



**Lesson Title: A Slice of Soil for Food!**

**Grades:** 4-8

**Duration of Unit:** 2 - 50 minute class period

**Materials:**

- 1 – Large apple
- 1 – Paring knife

**Vocabulary**

- Natural resources
- Soil conservation
- Omnivore
- Carnivore
- Herbivore
- Soil
- Plant

**STAGE 1 – DESIRED RESULTS**

**Montana State Standards:**

**Science: Content Standard 3** - Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.

**Science Content Standard 4.** Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space. Benchmark 2. **Math: Content Standard 1** (Grade 7 Benchmark) Number Sense and Operation – A student, applying reasoning and problem solving, will use number sense and operations to represent numbers in multiple ways, understand

relationships among numbers and number systems, make reasonable estimates, and compute fluently within a variety of relevant cultural contexts, including those of Montana American Indians. **Content Standard 2.1** (Grade 6-8 Benchmarks) Data Analysis Mathematics – A student, applying reasoning and problem solving, will use data representation and analysis, simulations, probability, statistics, and statistical methods to evaluate information and make informed decisions within a variety of relevant cultural contexts, including those of Montana American Indians.

**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 be able to:**

Students will be able to demonstrate and explain the portion of the earth’s surface that is suitable for raising food.

**STAGE 2 – ASSESSMENT EVIDENCE**

**Performance Task(s):**

Students will graph the percentages of the earth which represent distribution of: water, soil, and non-farmable portions of the Earth on a pie chart. Performance of understanding will be judged by correct graphing measurement.

**Other Evidence:**

- Students will assess each other’s graphs and Pyramid of Life drawings.

**STAGE 3 – LEARNING ACTIVITIES**

**Learning Activities:**

Present 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.

**Part 1:** Discuss how we depend on the soil while displaying the *Pyramid of Life*.

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. Plants in turn hold soil in place to help avoid soil erosion.

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. But we all have something in common. All

of our food can be traced back to plants growing in the soil.

Our food producing land is a limited 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. 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. Keep displaying the Pyramid of Life, now also display the Portions of the earth suitable for food production chart.
2. Cut the apple into four equal parts. Three parts represent the oceans of the world. The fourth part represents the land area.
3. Cut the land section in half lengthwise. Now you have two one-eighth pieces. One section represents land such as deserts, swamps, Antarctic, arctic, and mountain regions. These regions are not suitable for man to live.
4. Slice the remaining one-eighth 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.
5. Carefully peel the last one-thirty second 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 top soil remains the same?

#### **Notes:**

**Activities:**

1. Have students complete their own *Pyramid of Life*.
2. Have the students make a pie chart from the earth as an apple template depicting the portion of land used to grow our food versus all the other areas of the world such as water or land regions.

**Notes:****Assessment:**

**Pyramid of Life:** Have students post their Pyramid of Life on a bulletin board or the wall. Take time to talk about each student's work, have students check each other to make sure the pictures are in the correct order, allowing for explanation.

**Pie Chart:** Once again have students post their work on the bulletin board or on the wall. Check for correct percentages, if a student has not completed the correct percentages on the map, talk about what percentage of a pie chart they depicted, and if the amount is less or more than the correct amount.

*"This project was a coordinated effort by Montana Department of Natural Resources & Conservation, Montana Department of Agriculture, and Agriculture in Montana Schools to educate students about the value of Montana Rangeland. Contributions and support for this project was also given by the USDA Natural Resources Conservation Service and Montana Weed Control Association."*

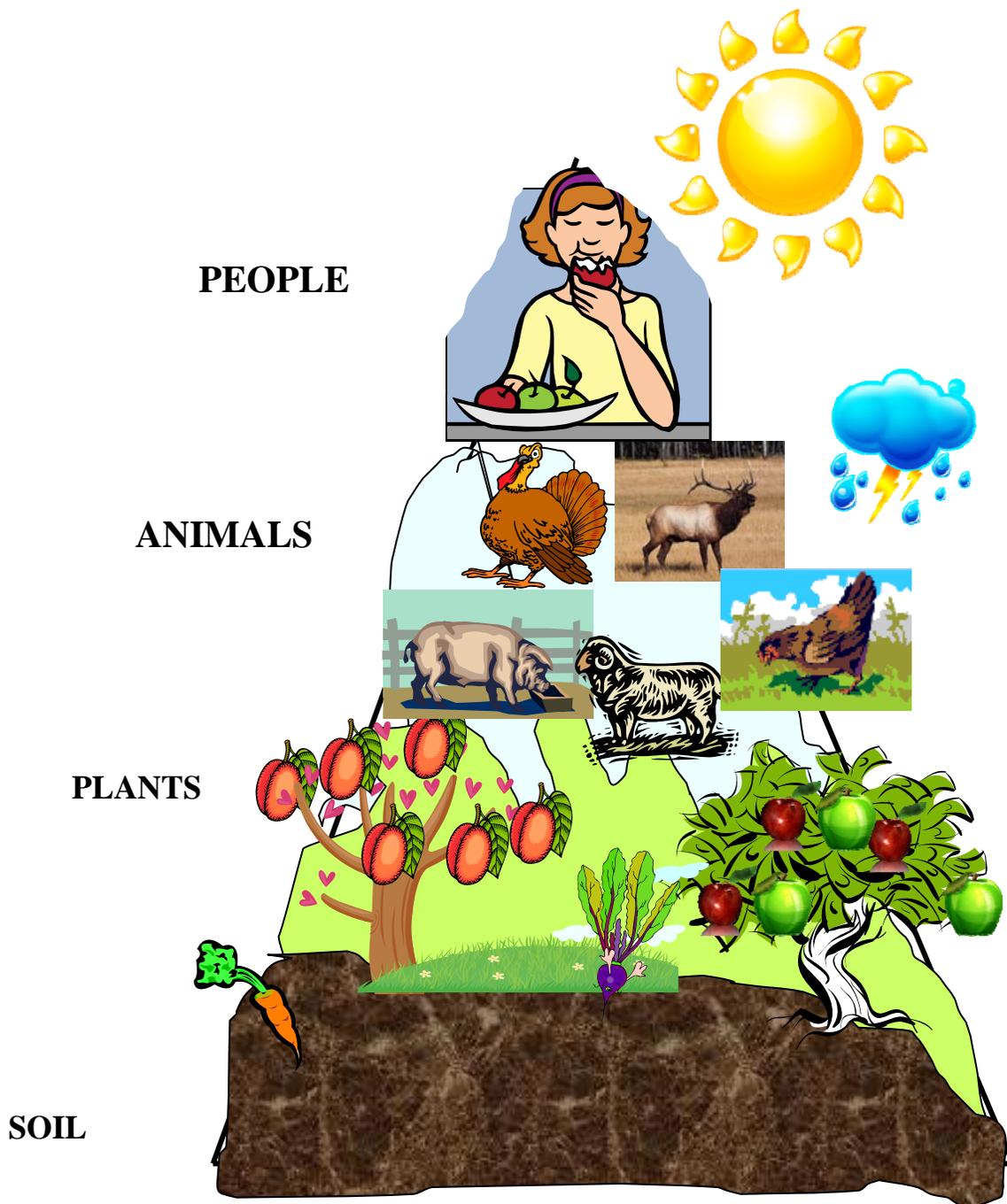
For more information please contact:

<http://www.aginmontanaschools.org/> or <http://dnrc.mt.gov/cardd/camps/default.asp>

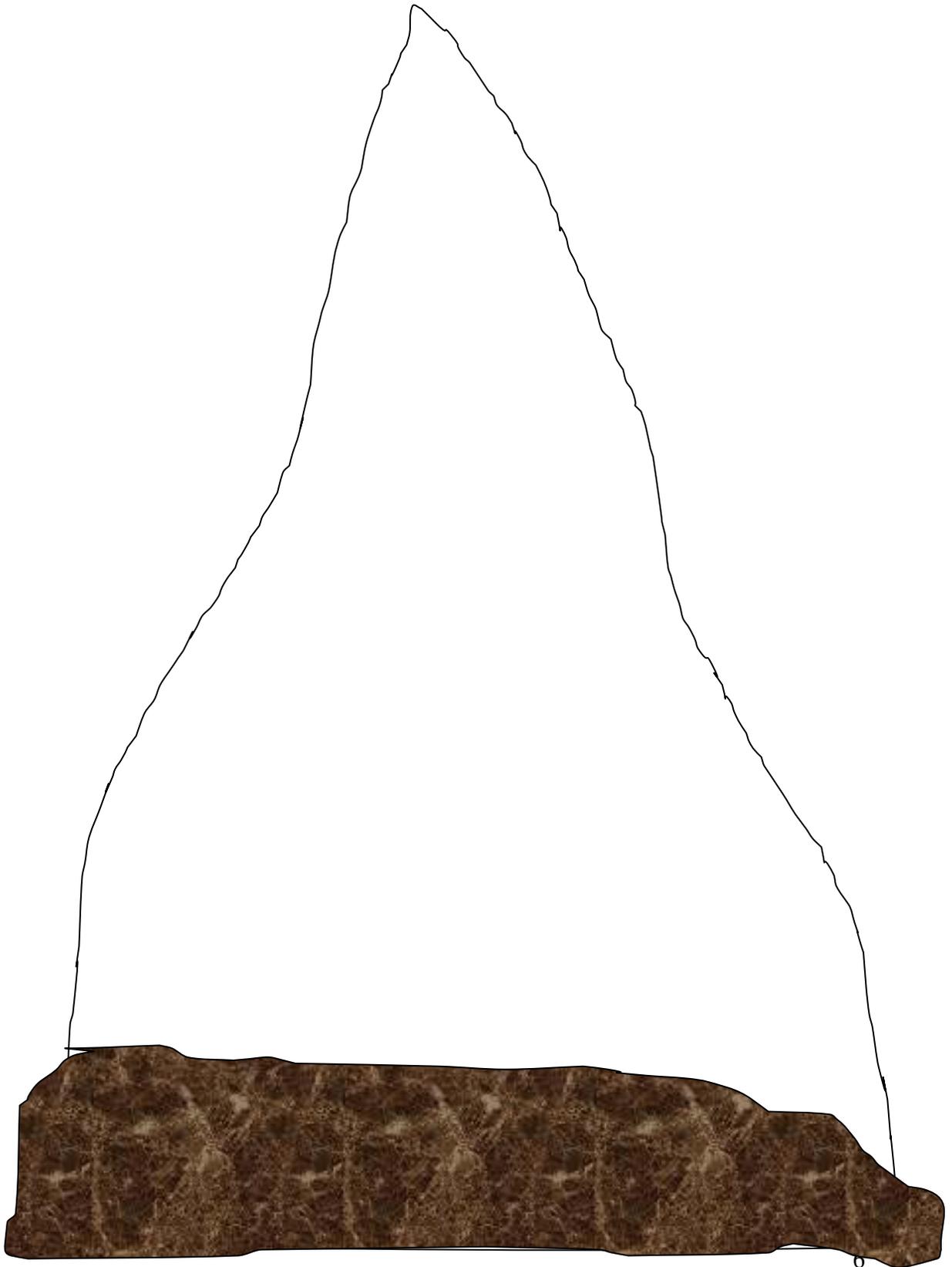
# *The Pyramid of Life*

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.

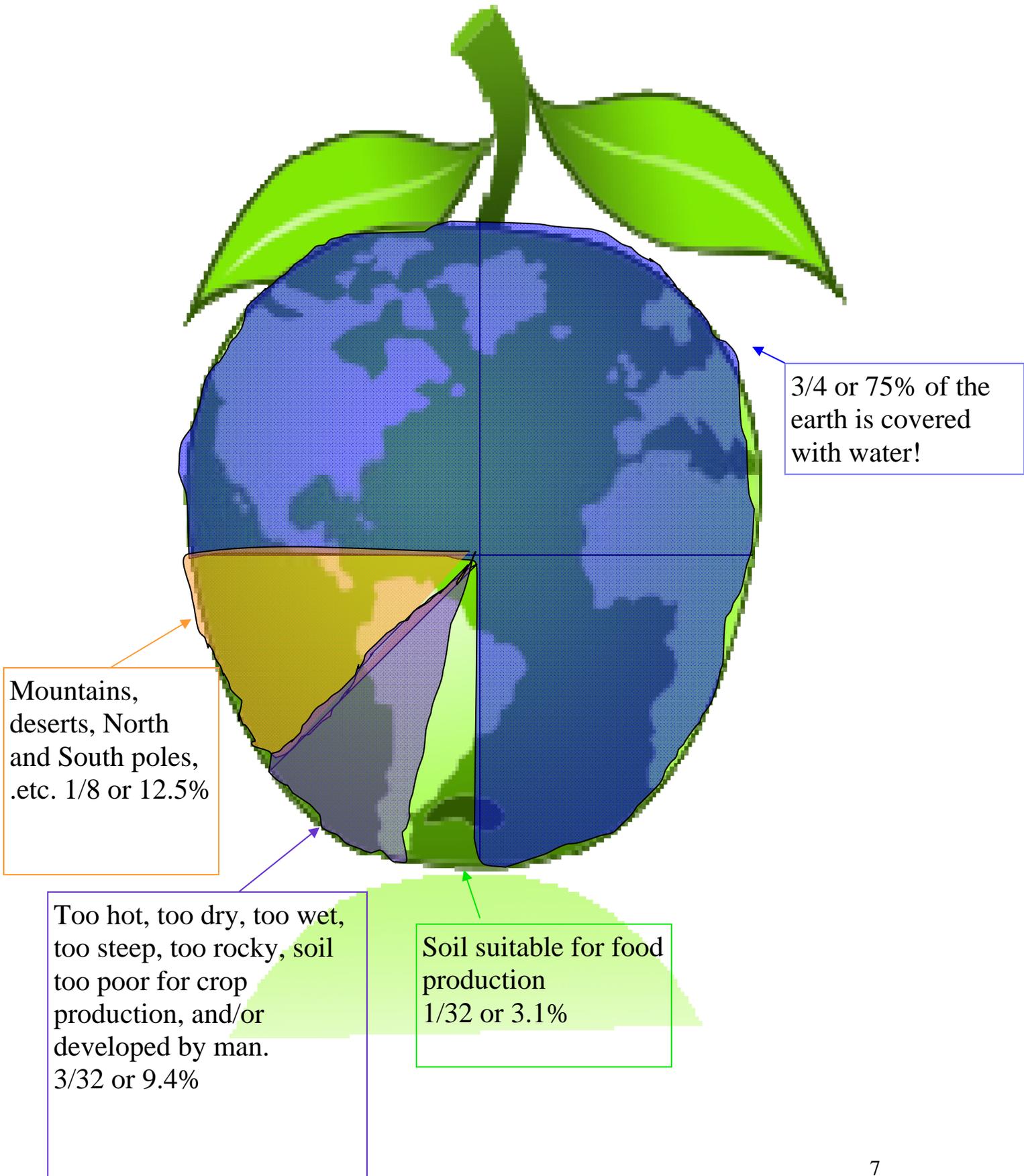
## PYRAMID OF LIFE



**Make your own pyramid of life by both drawing and coloring the plants, animals, and people parts, or by cutting out pictures from magazines and pasting them on the correct areas! Put your favorite food at the top! (Make sure you have the right ingredients from the soil up.)**



# Portions of the earth suitable for food production.



3/4 or 75% of the earth is covered with water!

Mountains, deserts, North and South poles, .etc. 1/8 or 12.5%

Too hot, too dry, too wet, too steep, too rocky, soil too poor for crop production, and/or developed by man. 3/32 or 9.4%

Soil suitable for food production 1/32 or 3.1%

