

50. HOW MUCH WATER AND SOIL IS THERE?

Overview: The earth has limited natural resources. Water and soil are two of them that are essential for plant and animal survival.

Objective: Using models, students will discover the relatively small amount of water and soil available for plants and animals and the need for conserving those resources.

Time Needed: 30 to 60 minutes

Group Size: Small or whole groups

Age Appropriateness: 4th grade and up

Site: The apple based activities can be done anywhere in the Garden. The bucket of water demonstration needs to be done by the Tortoise Habitat to be close to a water source.

Background: It is essential to conserve water and soil use as they are limited resources that are necessary for life on planet Earth. It takes 100 years for 1 inch of soil to form naturally. Soil is made of 3 main ingredients; minerals, organic material, and open space. Minerals include sand (2-.05mm), silt (.05-.002mm), and clay (<1002mm). Organic material comes from the remains of plants and animals. Open space is filled with air and water. Good soil for growing most plants is approximately 45% minerals, 5% organic materials, 25% air, and 25% water. Soil having near equal amounts of sand, silt and clay are good for growing most plants.

Only 1% of the water on planet Earth that is available for plant and animal use. The rest of the water is salty, stored in ice caps and glaciers, or is other wise unreachable or unfeasible to use.

Materials:

Provided at the Garden

5 gallon bucket

Measuring cups (1 needs to hold at least 2 ½ cups and be clear)

Eye dropper

Sharp knife

Provided by the classroom teacher

Apples (any kind)

Preparation:

Pre Activity: Review or teach students the need and use of water and soil by plants and animals, including humans.

Procedure:**Water Activity 1**

1. Fill a 5 gallon bucket full of water. Represents all the water on Earth.
2. Remove $2\frac{1}{4}$ cups from the bucket. What is left in the bucket represents the 97% of salt water on the Earth. The $2\frac{1}{4}$ cup of water represents 3% all the fresh water on Earth.
3. Pour out $1\frac{1}{2}$ cups from the $2\frac{1}{4}$ cups. That $1\frac{1}{2}$ cups represents the amount of water stored in polar ice caps and glaciers.
4. From the remaining $\frac{3}{4}$ cup, remove $\frac{1}{4}$ cup. That $\frac{1}{4}$ cup represents the water in the atmosphere or soil.
5. The remaining $\frac{1}{2}$ cup represents all the ground water and fresh surface water.
6. Remove 5 drops from the $\frac{1}{2}$ cup. Those 5 drops represents the amount of fresh water available to people. The rest of the $\frac{1}{2}$ cup is either unreachable or unfeasible to use.
7. Discuss the 5 drops and the importance of conserving and caring for our water supply.

Water Activity 2

1. Remove $\frac{1}{4}$ of an apple. The $\frac{3}{4}$ left represents all the water on Earth.
2. Cut a THIN slice off the $\frac{3}{4}$ to represent the 3% of water that is fresh.
3. Cut off $\frac{1}{3}$ of the thin slice to represent the amount of fresh water that is not locked up in glaciers or polar ice caps.
4. Half of the last slice represents the amount of fresh water that is accessible or less than 1% of all water on Earth.
5. Discuss the remainder of the apple slice and the importance of conserving and caring for our water supply.

Soil Activity

1. Slice an apple into quarters. Set aside 3 sections to represent the world's oceans. The remaining $\frac{1}{4}$ represents land.
2. Cut the remaining quarter in half ($\frac{1}{8}$ of total apple). This is land inhospitable to humans such as polar areas, high mountains, deserts, swamps, etc.
3. The portion left ($\frac{1}{8}$) represents land where people live. Slice it into four sections and set 3 aside. The 3 pieces set aside represent areas too rocky, wet, cold, steep, or populated to grow food.
4. Carefully peel the skin off the remaining section ($\frac{1}{32}$ of the apple).
5. The peel represents the portion of the Earth's land that is cultivated.

Modifications:

Extensions: Lead a discussion about the impact of drought or flood on the quality and quantity of soil and water on the Earth's surface.

Reference List:

Time of Year: Any