



Earth as an Apple



Resource: Earth as an Apple

Below find relevant school curriculum information and key AITC-M messages as well as a script that can be used as a guide for your presentation on the resource, Earth as an Apple. Please note that this is only a guide so feel free to bring your own experience, knowledge and style to this presentation and do what works best for you and the students.

About Agriculture in the Classroom-Manitoba

Agriculture in the Classroom-Manitoba (AITC-M) is a non-profit charitable organization dedicated to developing curriculum-based programs, activities and classroom resources for teachers and students to learn more about agriculture in Manitoba. AITC-M's ABC mandate ensures that all materials are accurate, balanced and current. This encourages students to develop critical thinking skills related to agriculture, food, bioproducts and life sciences. Working with commodity and industry-related organizations, AITC-M's programming, events and services will further develop future decision makers and entrepreneurs.

Key Messages:

- Agriculture is important to everyone because it provides the food we eat and many other products we use every day.
- Soil and water are needed to grow crops and raise animals for food for people.
- Arable soil and usable water are in very limited supply and much in demand by many parts and sectors of our society and we all need to protect them.
- Farmers in particular, are good stewards of the soil and water - which makes sense because they depend on soil and water to produce food and make a living.

Props provided for this presentation:

- Apples
- Paring knives to cut apples
- Cutting boards
- Garbage cans or bags

Presentation Guide:

You will have 15 minutes at this station to do:

- Introduction – about 2 - 3 min
- Earth as an Apple demonstration – approx. 6 ½ mins.
- The Earth's Water demonstration – approx. 5 ½ mins.

Introduction

80% of Canada's farmland is in the Prairie Provinces - 39% in Saskatchewan, 31% in Alberta and 11% in Manitoba. (Map on page 19 All About Food – Agri-Food Facts). The farms which grow our food here in Canada are mostly all located within just 550 km of the US border.

What physical conditions make so much of Canada's land area unsuitable for farming?

- **Topography:** type of landform (tundra); height above sea level (mountains); surface water (lakes, swamps, muskeg)
- **Climate:** amount and type (snow or rain) of precipitation and when it falls, length of growing season (number of frost free days); minimum and maximum temperatures during growing season.
- **Soil:** lack of soil; type and fertility of soil
- **Water:** amount and quality of ground water.



Fertile soils and sufficient water are the two most important natural resources needed to grow crops and raise livestock. Let's take a look at the availability of these resources on our planet.

Part 1 – The “Earth as an Apple”

Hold up an apple. Ask the students to imagine that the apple is our planet Earth. Have them estimate how much of the Earth's surface they think is used to grow all of our food.

Give an apple and paring knife to each pair of students.

Now do the following activity and have the students do the activity along with you.

Apple	Earth	Narrative
Whole Apple	Planet Earth	1. How much of the Earth's surface is covered in water? <i>Answer: 3/4</i>
$\frac{3}{4}$	Water	2. Cut the apple into quarters. Hold out $\frac{3}{4}$ in one hand. <i>So this much of the Earth is covered in water like oceans and lakes.</i>
$\frac{1}{4}$	Land on Earth	3. Set the 'water' sections aside and hold out the remaining quarter. <i>And this $\frac{1}{4}$ represents the total land surface. Can you think of some places where people cannot live and crops cannot grow?</i> <i>Answer: mountains, deserts, tundra, ice caps, swamps</i>
$\frac{3}{16}$	Land that is uninhabitable (and unsuitable for agriculture)	4. Slice the 'land' into 4 equal parts. Hold out $\frac{1}{16}$ of the apple. <i>This portion represents the land area that is mountains.</i> Hold out the second $\frac{1}{16}$ slice of the apple. <i>This portion represents the land area that is deserts.</i> Hold out the third $\frac{1}{16}$ slice of the apple. <i>This portion represents the land area that is tundra, ice caps, swamps and other areas where we cannot grow crops.</i>
$\frac{1}{16}$	Arable Land	5. Set the 3 – $\frac{1}{16}$ slices aside. Hold out the last $\frac{1}{16}$ slice of the apple. <i>This represents all the land suitable for growing crops.</i>
$\frac{1}{32}$	Arable land not used for agriculture	6. Slice the $\frac{1}{16}$ portion in half. Hold up $\frac{1}{32}$ piece of the apple. <i>This is the land that could once have produced food but is now buried under cities, highways, dams, schools and other structures people have built.</i>
$\frac{1}{32}$	Agricultural land	7. Set the $\frac{1}{32}$ piece aside. Hold out the $\frac{1}{32}$ piece remaining. <i>This last piece, just $\frac{1}{32}$ of the whole Earth, is what is left to grow all of the food needed to feed all of the 7 billion people in the world. But wait!</i>
Peel	Topsoil	8. Carefully peel the skin off this last piece. <i>"This small, thin piece of apple peel, barely 3% of the apple's surface, represents the topsoil on which we depend to produce our food. It takes nature up to 500 years or more to build one inch of top soil. So it is very important that not only farmers but everybody protect our soils.</i>

Collect all of the paring knives from the students.



If there is time tell students about these facts:

- The world's population continues to grow and thousands of acres of productive land are lost each year. Thus more and more people must be sustained with less and less land.
- In Canada only 5% of the land base is capable of producing food.

Ask students:

- About the threats to agricultural use of land (soil erosion, urbanization, climate change, etc.)
- What can be done to protect agricultural land from these threats (e.g. proper land use planning, limiting the expansion of cities and rural residential developments, stabilizing population growth, etc.).

Soil Facts

- Most life on earth depends on soil as a direct or indirect source of food
- Plants get nutrients from soil and animals get nutrients from plants or from animals that eat plants.
- Soils form very slowly – about one inch in 500 years or more depending on climatic and other conditions.
- Soil erosion is caused by the wind or water moving soil.
- Soil needs to be conserved to continue to support life.
- From 2002-2007 - 4,080,300 acres of agricultural land were converted to areas for homes, shopping centers, cities, etc.

