of collaborative discussions with diverse partners on grade level topics, building on others' ideas and expressing their own clearly.

NGSS 5. Earth's Systems

Disciplinary Core Ideas, ESS3.C: Human Impacts on Earth Systems

Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environment.

NGSS MS. Earth's Systems

Disciplinary Core Ideas, ESS3.A: Natural Resources

Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (MS-ESS3-1)

Understanding(s) /Big Ideas:

Students will be able to explain why only a small portion of the earth supports food production. Students will understand that soil is essential for life.

Essential Question(s):

What portion of the earth provides soils for food production and why? What organisms are reliant on soil for life?

Students will know:

Students will develop an understanding of the distribution of water, soil, desert and other areas of earth that are not suitable for food production. Students will know the role of soil in food production, and the dependence of life on soils. Students will know the percentage of soil on the earth's surface that is usable for food production.

Students will be able to:

Students will be able to demonstrate and explain the portion of the earth's surface that is suitable for food production. Students will demonstrate the reliance of life upon soils.

Performance/Observations

Performance Task(s):

Students will link food to soils, and create a pyramid of life food diagram.

Other Evidence:

Students will assess each other's pyramid of life drawings.

Learning / Inquiry Activities

Learning Activities:

1. Present your local farmer/ rancher and let them discuss briefly about the crop they grow, have them let students know that their operation depends on healthy soils. (10 minutes).
2. Show the apple and the paring knife to students, let them know that you will be explaining how much of our earth's surface is suitable for raising food with these two items.

Part 1: Discuss how we depend on the soil while displaying the *Pyramid of Life* (page 5)

One of our most important natural resources is soil. All living things depend on it as a source of food, either directly or indirectly. Plants depend on the soil to anchor them in place. Soil stores water and nutrients, which it then makes available for plant growth.

Some animals eat only plants for food. These are called herbivores. Humans eat plants, but we also use animals for food. We are called omnivores. There are other organisms that are also omnivores, like raccoons. Some animals eat only other animals. These animals are called carnivores. No matter if the organism is an omnivore, carnivore, or herbivore they all have something in common, all of their food can be traced back to plants growing in the soil.

Soil is a very important part of our world because we **all** depend upon soil for food. Our land, which has soils that will grow food, is a limited natural resource. Farmers and ranchers in the United States work hard to produce enough food to feed everyone in this country, plus a large number of people in other countries, so they must also work very hard to keep the soil in good condition.

A farmer in the United States, on average, produces enough food to feed 129 people. They realize they must get maximum production out of their soil, while at the same time protecting it for future generations. As world population continues to increase each person's food producing portion of land is becoming smaller and smaller. This means farmers must work harder to grow more food on the land they are using. It is the responsibility of all of us to use the soil wisely to insure a bright future.

A Thin Slice of Soil

Part 2: Demonstrate the small portion of the earth's surface, which is suitable for food production.

1. Display the portions of the earth suitable for food production chart (page 7).
2. Cut the apple into four equal parts. Tell students three parts represent the oceans and waters of the world and set these aside. The fourth part represents the land area.
3. Cut the fourth part (land section) in half lengthwise. Now you have two 1/8 pieces. One section represents land such as deserts, swamps, Antarctic, arctic, and mountain regions. These regions are not suitable for man to live, set one of the 1/8 sections aside.
4. Slice the remaining 1/8 section into four equal parts. Three of these one-thirty second sections represent the areas of the world which are too rocky, too wet, too hot, or where soils are too poor for production, as well as areas developed by man. Set these aside. You will only have a 1/32 piece left.
5. Carefully peel the last 1/32 section. This small bit of peeling represents the soil of our earth on which mankind depends for food production!
6. Discuss what this soil is used for. Possible questions: Why should we take care of our topsoil, which is used for growing plants? What must happen to the amount of food farmers grow if the world's population continues to increase while our earth's topsoil remains the same?
7. **Store the paring knife in a safe place before you began the next section!**

Notes:

1. Display page 5, the Pyramid of Life chart. Discuss briefly how each organism on the chart is related to soil.
2. Hand out the blank pyramid of life worksheet to each student (page 6). Tell students they will complete their own ***Pyramid of Life*** by illustrating the ingredients in pizza. First they must make a list of ingredients in pizza; you may have to help them. They will begin drawing the ingredients from the soil up in the order they would naturally appear. Tell students they will have 15 minutes to complete their drawings. (Allow an additional 3 minutes if some students are not finished.)
3. For pizza they must draw wheat for flour to make the crust, tomatoes for sauce, a dairy cow for cheese, and then whatever toppings they choose. Remind students that cows need grass to

eat in order to produce milk for cheese, so grass would go beneath the dairy cow. Pepperoni and sausage come from pork! Finished pizza at the top! Don't forget the herbs! **These items must be in order from the soil up.** Ask the teacher and local farmer/rancher that you invited to help students individually if needed. If students don't know what wheat plants look like, show them your example.

Notes:

Assessment:

Pyramid of Life: Have students post their Pyramid of Life on a bulletin board or the wall that the teacher has approved of. Take time to talk about student work, have students check each other to make sure the pictures are in the correct order, allowing for explanations. Ask your local farmer/rancher that you have invited to help students with the details of the food pyramid. Remember, you may know all about farming/ranching and food production, but the students may not. If the local farmer or rancher has produced any food, which is in the pizza, tell the students that they may clap when the food product the farmer/rancher has produced is discussed during this exercise. (EXAMPLE: If the local farmer grows wheat, the students may clap to thank the farmer for wheat when you discuss that part of the pizza food pyramid). This is a learning experience, if a student has the wrong order just help them get it correct.

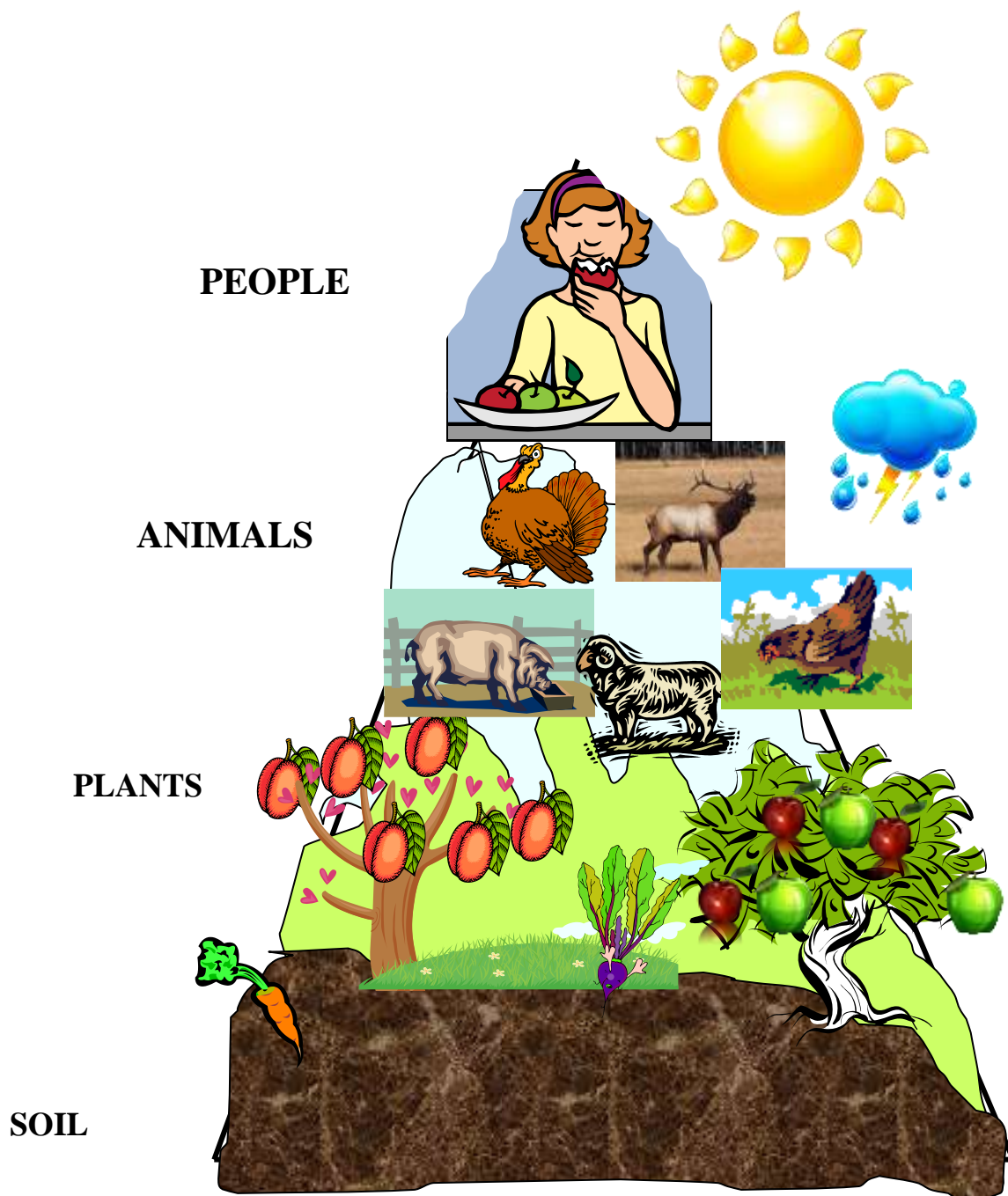
Discuss FFA

Now is the time to discuss FFA, and the really wonderful experiences and opportunities FFA brings to you. Let students know the benefits of FFA, and invite them to join FFA when they are at the correct grade level.

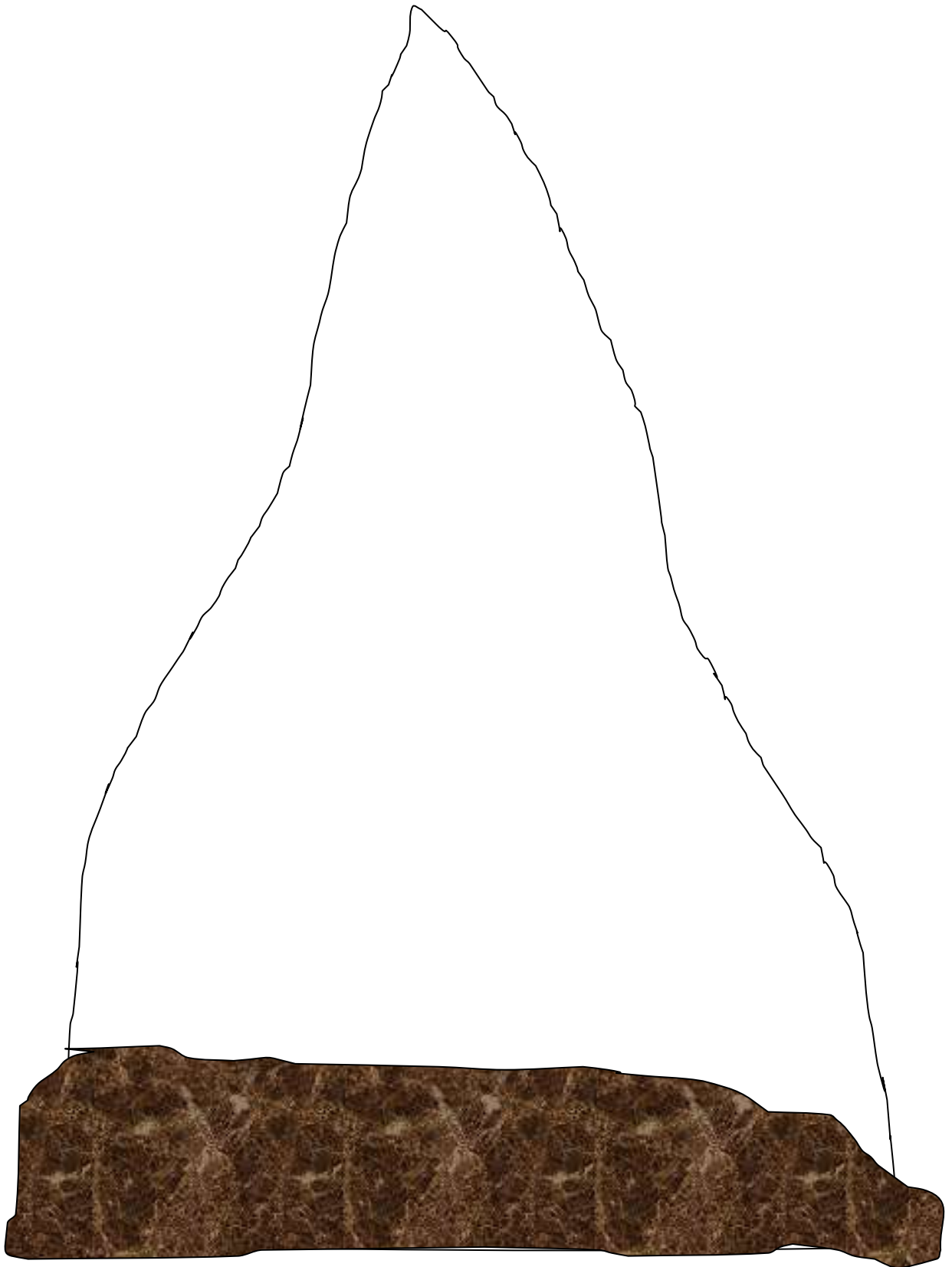
The Pyramid of Life

The foundation is soil, that along with sunlight and rain produce plant life. All animals depend on plants directly or indirectly for energy. Man should know that all life depends on the soil: as the soil goes, so goes all life.

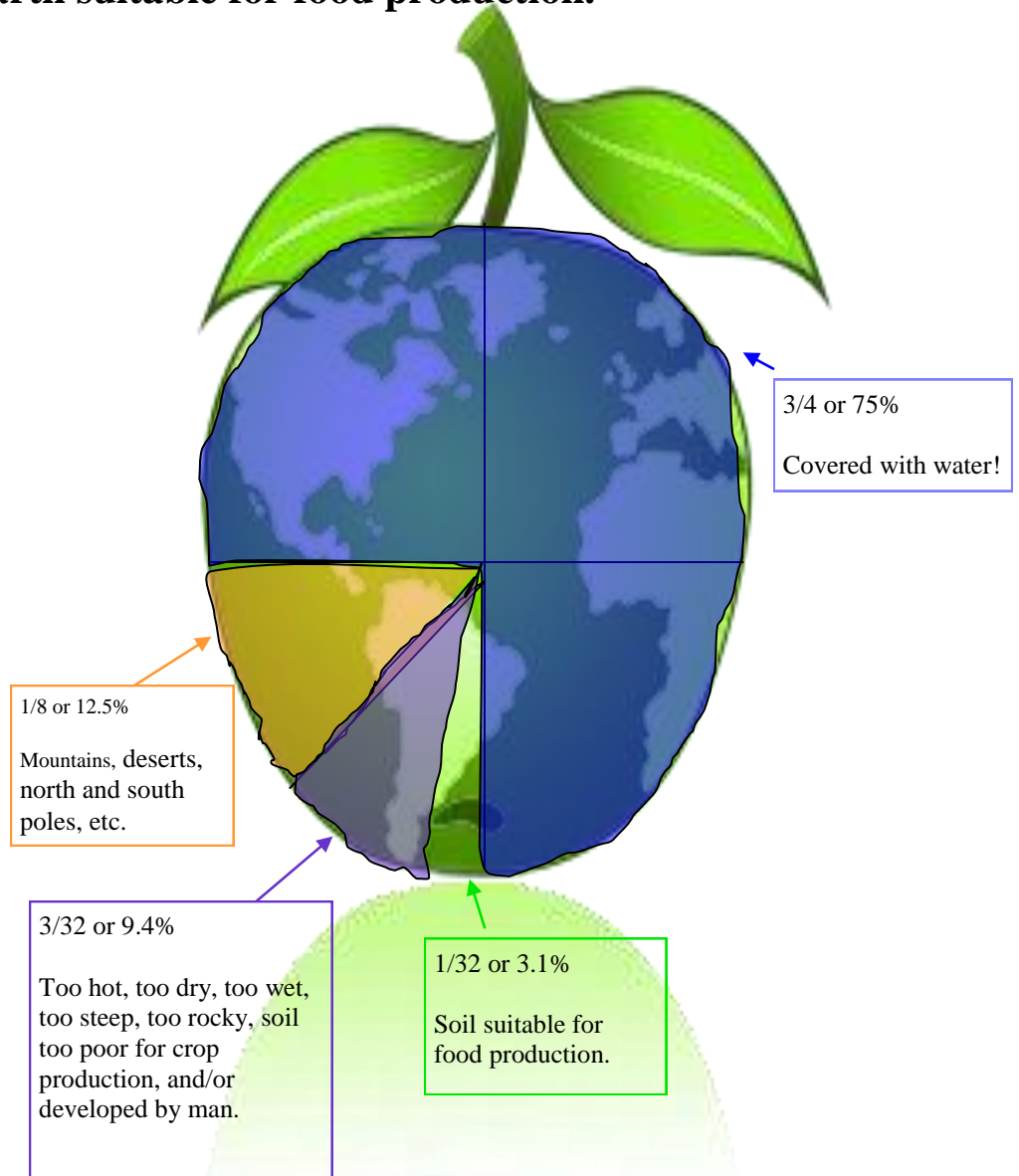
PYRAMID OF LIFE



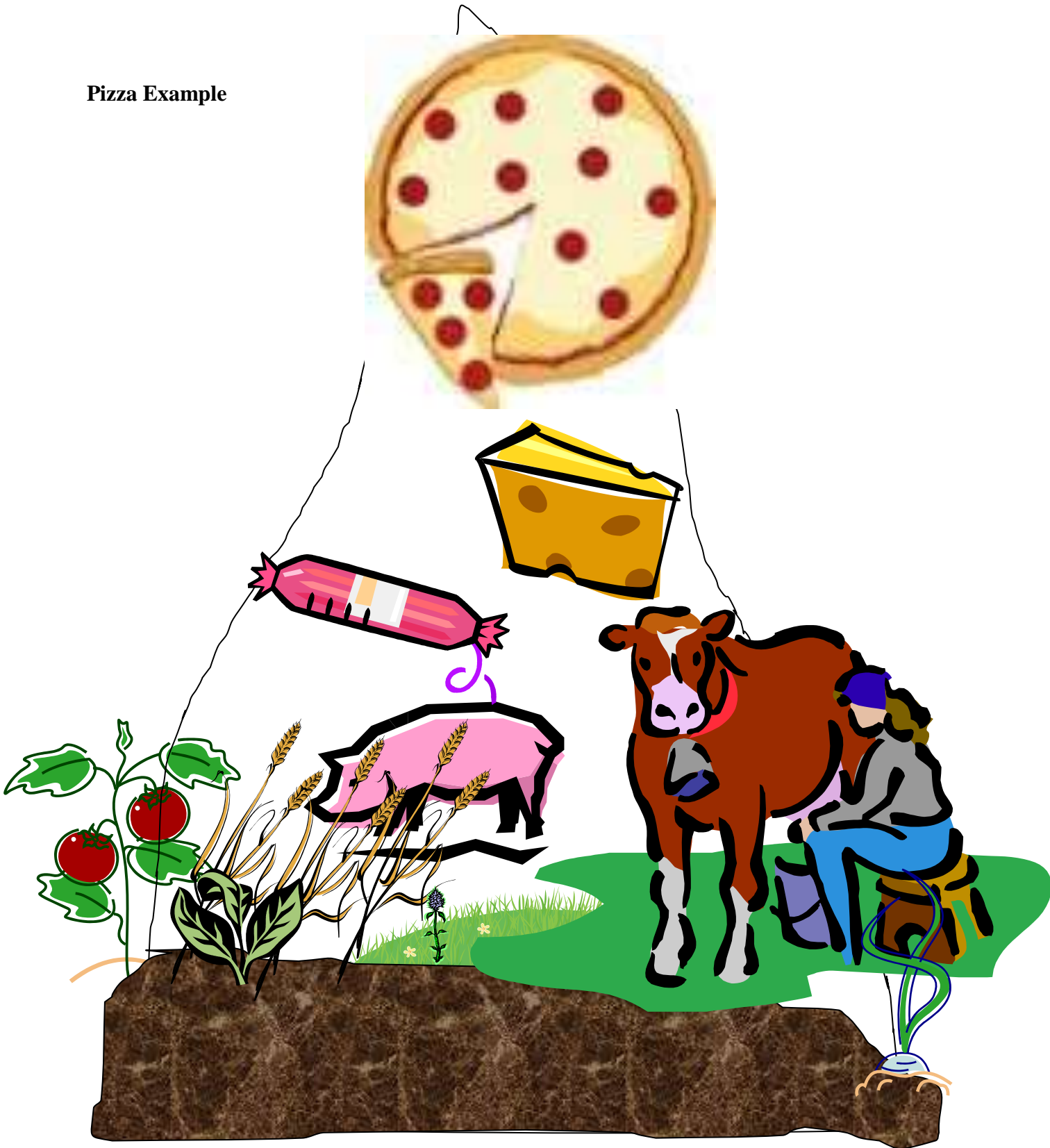
Worksheet 1: Make your own pyramid of life by both drawing and coloring the ingredients that are part of pizza. Remember these all depend upon healthy soils. (Make sure you have the right ingredients from the soil up and have fun!)



Portions of the earth suitable for food production.



Pizza Example



Montana Department of Agriculture and
Agriculture in Montana Schools

Portions of this lesson based upon information from Oklahoma State University
Division of Agricultural Sciences and Natural Resources