

The Earth as an Apple



Science helps us understand the earth around us and helps us to find new and creative ways to solve the challenges our world faces.

People in the world need food to eat, fiber like cotton to make the clothes we wear, and biofuels to power our cars. All of those things are grown on farms, but farmers face some unique challenges, and one of those challenges is finding the space to grow the things we need.

The world's population is growing, and by the year 2050 there will be nearly 10 billion people sharing our planet. The land we have for growing all of the food, fiber, and renewable fuel we will need for all of those people is not growing, so it's going to become harder to support all of those people.

Scientists are using their curiosity and imagination to explore this challenge to come up with innovative ways to make sure there will be enough for everyone in the future.

To visualize this, we will be using our own imaginations and an apple to see why this is an important challenge and why scientists are so busy studying it.

Note to parents and educators

This is not only a great project to help students learn about the importance of using science to find new ways to conserve natural resources, but you can also use it as an opportunity to learn about fractions!



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You will need:

- // an adult helper
- // Apple
- // Knife
- // Cutting board

A Note on Safety

Because this involves cutting with a sharp kitchen knife, we recommend adults cut the apples, remembering the following knife safety rules:

- Always cut away from your body and hands.
- Make sure that observers stand well back from the cutting area.
- Cut on a sturdy surface.

Step-By-Step Instructions

Step 1 Imagine that your apple represents the earth. Slice the apple into 4 equal slices, and set three slices aside. Those three slices represent the oceans. $\frac{3}{4}$ of the earth is covered by ocean, so is not suitable for farming. When you look at the remaining $\frac{1}{4}$ of your apple, note that this is the portion of the apple representing the land.

Step 2 Cut the remaining apple slice in half, and set one piece aside. That piece ($\frac{1}{8}$ of your apple) represents the land that isn't suitable for producing food: deserts, glaciers, mountains, and forests. The remaining $\frac{1}{8}$ of your apple is the land that could be useful in agriculture.

Step 3 Cut the remaining $\frac{1}{8}$ of your apple into four equal pieces. Set aside 3 of those pieces. Those three pieces ($\frac{3}{32}$ of your apple) represent cities, schools, neighborhoods, shopping centers, and all the other places where people live, and so buildings, parking lots, and other man made structures cover the land surface so you can't grow a lot of food on that portion. You will be left with one tiny piece of your apple $\frac{1}{32}$ the land mass available for agriculture.

Step 4 Carefully peel off the skin of your tiny piece of apple. This tiny piece of skin represents the topsoil layer where we grow our food, fiber, and renewable fuels.

Carry it forward

Our land is a precious resource, and all kinds of scientists are collaborating with farmers to find new ways to grow more on less land. What ideas do you have for ways that we can grow more food? Can you think of ways that they can help conserve our resources?

Write or draw your ideas