

8. Ecological Footprints: Human Wants and Needs affecting the Earth

Sources: *The Junior Environment Club Manual*, Waterloo Region District School Board and Youth Services Canada. Reprint of “The World in an Apple” by Jim Petrie from *Green Teacher*, Issue #46

Description

All species on the Earth need resources to survive. Animals have basic needs for survival, including food, water, shelter and space. All of these needs are fulfilled by the Earth’s resources and connect animals to the environment they live in. Most humans in Western society live beyond their needs. By fulfilling needs and wants humans consume a lot of the Earth’s resources. This activity allows students to explore their own personal needs for survival, and to draw connections to objects they own, have access to, or want, and the Earth’s resources that provide those products.

Background Information

Human activity has large impacts on the health of our natural environment. But humans are not the only species that affect their environment. All living things have an Ecological Footprint that varies in size. An Ecological Footprint is the amount of land necessary to support an individual life. Most species’ footprints are based solely on what they need to survive: food, water, shelter and space. A human being’s “footprint” includes not only needs, but also wants, or extras, that make our lives more comfortable or convenient (several cars, private swimming pools, disposable single-use products). As a result, humans’ footprint on the planet is very large. An understanding of our Ecological Footprint is a striking way to see our connections to and dependence on the Earth and can also highlight how we can reduce our impact on it.

Materials

- ▶ paper cut into the shape of a foot (lefts and rights)
- ▶ magazines
- ▶ writing materials
- ▶ glue
- ▶ scissors
- ▶ apple
- ▶ knife

Time Allotment

Introduction: “The World in An Apple” - 5-10 minutes

Student art work: 20 minutes

Assessing and comparing impacts: 5 minutes

Student sharing (if time allows): 5 minutes

Discussion: 5 minutes

Teaching/Learning Strategies

“The World in an Apple”

Tell students that the apple you are holding represents the Earth. Brainstorm and list on the blackboard ways that students are dependent on the Earth. Highlight food and shelter as two fundamental ways that we depend on the Earth. Then slice the apple in quarters to explore how much of the Earth’s resources are available to support our lives. Set aside the three-quarters that represent the oceans. Slice the remaining quarter into two pieces. Dispose of one piece: it represents the land that is inhospitable for humans. The remaining $1/8$ represents the land where people live or find shelter (use the term from the brainstorming session that most closely relates to shelter). Slice the remaining $1/8$ into four sections and set aside three of the sections. They represent areas too rocky, too steep or too cold to produce food. Carefully peel the remaining $1/32$ slice of the Earth. This peel represents the very thin skin of the Earth’s crust or soil that grows the food we need to live. This layer is less than five feet deep, and is capable of producing a relatively fixed amount of food. In addition, this thin layer of apple peel - which represents the soil – supports the world’s entire population which is currently six billion people and growing. Ask (rhetorically) if any of the students can divide this peel into six billion pieces!

Discuss the concept of an Ecological Footprint with students. Highlight the fact that all species use resources and need a share of the $1/32$ apple slice. The amount of the $1/32$ slice that each person uses to support her/his life is referred to as an Ecological Footprint.

1. Divide students into pairs. Hand out one set of footprints per pair of student.
2. Ask one member of the pair to go through the magazines and cut out pictures of things he/she wants or has at home (i.e. Nintendo, TV, bike, running shoes, toaster), and glue them on to the right footprint.
3. Have the other person cut out pictures or things that he/she needs to live (i.e. food, shelter, clean water) and glue them on to the left footprint. If students can’t find pictures, suggest that they draw what they need.
4. Ask student pairs to compare the two footprints in terms of what resources are needed to produce what is in each footprint. Ask what the impacts are of consuming those resources (show an example on the board).
5. If time permits, ask partners to join another set of partners and share their thoughts.

Follow-up Discussion Questions

- Discuss the collages and how the items in their pictures are connected to resources from the Earth.
- From what the students have created ask, “How large is our Ecological Footprint? How could the size be reduced?”
- Brainstorm ways that we can reduce waste or conserve resources every day.

Extensions for additional classroom projects/activities

- ▶ Explore ways students can conserve resources and challenge them to make these changes for two weeks. Monitor student progress and explore the process of becoming a conserver, not a consumer.
- ▶ Challenge other classes to do the same and reward them for the changes they have made.
- ▶ Have students calculate their Ecological Footprints.

<http://www.rco.on.ca/ecofootprint.html>

<http://www.bestfootforward.com/footprintlife.htm>

<http://www.ecofoot.org>

- ▶ Attempt to calculate the school's Ecological Footprint. For guidance and ideas, see Julie Sawchuk and Tim Cameron's article, "Measuring Your School's Ecological Footprint" in *Green Teacher* #61, Spring 2000.

Curriculum Connections: Clustering of Expectations

GRADE 4: SOCIAL STUDIES (2005)

- 4z32 • identify the natural resources necessary to create Canadian products and the provinces and territories from which they originate (*e.g. trees/furniture/Ontario*)
- 4z50 • identify and describe a cause-and-effect relationship between the environment and the economy in a province or territory (*e.g. overfishing on the Grand Banks; changes to landscape resulting from open-pit mining or clear-cut logging*)

GRADE 4: SCIENCE & TECHNOLOGY—Habitats and Communities (2007)

- 1.1 analyse the positive and negative impacts of human interactions with natural habitats and communities (*e.g., human dependence on natural materials*), taking different perspectives into account (*e.g., the perspectives of a housing developer, a family in need of housing, an ecologist*), and evaluate the ways of minimizing the negative impacts
- 3.10 describe ways in which humans are dependent on natural habitats and communities (*e.g., for water, medicine, flood control in wetlands, leisure activities*)

GRADE 5: SCIENCE & TECHNOLOGY— Conservation of Energy and Resources (2007)

- OE 1 analyse the immediate and long-term effects of energy and resource use on society and the environment and evaluate options for conserving energy and resources
- 1.1 analyse the long-term impacts on society and the natural environment of human uses of energy and natural resources, and suggests ways to reduce these impacts (*e.g., turning off the faucet while brushing teeth or washing and rinsing dishes, conserves water; reusing or recycling products, or using fewer products, conserves natural resources and energy*)
- 3.1 identify a variety of forms of energy (*e.g., electrical, chemical, mechanical, heat, light, kinetic*) and give examples from everyday life of how that energy is used (*e.g., electrical energy for cooking; chemical/electrical energy to run our cars; mechanical energy to hit a baseball; light energy for managing traffic on the roads; heat energy to warm homes and schools*)
- 3.2 identify renewable and non-renewable sources of energy (*i.e., renewable: sun, wind, ocean, waves and tides, wood; non-renewable; fossil fuels such as coal and natural gas*)

GRADE 7: SCIENCE & TECHNOLOGY—Interactions in the Environment (2007)

- OE 1 assess the impacts of human activities and technologies on the environment and evaluate ways of controlling these impacts
- 1.1 assess the impact of selected technologies on the environment