

Paper or Plastic?

Exploring Renewable Resources

Objective

Students will discuss renewable and non-renewable resources and research to determine which type of shopping bag—paper, plastic or cloth—is most sustainable.

Background

Renewable resources are resources that can be regrown or replenished in one or two human lifetimes or that are considered inexhaustible (like sunlight). Renewability assumes that the resource base isn't damaged. Trees are one example of this. We can grow trees again and again unless the soil fertility is destroyed. Renewable resources are considered inexhaustible if they are properly managed. Non-renewable resources are not. Food, fiber, wood, wildlife and sunlight are examples of renewable resources. Fossil fuels and minerals are non-renewable. Non-renewable resources can't be regrown or replenished and may be used up over the years.

There is some disagreement over which resources can be considered renewable and which cannot. Some people might consider humans to be renewable resources, while others argue that individuals cannot be replaced. Others may argue that trees are renewable but forests are non-renewable because of the difficulty in putting everything (moss, lichens, arthropods, etc.) back exactly in place.

The word “sustain” comes from the Latin word *sustinere*, which means “to keep in existence, maintain, and support.” As it pertains to agriculture, sustainable describes farming systems that are “capable of maintaining their productivity and usefulness to society indefinitely. Such systems . . . must be resource-conserving, socially supportive, commercially competitive, and environmentally sound,” according to Missouri Agricultural Economist John Ikerd.

According to the 1990 Farm Bill, sustainable agriculture is an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- satisfy human food and fiber needs.
- enhance environmental quality and the natural resource base upon which the agricultural economy depends.
- make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls.
- sustain the economic viability of farm operations.
- enhance the quality of life for farmers and society as a whole.

To create a sustainable world, inhabitants must use renewable

Oklahoma Academic Standards

GRADE 6

Speaking and Listening:
R.1,2,3; W.1,2. Research:
R1,2,3; W.1,2,4
Life Science: 2.1-2,3,4,5. Earth
Science: 3.3

GRADE 7

Speaking and Listening:
R.1,2,3; W.1,2. Research:
R1,2,3; W.1,2,4
Physical Science: 1-3

GRADE 8

Speaking and Listening:
R.1,2,3; W.1,2. Research:
R1,2,3; W.1,2,4
Life Science: 1-1

resources no more quickly than they can be regrown. They must not use non-renewable resources or must use them slowly enough so that renewable resources can eventually take their place. And they must prevent waste and pollution as much as possible so that all waste can be absorbed or neutralized by the environment.

Resources: Richard Duesterhaus, “Sustainability’s Promise,” *Journal Of Soil and Water Conservation*, Jan.-Feb. 1990; “Food, Agriculture, Conservation, and Trade Act of 1990” (FACTA), Public Law 101-624, Title XVI, Subtitle A, Section 1603 (Government Printing Office, Washington, DC, 1990.)

English Language Arts

1. Write the terms “renewable resources” and “non-renewable resources” on the chalkboard.
—Students will define the terms in class discussion.
2. Read and discuss background and vocabulary.
3. Students will brainstorm to develop a list of renewable resources.
—Write the ideas on the chalkboard.
—Repeat for non-renewable resources.
4. Divide students into groups of three or four.
—Give each group a paper bag, a plastic bag, a durable cloth bag (cotton) and copies of the worksheet included with this lesson.
—Students will discuss the topics on the worksheet.
—Students will use online or library resources to determine which type of bag is most sustainable. (There is no correct answer.)
—Students will justify their choices.
5. Students will report on their findings. Did the groups come to a consensus, or was the decision based on majority rule?
6. Lead a class discussion based on the following questions. —If non-renewable resources can be used up, why do people continue to depend on them? (price, convenience, no renewable resource to take the place of non-renewable) —Will we ever actually run out of non-renewable resources such as oil and coal? (As resources become scarcer, their prices rise. Rising prices provide incentives to develop less expensive resources. Some believe our ingenuity and technology will help us develop substitutes for existing resources as they become more expensive. Others believe there isn’t enough time left to develop affordable substitutes before they run out.
—Are all natural resources on earth exhaustible? (No. Some resources, like trees, can be replanted.)

Science

1. Provide students with an assortment of materials—popcorn, corn husks, glue, needles and thread, staplers, grass, tree bark, fibers, etc.,—or have students bring their own materials.
—Students will use the materials to create a new type of bag fiber.
—Students will describe in writing or as a presentation to the class how the fiber was made and how it will be transported and used.

Materials

4-5 paper bags
4-5 plastic bags
4-5 durable cloth bags
popcorn
corn husks
glue
needles and thread
staplers
grass
tree bark
fibers

Extra Reading

- Defoe, Daniel, *Robinson Crusoe*, Collector's Library, 2011.
- Desonie, Dana, *Geosphere: The Land and Its Uses (Our Fragile Planet)*, Chelsea House, 2008.
- Dr. Seuss, *The Lorax*, Random House, 1976.
- Flatt, Lizann, *Life in a Forestry Community (Learn About Rural Life)*, Crabtree, 2009.
- King, Zelda, *Examining Forest Habitats (Graphic Organizers, Habitats)*, PowerKids, 2009.
- Kirkland, Jane, *Take a City Nature Walk*, Stillwater, 2005.
- Kirkland, Jane, *Take a Tree Walk (Take a Walk Series)*, Stillwater, 2002..
- Raum, Elizabeth, *Potato Clocks and Solar Cars: Renewable and Non-Renewable Energy*, Raintree, 2007.
- Wallace, Marianne D., *American Forests: Guide to Plants and Animals*, Fulcrum, 2009.
- Wyss, Johann David, *The Swiss Family Robinson: or, Adventures on a Desert Island*, Nabu, 2010.

Vocabulary

inexhaustible—infinite; unlimited; never-ending

non-renewable—inability to regrow or replenish; limited quantity

renewable—ability to regrow or replenish in one or two human lifetimes

replenish—restock or refill

resource—something that can be used for support or help

sustain—keep in existence; maintain; support

Name _____

Worksheet: Paper or Plastic?

| Type of Bag | Made from a renewable resource? | Environmental impacts from growing, harvesting or manufacturing | Are non-renewable resources used to make it? | How many times can it be used? | Can it be composted (added to the soil instead of put into a landfill or burned)? |
|-------------|---------------------------------|---|--|--------------------------------|---|
| Paper | | | | | |
| Plastic | | | | | |
| Canvas | | | | | |

Name _____

Worksheet: Paper or Plastic? (answers)

| Type of Bag | Made from a renewable resource? | Environmental impacts from growing, harvesting or manufacturing | Are non-renewable resources used to make it? | How many times can it be used? | Can it be composted (added to the soil instead of put into a landfill or burned)? |
|-------------|---|--|--|--|---|
| Paper | Yes. Made from trees that can be regrown. | Harvesting trees can mean a loss of habitat for some species and creates air and water pollution. Paper factories can pollute the air and water. | Yes. Fossil fuels are used for harvest and transport of raw materials and final products. | A few times. Although they are not particularly durable, high quality paper bags can be used many times. | Yes |
| Plastic | No. Made from fossil fuels. | Extracting oil from ocean or land can mean loss of habitat for some species. Plastic factories can pollute the water and air. Occasionally, oil spills during transport damage habitat. | Yes. Fossil fuels used for extraction from the ground and transport. Electricity, potentially from burning coal or oil, used to manufacture. | Many times. If not overloaded, the plastic will remain intact for many uses. | No |
| Canvas | Yes, if made from cotton. | Pesticides and fertilizers are widely used on cotton crops, although organic cotton is grown without pesticides. These chemicals can pollute water and soils and harm living things. Land used for growing cotton replaces natural habitat for some species. | Yes. Fossil fuels used for harvest and transport of raw materials and final products. Electricity, potentially from burning coal or oil, used to manufacture | Potentially can be used for years. Bags should be kept clean and repaired when needed. | Yes, if made from cotton. Cotton is a natural fiber and eventually breaks down in the soil. |