Seas, Trees, and Economies

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Seas, Trees, and Economies

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Introduction

Seas, Trees, and Economies was originally written by Curt L. Anderson, Ph.D., Professor Emeritus, University of Minnesota-Duluth and published by the University of Missouri-St. Louis. In his introduction to the unit, Dr. Anderson said:

> Children and far too many adults fail to see the contradiction in asking loggers to "spare those trees" and asking contractors to "build more and better homes for everyone." These are both worthy desires. Unfortunately, new homes require a cleared space and lumber made from wood or wood products. As a result, more homes means fewer standing trees. Conversely, more spared trees translates into fewer homes. The size of our natural environment is limited. If we choose one thing, we invariably give something else up…The lessons [in this unit] were written to help students understand the relationship between our natural environment and the economy as well as to describe how the environment and the economy jointly provide us with goods and services that we want. The lessons provide students with tools they need to recognize fundamental trade-offs, to explain how and why choices are made, and to explain how people can make better choices regarding the use of natural resources and the disposal of wastes that production and consumption unavoidably create.

With permission, economic education staff at the Federal Reserve Bank of St. Louis have revised the lessons to include updated examples, compelling questions, assessments, and alignment with current national standards. Each lesson teaches fundamental economic concepts such as scarcity, resources, goods, services, opportunity cost, trade-offs, value, price, and incentives. Most lessons employ simulations and other hands-on activities engaging students in the learning process and providing experiences to help them discover why things happen as they do.

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Lesson 1:
The Mystery Trees of Island Breeze

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Standards and Benchmarks (see page 1.12)

Lesson Description

Students read a short story about a fictional natural resource, the great Mystery trees of Island Breeze. Students discuss the various goods and services provided by the trees, draw pictures of the uses of the trees, and then role-play to demonstrate the effect of scarcity on a society.

Grade Level

6-8

Economic Concepts

Goods

Natural resources

Opportunity cost

Scarcity

Services

Trade-offs

Wants

Objectives

Students will be able to

- define wants, goods, services, natural resources, trade-offs, scarcity, and opportunity cost;
- explain that natural resources are used to produce goods and services that satisfy people's wants;
- recognize that natural resources have alternative uses; and
- explain why scarcity forces people to make choices about how they use natural resources.

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Compelling Question

How do people deal with scarcity?

Time Required

45-60 minutes

Materials

- Visuals 1-1 and 1-2
- Copy of Handouts 1-1 and 1-2 for each student
- One piece of drawing paper for each student
- Pencils and crayons
- Masking tape

Preparation

Before class, use masking tape to mark off a space in which only half the class can stand comfortably. This space will represent the Island Breeze from the story on Handout 1-1.

Procedure

1. Explain that people have unlimited wants. **Wants** are desires that can be satisfied by consuming goods and services. Define **goods** as objects that satisfy people's wants and **services** as actions that satisfy people's wants. Ask students for examples of goods and services they want.

2. Display *Visual 1-1: What People Want* and read it aloud or have students read it aloud. Ask students to add some ideas to the list. (*Examples: Cold people want furnaces. Hot people want air conditioners. Wet people want towels. Walking people want sidewalks. Bike-riding people want bike trails.*) Have students refer to the visual and complete the following sentence: "These things that satisfy our wants are called _____." (*Goods and services*)

3. Ask students for examples of goods and services from Visual 1-1. (*Answers may include goods: food, beds, fans, sweaters, toys, houses; and services: education, housekeeping, travel, movie entertainment, haircuts.*)

4. Display *Visual 1-2: Natural Resources Are Used to Produce Goods and Services* and explain that **natural resources** are things that occur naturally in and on the earth that are used to produce goods and services. Read the visual aloud or ask a student to. Ask students to expand

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the list. (*Examples: Trees are used to make paper. Water is used to produce electricity. Mountains are used for climbing. Rivers are used to move barges. Oil is used to make gasoline. Oil is used to make plastic. Sand is used to make windows. Diamonds are used to make jewelry.*)

5. Point out that some things listed on Visual 1-2, such as oxygen, UV protection, flood control, and water, are provided directly to people by the environment for free; that is, at a price of zero. Others are provided for a price through the economic system by producers who use natural resources to make the goods and services people want. In either case, people's wants are being satisfied.

6. Distribute a copy of *Handout 1-1: The Mystery Trees of Island Breeze* to each student. Have them read the story and then ask students to describe the various goods and services provided to the islanders by the Mystery trees. They should also identify the wants these goods and services satisfy.

7. Summarize these uses into two categories—goods and services—as follows:

   Goods

   - Wood from the tree is used to produce homes for shelter.
   - Wood from the tree is used to produce toys for play.
   - Bark from the tree is used to produce paper for writing.
   - Wood from the tree is used to produce boats for travel and fishing.
   - Fruit from the tree provides food for the hungry people.

   Services

   - The trees provide windbreaks for the island.
   - The trunk and branches of the tree provide a home for the Falana birds.
   - The leaves and branches of the tree provide shade and windbreak for the people.
   - The vines of the tree provide entertainment and a place to play for the children.

8. Tell students to assume that these are mutually exclusive uses; that is, each tree is dedicated to only one of these uses. This makes sense, according to the story, because harvesting fruit and wood from the tree means it can't be used for shade, play, or windbreak. Logging the trees and harvesting the fruit would also disturb the Falana. Similarly, trees trimmed to grow fruit would not be good wood producers, and vice versa.

9. Divide the class into four groups: Mystery trees that will provide wood, Mystery trees that will provide fruit, Mystery trees that will provide homes for the Falana birds, and Mystery trees that will provide services for the people.

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10. Distribute a piece of drawing paper to each student. Tell students to draw a picture of a Mystery tree. The features of the tree should illustrate the use a student's group has been assigned. For example, a tree with a massive trunk and branches would be used for wood. A tree trimmed and showing a lot of fruit would be used to provide fruit. A tree showing nests would be used to provide homes for the Falana. A tree with vines would represent play and recreation for the islanders.

11. When students have completed their pictures, tell them to write the name of their group at the top of their picture.

12. Tell students to hold their pictures and stand up.

13. Explain that each student represents a Mystery tree used to provide a particular good or service. Explain that there are plenty of trees representing each good or service to satisfy all the people's wants. However, all trees must be "planted" on the Island Breeze.

14. Instruct all students to stand near the space you have marked off to represent the island. Begin planting the trees on the island by placing students, one at a time, in the marked area. It should soon become apparent that all the "student trees" cannot be planted on the island—they won't all fit. Ask students the questions below. As they respond, have them explain why their assigned use is more important than the other uses. (NOTE: This should lead to a discussion about which uses are the most valuable to the people; that is, which uses provide the greatest amount of satisfaction of wants.)
    - How many trees should be planted to provide wood for homes, boats, and toys?
    - How many trees should be planted to provide fruit?
    - What about trees that provide shade, play, and windbreak for the islanders?
    - How big should the Falana preserve be?

15. Explain that a **trade-off** is giving up some of one thing to gain more of something else. Point out the trade-offs inherent in their decisions. If they choose to plant more trees for fruit and fewer trees for wood, there will be more fruit to eat but fewer homes and boats. If they choose to plant more trees for Falana birds and fewer trees along the coastline, there will be more birds but fewer shady and play areas and less windbreak.

16. After this problem has been resolved and the "island" is filled, tell the "excess" students to be seated. Announce the following: "Oops, I forgot! We need room for the people and their homes!" Mark off a portion of the island for this use and again ask which trees should remain. After students have decided what to do, discuss the following:

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- What is the islanders' problem? (*There isn't enough land to plant all of the Mystery trees needed to provide the people with all the goods and services they want.*)
- Because there aren't enough trees for the people to have all the goods and services they want, what must they do? (*They must make choices.*)
- If the islanders wanted to increase the size of the Falana preserve by one tree, what would happen? (*The people must give up one tree reserved for another use. So they would gain the satisfaction of a larger Falana preserve, but they would lose the satisfaction of the other good or service the tree would have provided.*)

17. Demonstrate this concept by adding a tree to the Falana preserve and removing a fruit or wood tree. Explain that the islanders are faced with the problem of scarcity. **Scarcity** is the condition that exists because there are not enough resources to produce everyone's wants. The land and trees on Island Breeze are scarce, so the people can't have all the goods and services they want. As a result, they must make choices.

18. Remind students that by choosing to have a larger Falana preserve, the people give up fruit or wood. What they give up is their opportunity cost. **Opportunity cost** is the value of the next-best alternative when a decision is made; it's what is given up.

19. Explain that this morning you had to choose between a bagel with cream cheese and cereal with banana for breakfast. You decided to have the bagel with cream cheese. You gave up the opportunity to have cereal with banana. The cereal with banana was your opportunity cost. It was the alternative you would have chosen if you hadn't chosen the bagel with cream cheese.

20. Give the following examples, selecting students to make a choice and identify the opportunity cost in each example:
    - Your grandparents give you $50 for your birthday. You think carefully about all the things you might do with your money and narrow your alternatives to three: save the money to buy a cell phone in the future, buy a new video game, or buy new jeans. Which would you choose? (*Answers will vary.*) What is your opportunity cost? (*The higher-valued alternative of the two not chosen [e.g., either jeans or video game]—not both*)
    - Your class is going to take a field trip. The teacher has offered the following alternatives: a trip to the history museum, a visit to the science center, or a trip to the art museum. Which would you choose? (*Answers will vary.*) What is your opportunity cost? (*The higher-valued alternative of the two not chosen—not both*)

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Closure

21. Review the key concepts in the lesson with the following questions:
    - What are wants? (*Desires that can be satisfied by consuming goods and services*)
    - What are goods? (*Objects that satisfy people's wants*)
    - Name some goods on the island. (*Homes, boats, fruit*)
    - Name some goods that you consume. (*Clothes, food, paper*)
    - What are services? (*Actions that satisfy people's wants*)
    - Name some services in the story. (*Shade, play, windbreak*)
    - Name some services that you consume. (*Education, bike repair, haircuts*)
    - What are natural resources? (*Things that occur naturally in and on the earth that are used to produce goods and services*)
    - Give some examples of natural resources. (*Land, water, trees, oil*)
    - How do natural resources help people satisfy their wants? (*Some natural resources provide goods and services directly; others are used to produce goods and services. People consume goods and services to satisfy their wants.*)
    - Give some examples of natural resources, the goods and services they are used to produce, and the wants the goods and services satisfy. (*Land used to grow food to satisfy hunger, land used to build homes to satisfy a want for shelter, natural gas used to produce heat to satisfy a want for warmth, the ozone layer that provides UV protection, trees that provide shade and oxygen*)
    - What is scarcity? (*The condition that exists because there are not enough resources to produce everyone's wants*)
    - What natural resources were scarce on Island Breeze? (*Land, trees*)
    - How do people deal with scarcity? (*They must make choices.*)
    - What is opportunity cost? (*The value of the next-best alternative when a decision is made; it's what is given up*)
    - Given an example of a choice you have made and the opportunity cost of your choice. (*Answers will vary.*)

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Assessment

22. Distribute a copy of *Handout 1-2: Assessment* to each student. Tell the students to read the directions and complete the task assigned. Review students' answers with the following answer key:

    1. *Water is a natural resource because it occurs in nature.*
    2. *Scarcity is not having enough resources to satisfy all wants. Water was scarce in Red Rock. There wasn't enough to satisfy all the desired uses.*
    3. *Answers will vary.*
    4. *People make choices to deal with scarcity.*

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Visual 1-1: What People Want

Hungry people want food.

Thirsty people want water.

Tired people want beds.

Hot people want fans.

Cold people want sweaters.

Sick people want medicine.

Young people want toys.

Homeless people want houses.

Hairy people want haircuts.

Curious people want books.

Healthy people want clean air.

Nature-loving people want homes for wildlife.

Dirty people want soap.

Sad people want funny movies.

People who can't read want education.

Outdoor people want sunscreen.

Messy people want housekeepers.

Busy people want computers.

Bored people want travel.

People wish to satisfy their wants to make themselves happy.

Goods and services are used to satisfy these wants.

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Visual 1-2: Natural Resources Are Used to Produce Goods and Services

Land is used to grow food.

Forests are used to control floods.

Rain is used to provide water.

Hawks are used for bird watching.

Iron ore is used to produce cars.

Oil is used to make paint.

Lakes are used for boating.

The ozone layer is used for UV protection.

Trees are used to build houses.

Sheep wool is used to make sweaters.

Beaches are used for relaxing vacations.

Sand is used to make bottles.

Gold is used to make jewelry.

Trees produce oxygen.

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Handout 1-1: The Mystery Trees of Island Breeze

Far away from anywhere is Island Breeze. It is a small island, just big enough for the people who live there. The people live a quiet life. They depend on the great Mystery trees that grow on the island.

The people eat the fruit from the Mystery trees. They carve their fishing boats out of the trunks of the trees. The islanders write stories about the beloved Falana birds on paper made from the bark of the Mystery trees. They lie in the cool shade of the trees' broad, fern-like leaves. The children of Island Breeze play with the strong vines of the trees and make whistles and paddles out of its wood.

For the Mystery trees to produce fruit, they must be trimmed each year by the islanders. If not trimmed, the trees grow wider and taller and become good wood producers.

The Mystery trees are also used to build small homes to protect the people from the strong winds that often blow from the north. The islanders have let the Mystery trees on that side of the island grow tall to help block the winds.

The people enjoy the bright red Falana birds, which nest on the tips of the Mystery trees. "We like when the Falana are happy," say the islanders. Because the people enjoy the birds so much, a part of the Mystery forest is preserved as a safe, peaceful place for the Falana. The islanders like to go there to watch the birds, especially on sunny days.

Life is easy on the Island Breeze—as long as there are plenty of Mystery trees.

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Handout 1-2: Assessment

Directions: Read the information below and answer the questions that follow.

The city of Red Rock receives all of its fresh water from the Red Rock reservoir. Lately there hasn't been much rain. The water level in the reservoir has started to fall, and the citizens of Red Rock are very concerned about having enough water. They use fresh water to irrigate crops, drink, bathe, swim, water lawns, cool machinery, and wash cars, clothes, and many other things. What will they do if the water level in the reservoir continues to fall?

They have called a meeting to discuss the water problem. You've been asked to help conduct the meeting. As an outline for your meeting, answer the following questions:

1. What type of resource is water? Why?

2. What is scarcity, and how does it apply to the people who live in Red Rock?

3. Give an example of a choice the citizens of Red Rock might make about the use of fresh water. Explain what the opportunity cost of their choice would be.

4. How do people like those in Red Rock deal with scarcity?

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Standards and Benchmarks

Voluntary National Content Standards in Economics

Standard 1: Scarcity

- **Benchmarks: Grade 4**

  1. People make choices because they can't have everything they want.
  2. Economic wants are desires that can be satisfied by consuming a good (an object), a service (an action), or a leisure activity.
  3. People's choices about what goods and services to buy and consume determine how resources will be used.
  5. The opportunity cost of an activity is the value of the best alternative that would have been chosen instead. It includes what would have been done with the money spent and the time and other resources used in undertaking the activity.
  7. Natural resources such as land are "gifts of nature"; they are present without human intervention.

- **Benchmarks: Grade 8**

  1. Scarcity is the condition of not being able to have all of the goods and services that one wants. It exists because human wants for goods and services exceed the quantity of goods and services that can be produced using all available resources. Scarcity is experienced by individuals, governments, and societies.
  2. Making good choices should involve trading off the expected value of one opportunity against the expected value of its best alternative.
  3. The choices people make have both present and future consequences.
  4. The evaluation of choices and opportunity costs is subjective; such evaluations differ across individuals and societies.

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Lesson 2:
Here Today, Back Here Tomorrow

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Standards and Benchmarks (see page 2.11)

Lesson Description

Students engage in a trading activity that allows them to chart the flow of a natural resource out of the environment, through the economy, and then back into the environment.

Grade Level

6-8

Economic Concepts

Consumer

Consumption

Goods

Intermediate goods

Natural resources

Production

Services

Trade-off

Waste

Objectives

Students will be able to

- define goods, services, consumer, production, natural resources, intermediate goods, waste, and trade-off;

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- explain the "life cycle" of natural resources used in an economy; and
- explain how the environment provides raw materials and services that are used to satisfy people's wants.

Compelling Question

How can waste that occurs through the transformation of natural resources into goods and services be reduced?

Time Required

30-45 minutes

Materials

- Visual 2-1
- One or two copies of Handout 2-1, cut apart and shuffled so that one set of four cards is available for each student (NOTE: A set contains one natural resource, one intermediate good, one good, and one waste card. The handout provides enough sets for a class of 25 students. For classes with fewer than 25 students, remove sets. For classes with more than 25 students, add duplicate sets.)
- One copy of Handout 2-2 for each student
- Internet access for online dictionaries
- Drawing paper, pencils, and crayons

Procedure

1. Point out a wooden desk or other wooden object in the classroom and ask the following questions:
   - What was used to make this desk? (*Wood or lumber*)
   - From where did the person who produced the desk buy the lumber? (*Lumberyard or sawmill*)
   - Where was the wood or lumber before it arrived at the lumberyard or sawmill? (*It was a tree in a forest.*)
   - What might happen to this desk in 15 to 20 years? (*It might become old and unusable.*)
   - Once the desk is placed in the trash, where will it go? (*Landfill or incinerator*)

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2. Display *Visual 2-1: Vocabulary* and explain the following:
    - **Goods** are objects that satisfy our wants.
    - **Services** are actions that satisfy our wants.
    - When people buy and use goods and services, they are **consumers**.
    - **Production** occurs when resources and intermediate goods are used to make goods and provide services.
    - **Natural resources** are things that occur naturally in and on the earth that are used to produce goods and services. For example, trees occur naturally on the earth. Natural resources often are transformed into intermediate goods that are used to produce many other goods.
    - An **intermediate good** is a man-made good that is used to produce another good or service, becoming part of that good or service. For example, trees (natural resources) are cut into lumber (intermediate good). The lumber is used to produce desks and becomes part of the desks.

3. Discuss the following:
    - Name some goods that you consume. (*Clothing, food, pencils, paper, games*)
    - Name some services that you consume. (*Education, bus transportation, bike repair*)
    - Give some examples of natural resources. (*Oil, water, plants, trees, rocks, soil, minerals*)
    - Name some goods that are produced with natural resources. (*Oil—gasoline and plastic; water—bottled water, other beverages, food, shampoo, and lotion; soil—plants, fruits, and vegetables; Minerals—aluminum cans, jewelry, and glass*)

4. Explain that when goods are produced and consumed, waste occurs. **Waste** is the unavoidable material that remains after something has been consumed or produced. Some waste may be recycled to produce more goods, while the rest of the waste is put back into the environment in the ground (landfill), in waterways (through sewers), or in the air (incineration). Thus, each natural resource has its own "life cycle" as it starts in the environment, is used in the economy, and then eventually is returned to the environment. Discuss the following:
    - Give some examples of waste that is recycled to produce more goods. (*Aluminum cans, some plastic products, paper*)
    - Give some examples of waste that is put back into the environment—whether in landfills, through sewers, or incinerated into the air. (*Packaging from various products may be put into landfills or incinerated; water used to produce chemicals and cool machinery flows back into rivers and streams; treated sewage flows into rivers; and carbon dioxide and other gases are emitted from cars.*)

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5. Tell students they are going to discover the life cycle of several natural resources by playing a simple trading game. Each student will receive four cards. The object of the game is to collect a set of cards that trace the life cycle of one natural resource through each of its stages: natural resource, intermediate good, good, and waste. Each student should make one-for-one trades with other students until collecting a complete and accurate set of four cards for a specific resource.

6. Once a student thinks he or she has a complete set of cards, the student should bring it to you to verify that it is complete and accurate. If correct, the student receives a copy of *Handout 2-2: The Lifecycle of a Natural Resource* to complete by drawing pictures that represent each of the four stages for the resource. If incorrect, the student must continue trading until a complete set has been collected. (NOTE: Each set is identified as a row on Handout 2-1. For example, a correct answer for "tree" would be tree, wood/lumber, furniture, and scrap wood. An incorrect answer for "oil," according to the table, would be oil, plastic, jar, and used jar.)

7. Instruct students to begin trading. When all students have completed trading and have completed Handout 2-2, allow several of them to share their natural resource life cycles. Display student pictures on a bulletin board titled "The Life Cycle of Natural Resources."

8. Point out that bringing natural resources into the economy unavoidably creates waste because materials can never really disappear altogether. So the environment not only supplies us with materials to produce the goods and services we want, it also is the place where we put our waste.

9. Explain that putting waste into the environment prevents the environment from providing other goods and services that people want. Give the following examples:
    - When we place waste into the air, the environment can't provide the clean air that we want to breathe.
    - When we place waste into the air, we damage the ozone layer. This means the environment can't provide the UV protection that we want.
    - When we put waste into the water, the environment can't provide the clean water that we want.
    - When we cut down trees and eliminate grasslands, the environment can't provide the flood protection and wildlife habitat that we want.

10. Explain that our environment is limited. This means there's a limited amount of clean water, clean air, land space, and so on. This means that if we want to produce more goods and services in the economy, we give up goods and services the environment provides. If we want more goods and services the environment provides, we give up goods and services pro-

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duced in the economy. Giving up some of one thing to have more of something else is called a **trade-off**.

11. Point out that decisionmaking often involves trade-offs. For example, if you have an important test you must study for, you may give up some free time after school to spend additional time studying. If you want to be a better baseball player, dancer, or saxophone player, you may give up some time sleeping in on Saturday morning to spend more time practicing.

Closure

12. Review the major points of the lesson by discussing the following:
    - What are consumers? (*People who buy and use goods and services*)
    - What are goods? (*Objects that provide satisfaction*)
    - What are services? (*Actions that provide satisfaction*)
    - What are natural resources? (*Things that occur naturally in and on the earth that are used to produce goods and services*)
    - What are the four stages of a natural resource's life? (*Natural resource, intermediate good, good, waste*)
    - What is an intermediate good? (*A man-made good that is used to produce another good or service, becoming part of that good or service*)
    - Give an example of an intermediate good. (*Wood pulp, lumber, steel, leather, glass*)
    - What is production? (*The process of using resources and intermediate goods to make goods and provide services*)
    - What is waste? (*The unavoidable material that remains after something has been consumed or produced*)
    - Why is waste a problem? (*It ends up back in the environment and makes it difficult for the environment to provide other goods and services we want.*)
    - What is a trade-off? (*Giving up some of one thing to have more of another thing*)
    - What trade-off do we make between the economy and the environment? (*If we want to produce more goods in the economy, we give up environmental goods such as clean air and clean water. If we want more clean air and clean water, we must give up some goods produced in the economy.*)

Assessment

13. Talking with students, create a list of goods in the classroom (pencils, paper, desks, water, tables, chairs, markers, crayons, and so on). Ask students to choose an item from the list and

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explain which natural resources were used to produce the item and from where these natural resources might have come. Then ask students to explain what happens to these goods after they are used up. (*Paper comes from trees—perhaps from forests in another state. When the paper is used, it is tossed in the trash or recycle bin. Then it is hauled away by a garbage truck to be recycled, put in a landfill, or possibly incinerated. If it is incinerated, it isn't eliminated. Its molecules are dispersed over a very wide area. Water comes from rain or snow melt from nearby mountains. It comes to homes, businesses, and schools through pipes. Once it is used, it is flushed or poured down the drain and enters the sewer system. From there it goes to a sewage treatment facility where it is treated and discharged back into a nearby river or evaporated back into the atmosphere.*)

Extension

14. Discuss the following "Four Rs" of waste management:

    - **Reduce** means to produce and consume fewer goods. Producing fewer goods means we use fewer natural resources and produce less waste.
    - Give examples of ways in which you, your family, or your class might reduce. (*Write on a chalkboard or whiteboard that can be reused instead of on paper. Read a textbook online. Both of these reduce the use of paper. Take showers instead of baths because typically a shower uses less water than a bath. Use cloth bags for shopping, reducing the use of paper or plastic for bags.*)
    - **Reuse** means to use goods more than once or to use goods in new ways.
    - Give examples of ways in which you, your family, or your class might reuse. (*Use both sides of the paper on which you write and draw. Hand down clothing to younger brothers and sisters. Keep boxes and wrapping paper in which you received gifts and use them when you give gifts. Use reusable cloth bags for shopping.*)
    - **Refine** means to develop production methods that use fewer intermediate goods and less energy and, therefore, use fewer natural resources and produce less waste.
    - Give examples of ways in which you, your family, or your class might refine. (*Cooking in a microwave instead of an oven reduces the use of electricity, which means using less coal, oil, or uranium. Using computers to store information saves paper. Better-insulated windows and doors reduce the school's and/or your family's need for heating and cooling.*)
    - **Recycle** means to collect used materials and use them to produce goods. This means fewer natural resources are used and less waste is produced.
    - Give examples of ways in which you, your family, or your class might recycle. (*Place paper, glass, aluminum, and plastic in recycle bins. Use empty boxes and cardboard tubes to produce storage containers for the classroom.*)

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Visual 2-1: Vocabulary

Goods: Objects that satisfy our wants.

Services: Actions that satisfy our wants.

Consumers: People who buy and use goods and services.

Production: Occurs when resources and intermediate goods are used to make goods and provide services.

Natural resources: Things that occur naturally in and on the earth that are used to produce goods and services.

Intermediate good: A man-made good that is used to produce another good or service, becoming part of that good or service.

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Handout 2-1: Flow Cards (page 1 of 2)

TREE Natural resource	**WOOD/LUMBER** Intermediate good	**FURNITURE** Good	**SCRAP WOOD** Waste
COW Natural resource	**LEATHER** Intermediate good	**COAT** Good	**OLD COAT** Waste
OIL Natural resource	**GASOLINE** Intermediate good	**CAR FUEL** Good	**EXHAUST GASES** Waste
IRON ORE Natural resource	**STEEL** Intermediate good	**CAR** Good	**JUNK CAR** Waste
SUGAR CANE Natural resource	**SUGAR** Intermediate good	**CANDY BAR** Good	**SEWAGE** Waste
SNOW/RAIN Natural resource	**WATER** Intermediate good	**SOFT DRINK** Good	**SEWAGE** Waste
SAND Natural resource	**GLASS** Intermediate good	**JAR** Good	**USED JAR** Waste
GALENA Natural resource	**LEAD** Intermediate good	**BATTERY** Good	**OLD BATTERY** Waste
SHEEP Natural resource	**WOOL** Intermediate good	**CARPET** Good	**OLD CARPET** Waste
RUBBER TREE Natural resource	**RUBBER** Intermediate good	**TIRE** Good	**OLD TIRES** Waste
OIL Natural resource	**PLASTIC** Intermediate good	**MILK JUG** Good	**USED JUG** Waste
BAUXITE ORE Natural resource	**ALUMINUM** Intermediate good	**SOFT DRINK CAN** Good	**USED CAN** Waste
COW Natural resource	**MILK** Intermediate good	**CHEESE** Good	**SEWAGE** Waste

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Handout 2-1: Flow Cards (page 2 of 2)

COAL DEPOSIT Natural resource	**COAL** Intermediate good	**ELECTRICITY** Good	**ASH AND GASES** Waste
COTTON Natural resource	**CLOTH** Intermediate good	**SHIRT** Good	**RAGS** Waste
LIMESTONE Natural resource	**CONCRETE** Intermediate good	**SIDEWALK** Good	**BROKEN SLABS** Waste
SILKWORM Natural resource	**SILK** Intermediate good	**TIE** Good	**OLD TIE** Waste
WHEAT Natural resource	**FLOUR** Intermediate good	**BREAD** Good	**SEWAGE** Waste
COPPER ORE Natural resource	**COPPER** Intermediate good	**WATER PIPES** Good	**SCRAP METAL** Waste
TREE Natural resource	**WOOD PULP** Intermediate good	**PAPER** Good	**TRASH** Waste
PLANT Natural resource	**CHEMICALS** Intermediate good	**MEDICINE** Good	**SEWAGE** Waste
SOIL NUTRIENTS Natural resource	**CROPS** Intermediate good	**VEGETABLE** Good	**SEWAGE** Waste
GOLD DEPOSITS Natural resource	**GOLD** Intermediate good	**JEWELRY** Good	**OLD JEWELRY** Waste
CHICKEN Natural resource	**EGGS** Intermediate good	**CAKE** Good	**SEWAGE** Waste
OIL Natural resource	**CHEMICALS** Intermediate good	**PAINT** Good	**OLD PAINT** Waste

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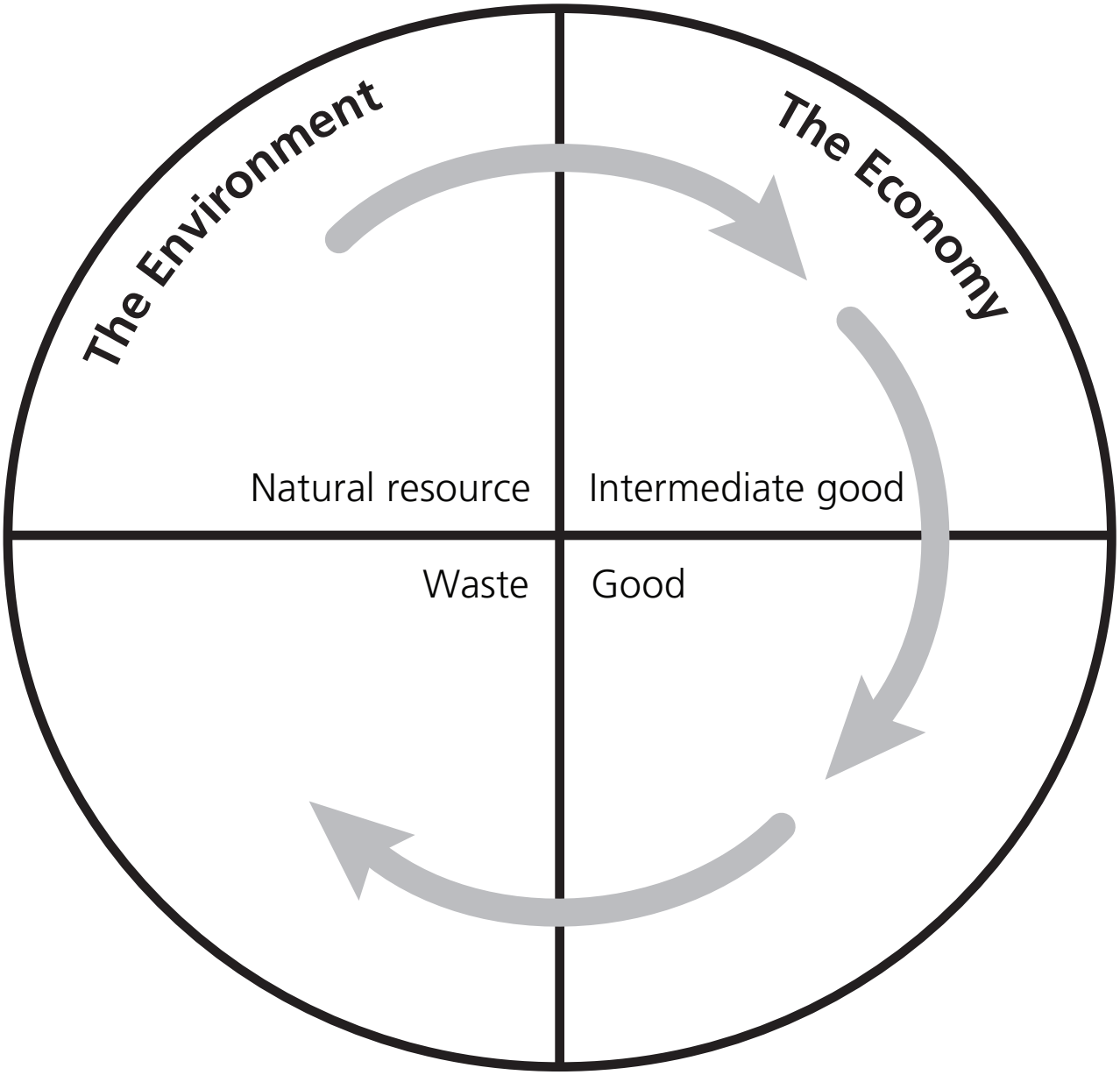
Handout 2-2: The Life Cycle of a Natural Resource



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Standards and Benchmarks

Voluntary National Content Standards in Economics

Standard 1: Scarcity

- **Benchmarks: Grade 4**

  1. People make choices because they can't have everything they want.
  2. Economic wants are desires that can be satisfied by consuming a good (an object), a service (an action), or a leisure activity.
  3. People's choices about what goods and services to buy and consume determine how resources will be used.
  6. Productive resources are the natural resources, human resources, and capital goods available to make goods and services.
  7. Natural resources such as land are "gifts of nature"; they are present without human intervention.
  8. Human resources are the people who do the mental and physical work to produce goods and services.
  9. Capital goods are goods that are produced and used to make other goods and services.
  11. Most people produce and consume. As producers they help make goods and services; as consumers they use good and services to satisfy their wants.

- **Benchmarks: Grade 8**

  1. Scarcity is the condition of not being able to have all of the goods and services that one wants. It exists because human wants for goods and services exceed the quantity of goods and services that can be produced using available resources. Scarcity is experienced by individuals, governments, and societies.
  2. Making good choices should involve trading off the expected value of one opportunity against the expected value of its best alternative.
  3. The choices people make have both present and future consequences.

Standard 3: Allocation

- **Benchmark: Grade 8**

  5. As consumers, people use resources in different ways to satisfy different wants. Productive resources can be used in different ways to produce different goods and services.

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Lesson 3:
Letter Perfect and Clean Enough

Author

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Standards and Benchmarks (see page 3.11)

Lesson Description

Students learn about the types of natural resources (plant, animal, mineral, fossil fuel, and other) that the environment provides. Then they solve a puzzle, practice their printing, and develop a scarcity slide that they use to illustrate trade-offs—letter perfect versus clean enough.

Grade Level

6-8

Economic Concepts

Natural resources

Opportunity cost

Scarcity

Trade-offs

Compelling Question

Why must people make choices about the use of natural resources? Or: How do we make choices about the use of natural resources?

Objectives

Students will be able to

- define natural resources, scarcity, opportunity cost and trade-off;
- give examples of natural resources provided by the environment;
- explain that any alternative involves benefits; and
- explain the trade-off between a perfectly clean and clean-enough environment.

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Time Required

Two days: Day 1 (15-20 minutes), Day 2 (50-60 minutes)

Materials

- Visual 3-1
- A copy of Handouts 3-1 and 3-2 for each student
- Online reference materials—dictionaries, encyclopedias
- Paper, pencil, and scissors for each student

Procedure

Day 1

1. Write "natural resources" on the board. Define **natural resources** as those things that occur naturally in or on the earth that are used to produce goods and services.

2. Explain that people use natural resources to produce goods and services they want or use natural resources directly. For example, they can use trees to provide lumber for wood products or wood pulp for paper, or they can enjoy the beauty and shade that trees provide.

3. Explain that the class will talk about five general categories of natural resources—animal, plant, mineral, fossil fuel, and other. List these five categories on the board. Discuss the following:
   - Give some examples of animal resources. (*Cows, pigs, ducks, chickens*)
   - Give some examples of plant resources. (*Trees, flowers, vegetable plants*)
   - Give some examples of mineral resources. (*Zinc, bauxite, silica*)
   - Give some examples of fossil fuel resources. (*Coal, crude oil*)

4. Explain that the "other" category might include things like air, solar energy, pretty vistas, the ozone layer, water, and so on.

5. Tell students that you have a challenge for them. They must develop a list of natural resources. The list must include at least one resource from each of the five categories. All 26 letters of the alphabet must be represented somewhere in the list. The student who has the shortest list (measured by the total number of letters) that represents each category and all 26 letters of the alphabet wins.

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6. Display *Visual 3-1: Natural Resource List* as an example. Point out that this list includes 59 letters. Each letter of the alphabet is represented and there is at least one natural resource from each category. Explain that you have another list that uses only 39 letters, but you will not reveal it until after they have completed their lists.

7. Tell students they may use reference materials to find examples of animals, plants, minerals, fossil fuels, and other natural resources to make their lists. Allow one or two days for students to complete the task.

Day 2

8. Ask students to present their lists to the class. Determine who has created the shortest list while meeting the criteria. Write this list on the board. If no list is shorter than 39 letters, use the following list: quartz, fox, sorghum, banyan, oil, wave, jasper, and duck. Explain that duck and fox are animal resources. Sorghum (a crop grass) and banyan (a tree) are plant resources. Oil is a type of fossil fuel. Quartz and jasper (a precious stone) are mineral resources. Wave represents water, which is a potential source of energy and fills the "other" category.

9. Instruct the students to make sure that each letter of the alphabet is represented in the list.

10. Point out that students can easily practice printing by writing and rewriting the list because every letter in the alphabet is represented on the list.

11. Distribute paper and a pencil to each student. Tell students to print the list over and over again. Each time they should try to print the letters as perfectly as they can. (NOTE: Before students begin the assignment, you may want to review correct letter formation.)

12. Have students begin printing and continue printing for 10 minutes. After 10 minutes, ask if any students think they have formed the letters perfectly. If students answer yes, check their letters. Point out that although their letters are close to perfect, they aren't perfect yet.

13. Suggest that more practice will help students produce letters that are closer to perfect. Ask students if they think there should be another 10-minute printing session. (*Answers will vary. Some students will probably say that they have practiced enough or that their letters are good enough or close enough to perfect. Others may say that their hands are tired, that they are bored with writing the list, or that they would prefer to do something else.*)

14. Explain that if the class spends more time practicing printing, it will have less time to spend doing something else like practicing and improving math skills, reading skills, or other skills. Likewise, if students spend all their time at home practicing their printing, then they have no time for other things like practicing math, cleaning their rooms, or being with friends.

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15. Distribute a copy of *Handout 3-1: The Scarcity Slide* to each student. Explain that time is limited, and, as a result, people must make choices about how they use their time.

16. Explain that Handout 3-1 includes a scarcity slide. The length of the slide represents how much time students have to spend in the evening either practicing printing or cleaning their rooms. The scale on Handout 3-1 shows the results of time spent doing each of these activities; that is, the quality of printing improves as one moves up from the double line in the middle (very poor printing, very messy room), and room cleanliness improves as one moves down from the middle line.

17. Tell students to cut out the scarcity slide and cover the scale with their slides. Ask students if any part of the scale is uncovered. (*No*) Explain that this means they have enough time to have both "very good" printing and a "very clean" room.

18. Instruct students to fold along the first dashed line (from either end) of the scarcity slide so that one large and two small rectangles are visible. This means they have less time available this evening. Ask them to place the scarcity slide on the scale. Discuss the following:

    - Do you still have enough time to have both very good printing and a very clean room? (*No, they can have one or the other but not both—there just isn't enough time.*)
    - What are the choices available with this amount of time? (*A very clean room/good printing or a clean room/very good printing*)

19. Instruct students to fold along the second dashed line of the scarcity slide so that one large and one small rectangle are visible. Point out that they now have even less time this evening. Tell them to place the slide over the scale and move the slide up and down to consider the choices available. Discuss the following:

    - If you choose to have a very clean room, what will happen to the quality of your printing? (*It will be poor.*)
    - If you choose to have a clean room, what will happen to the quality of your printing? (*It will be fair.*)
    - If you choose to have good printing, what will happen to the cleanliness of your room? (*It declines to fairly clean.*)
    - If you choose to have very good printing, what will happen to the cleanliness of your room? (*It declines to messy.*)

20. Instruct students to fold their scarcity slides at the final dashed line so that only the one longer piece is visible. Again have them place the slide on the scale to identify the choices available. Discuss the following:

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- Why isn't it possible to have a very clean room? (*There isn't enough time.*)
- Why isn't it possible to have very good printing? (*There isn't enough time.*)
- If you choose to have good printing, what happens to the cleanliness of your room? (*It declines to very messy.*)
- If you choose to have fair printing, what happens to the cleanliness of your room? (*It improves to messy.*)
- If you choose to have a fairly clean room, what happens to the quality of your printing? (*It declines to poor.*)
- If you chose to have a clean room, what happens to the quality of your printing? (*It declines to very poor.*)

21. Given unlimited time, students can become both letter perfect and have perfectly clean rooms. However, when time is limited, they must settle for less. Students are forced to decide how much of each is good enough given limited time.

22. Explain that just as time is limited, natural resources are scarce. **Scarcity** exists when there are not enough resources to produce everyone's wants. There aren't enough natural resources to provide all the goods people want, such as food, homes, clothing, movies, games, and toys, and abundant clean air, clean water, shade, and park space.

23. Explain that just as limited time forced students to make choices about the quality of their printing and the cleanliness of their rooms, the scarcity of natural resources requires societies to choose how many goods to produce and how much of a clean environment to produce. Societies must decide how clean is "clean enough."

24. Explain that for the students and for societies, choices involve trade-offs and opportunity cost. **Opportunity cost** is the value of the next-best alternative when a decision is made; it's what is given up. A **trade-off** involves giving up some of one thing to gain more of something else.

25. Refer students to the scarcity slide and explain that it can be used to help identify opportunity cost and trade-offs. Instruct students, using the second-shortest scarcity slide (one large and one small rectangle visible) to identify the alternatives available. (*Very good printing/messy room, good printing/fairly clean room, fair printing/clean room, poor printing/very clean room*)

26. Tell students to place the slide on the scale to show very good printing/messy room.

27. Have them move the slide to another alternative—good printing/fairly clean room. Point out that the opportunity cost of this alternative is the highest-valued alternative they give up—in this case, very good printing/messy room.

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28. Explain that choosing good printing/fairly clean room requires students to trade off a little quality of printing for a little cleaner room. Students must decide if the additional benefit of this alternative offsets the additional costs.

29. Ask students to choose another alternative and to identify the opportunity cost of the choice and the trade-off made. For example, students could choose poor printing/very clean room. The opportunity cost of this choice is the highest-valued alternative they gave up—perhaps fair printing/clean room. They trade off a little quality of printing to gain additional cleanliness.

30. Explain that society can choose to produce various amounts of goods and various amounts of a clean environment. Each alternative involves opportunity cost and trade-offs for society.

Closure

31. Review the major points of the lesson by discussing the following:

    - What are natural resources? (*Things that occur naturally in and on the earth that are used to produce goods and services*)
    - Are natural resources scarce? (*Yes*) What does this mean? (*There aren't enough natural resources to provide everything we want.*)
    - What is opportunity cost? (*The value of the next-best alternative when a decision is made; it's what is given up*)
    - Give an example of a decision you made and the opportunity cost of your choice. (*Answers will vary.*)
    - What is a trade-off? (*Giving up some of one thing to gain more of something else*)
    - Suppose you have a choice between Meal Pack #1 (which includes a large hamburger, medium fries, and a medium soft drink) and Meal Pack #2 (which includes a small hamburger, large fries, and a medium soft drink). Both meal packs are the same price. Which would you choose? (*Answers will vary.*) What is your opportunity cost? (*Meal Pack #1 or Meal Pack #2, depending on the choice*) What trade-offs did you make? (*Gave up some burger for more fries or gave up some fries for more hamburger*)

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Assessment

32. Distribute a copy of *Handout 3-2: Assessment* to each student. Read the directions with the students and instruct them to complete the work. Use the answer key below to review the answers.

    1. *Water is scarce in the village.*
    2. *There isn't enough water to satisfy all the villagers' wants.*
    3. *The villagers must decide how to use the water that is available.*
    4. *They give up some bathing—they could have only half as many baths as they want.*
    5. *Answers will vary.*

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Visual 3-1: Natural Resource List

Elephant

Quail

Fox

Blue jay

Grass

Oak

Zinc

Copper

Silver

Coal

Water

Mud

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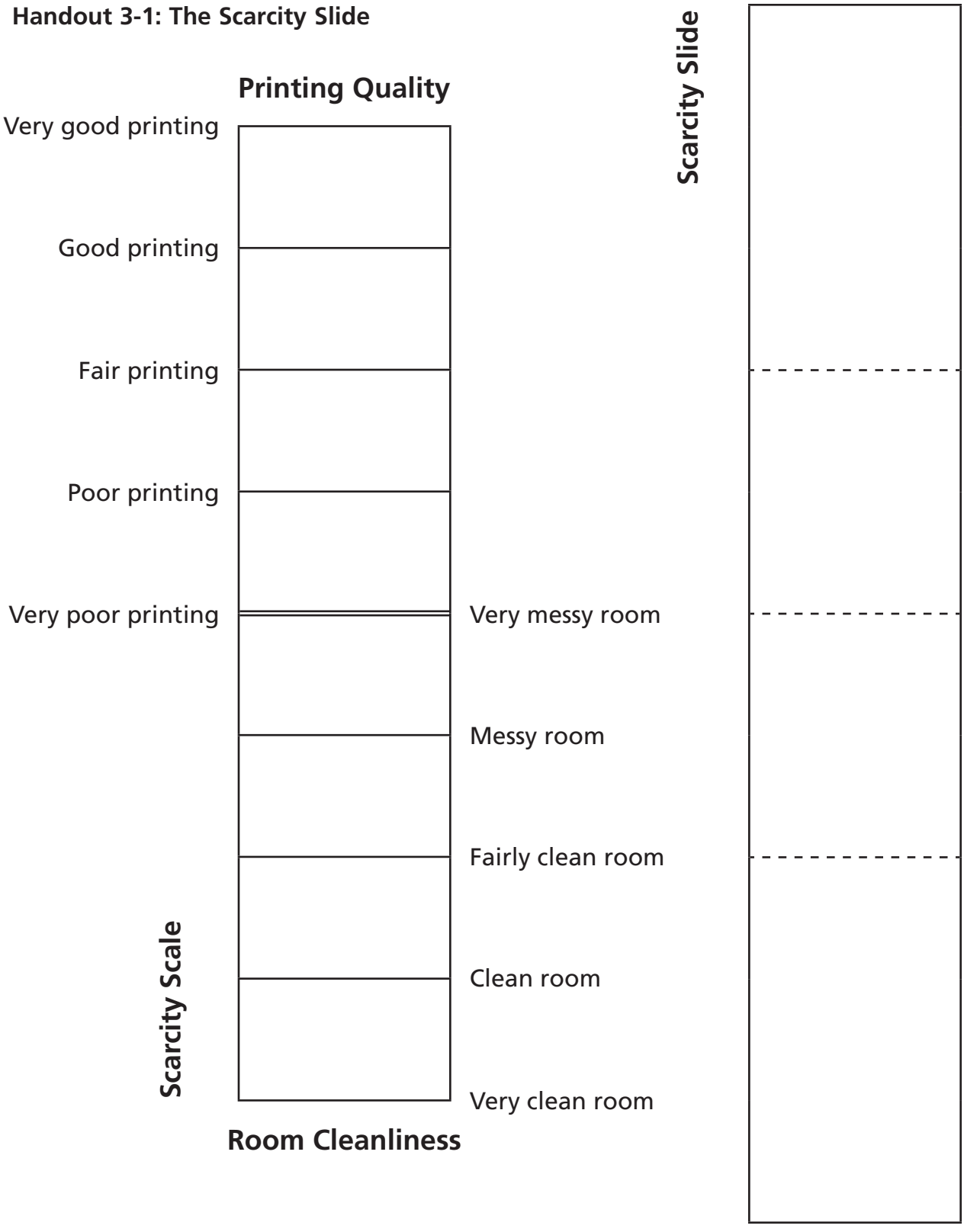
Handout 3-1: The Scarcity Slide



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Handout 3-2: Assessment

Directions: Read the following paragraph and answer the questions below.

A village receives all its water from a well fed by a small underground spring. If all people are to have their fill of drinking water, the village must take 100 gallons of water from the well each day. For all people to satisfy bathing wants, the village must take 200 gallons of water from the well each day. To meet all their drinking and bathing wants, the villagers would use 300 gallons of water each day. The spring supplies a total of 200 gallons of water each day.

1. What is scarce in the village?

2. Why is it scarce?

3. What are the consequences of this scarcity problem?

4. If the villagers choose to completely satisfy all their desires for drinking water, what will happen?

5. What choice would you make? Why?

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Standards and Benchmarks

Voluntary National Content Standards in Economics

Standard 1: Scarcity

- **Benchmarks: Grade 4**

  1. People make choices because they can't have everything they want.
  3. People's choices about what goods and services to buy and consume determine how resources will be used.
  4. Whenever a choice is made, something is given up because resources are limited.
  5. The opportunity cost of an activity is the value of the best alternative that would have been chosen instead. It includes what would have been done with the money spent and the time and other resources used in undertaking the activity.
  7. Natural resources such as land are "gifts of nature"; they are present without human intervention.

Standard 2: Decision Making

- **Benchmarks: Grade 4**

  1. Choices involve getting more of one thing by giving up something else.
  2. A cost is what you give up when you decide to do something. A benefit is what satisfies your wants.

- **Benchmark: Grade 8**

  1. To determine the best level of consumption of a product, people must compare the additional benefits with the additional costs of consuming a little more or a little less.

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Lesson 4:
Waste Not, Want a Lot

Author

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Standards and Benchmarks (see page 4.8)

Lesson Description

Students play the role of producers, deciding what and how to produce in response to various incentives.

Grade Level

6-8

Economic Concepts

Incentives

Natural resources

Production

Waste

Objectives

Students will be able to

- define production, incentives, waste, and natural resources;
- explain that people respond to incentives;
- predict a change in people's behavior based on a change in an incentive; and
- define waste in physical and economic terms.

Compelling Question

How can incentives influence our use of natural resources?

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Time Required

50 minutes

Materials

- A copy of Handout 4-1 for each student
- A pencil, scissors, a ruler, a circle template (2" diameter), and four sheets of 8" x 10" paper for each student (NOTE: Trim 8 ½" x 11" paper before giving it to students.)
- Prizes for each production round (optional)

Procedure

1. Explain that students are going to participate in a production activity. **Production** is the process of using resources and intermediate goods to make goods and provide services. In this production activity, students will work in teams. There will be two production rounds. Each round will last five minutes. The team that earns the most points in a round wins that round.

2. Explain that the activity requires some drawing and cutting skills, so teams must carefully consider what to produce. Teams will earn points by producing 2" x 2" paper squares or circles (the size of the circle template provided). Each student will receive only one piece of paper with which to work. Students may produce all squares, all circles, or any combination of squares and circles to earn the most points for their teams. Only one square or circle may be cut at a time; that is, no paper stacking is allowed. Only completed squares and circles will count. To be counted, squares must be 2" x 2", and the circles must look like the template.

3. Point out that at the beginning of each production round, students will be told the point value for circles and squares. Then, team members will have two minutes to discuss the best strategy for production. No production may take place during the strategy discussion.

4. Divide the class into groups of equal size with three to five students in each group. Distribute a pencil, scissors, a ruler, a circle template, and two sheets of paper to each student.

Round 1

5. Announce that each square produced is worth one point and each circle produced is worth one point. Allow two minutes for the team to discuss production strategy.

6. After two minutes have passed, announce that students may begin production. Allow five minutes for production. Tell the class when only one minute remains and again when only 15 seconds remain.

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7. At the end of five minutes, instruct students to stop producing. Tell teams to count their completed squares and circles and report the number of points earned. (Award the winning team or teams a prize if desired.) Have the winning team(s) share strategy with the class. (*In this round, the best strategy is to draw a grid of 2" x 2" squares on the paper and cut along the lines to produce 20 squares. This minimizes drawing and cutting time and maximizes the points per sheet of paper. The winning team will probably have used this strategy. Keep a sheet of paper that has been partially cut by the winning team for use in Step 14 below.*)

8. Have teams describe their strategies. Ask why some team strategies were more successful than others. (*They were able to earn more points because they focused on producing squares. Even though squares and circles were worth the same number of points, it took more time to draw and cut out circles than to draw and cut out squares.*) If all teams employed the same strategy, ask why that strategy was chosen.

Round 2

9. Announce that in Round 2 each square is worth one point and each circle is worth four points. Distribute two sheets of paper to each student. Allow two minutes for teams to discuss production strategy.

10. Repeat Steps 6 and 7 above. (*In this round, the best strategy is to produce as many circles as possible. It still requires more time to draw and cut circles; however, the value of circles has increased. Producing five circles provides as many points as producing 20 squares. Changing the points awarded for circles changes the incentive for producing circles. Keep a sheet of paper that has been partially cut by the winning team for use in Step 14 below.*)

11. Have teams describe their strategies. Discuss the following:
    - Why were some team strategies more successful than others? (*They chose to produce as many circles as possible. Although circles were time-consuming to draw and cut, they were more valuable in this round. As a result, six circles provided more points than 20 squares.*)
    - Why was the strategy for winning in Round 1 different from the strategy for winning in Round 2? (*The points assigned to a circle were different in Round 1 than in Round 2.*)

12. Remind students that in both rounds the same things were used for production—students, paper, scissors, pencils, templates, and rulers. Each round produced different results because the incentives were different. **Incentives** are actions, awards, and rewards that determine the choices people make. In this production activity, points were incentives.

13. Point out that in the first round, the incentive to produce circles was one point and the incentive to produce squares was one point. In the second round, the incentive to produce

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circles changed. As a result, producers' behavior changed. They were willing to produce more circles in Round 2 because they received more points for each circle compared with the points they received for each square.

14. Hold up a partially cut sheet of squares from Round 1 and a partially cut sheet of circles from Round 2. Define **waste** as the unavoidable material that remains after production and consumption. Discuss the following:
    - Give an example of waste in this production activity. (*Paper that remains when all possible circles and squares have been cut out*)
    - In terms of using all paper, which production is less wasteful—circles or squares? (*Cutting squares is less wasteful because there are no gaps or wasted sections of paper between the squares. When you cut 20 squares from the page, all paper is used. When cutting circles, there is unused paper around the circles and thus wasted paper.*)

15. Ask students if this means it would be better not to produce circles. (*Answers will vary.*) Point out that in Round 1 it was better to produce squares because circles and squares had the same value and less paper was wasted when squares were produced.

16. Point out that in the second round, only 40 points were possible from producing squares, but at least 160 points were possible when producing circles (by cutting a 2" circle in the equivalent space of one square). There was less physical waste of paper from producing squares in both rounds. However, in Round 2, producing squares meant wasting (giving up) the value of the circles that could have been produced.

17. Note that in Round 2, if 40 squares are produced, no paper is wasted. However, the value of 40 squares is only 40 points. By using paper to produce squares, the additional 120 points (value) that could have been earned by producing circles are given up.

18. Explain that the economic goal of production is to obtain the most value or satisfaction from a resource. In the first round, the most value is obtained from the paper by producing squares. In the second round, the most value is obtained from the paper by producing circles. The additional value of the circles outweighs the additional cost of the paper wasted.

19. Ask students the following question: "If a cave man were asked to carve wheels from a slab of stone, which would have more value—carving round wheels and wasting some of the slab or carving square wheels and wasting none of the slab?" (*Round wheels are more useful and have more value than square wheels. The additional value of the round wheels offsets the additional cost in terms of wasted slab.*)

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20. Look around the classroom and ask students if they notice any of the mess created by the production of circles and squares. Point out that the mess is very unattractive and that it will be difficult to work until the classroom is cleaned.

21. Remind students that in creating circles, more value was gained from the paper. However, the waste created by the production of circles leads to loss of satisfaction because of the mess. Discuss the following:

    - How could the waste/mess that remains from the production of circles be reduced? (*Answers will vary. However, guide students to recognize that a change in incentives could change production behavior.*)
    - Predict what would happen if teams received one point for squares, four points for circles, and lost two points for every square inch of waste paper. (*Fewer circles would be produced.*)
    - Why would fewer circles be produced? (*This occurs because of the change in the incentive. Loss of points for waste would be an incentive to create less waste and, therefore, produce fewer circles.*)

22. Explain that just as incentives determined what was produced from the paper, incentives determine how we use our natural resources to produce goods and services in the economy. Price is an incentive for producers. When the price of a good increases, producers will produce more of it. If the price decreases, producers will produce less of it.

23. Define **natural resources** as things provided by nature or the natural environment; that is, things that occur naturally in or on the earth. Natural resources are used to produce goods and services. Ask the students for examples of natural resources. (*Land, oil, coal, water, minerals*) Discuss the following:

    - What is the incentive for producers to make a good or service? (*The price received for the good or service*)
    - Does our society produce physical waste when goods and services are produced? (*Yes*) Give some examples. (*Dirty water from producing foods, medicines, and chemicals; air pollution from producing energy; sawdust from wood construction; tailings or waste rock from mining; wood pulp from making paper*)

24. Explain that the waste resulting from production affects the environment, reduces people's enjoyment of the environment, and, as a result, reduces the real value of the goods produced.

25. Remind students that when the incentive for producing circles changed, the number of circles produced changed. Point out that changing incentives can change the way people use natural resources in the economy and the amount of waste produced, which affects the environment.

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For example, if we make chemical producers pay for each pound of waste they produce, they will produce less waste. If, at the end of each year, we determined how many miles a car has been driven and charged the owner an air pollution fee for each mile, people would drive fewer miles and create less air pollution.

Closure

26. Review the main points of the lesson with the following questions:

- What are natural resources? (*Things that occur naturally in and on the earth that are used to produce goods and services*)
- What is production? (*The process of using resources and intermediate goods to make goods and provide services*)
- What are incentives? (*Actions, awards, and rewards that determine the choices people make*)
- Are there any rewards that influence your behavior in the classroom? (*Prizes for reading or homework passes for good behavior*)
- Are there any penalties that influence your behavior in the classroom? (*Staying in from recess for talking during class*)
- What is the incentive that encourages producers to produce more or less of something? (*Price*)
- How can incentives be used to change our use of natural resources? (*Establishing the right incentives—rewards or penalties—can cause us to use less of a natural resource.*)

Assessment

27. Distribute a copy of *Handout 4-1: Assessment* to each student. Read the directions with the students and instruct them to complete the work. Use the answer key below to review the answers.

1a. *The waste is the food and food wrappings all over the ground.*

1b. *Students who throw food wouldn't be allowed to eat outside the next day. Students could be given additional minutes outside if they don't throw food.*

2a. *The waste is the sales receipts and cookie crumbs on the floor and the noise.*

2b. *Students could be fined for littering the floor and for the noise.*

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Handout 4-1: Assessment

Read the following situations and answer the questions.

1. Students at the Grover Cleveland Elementary School prefer to bring their lunches to school and eat outside on the playground. Sometimes they get carried away and throw bits and pieces of food at one another. When they return to their classrooms, there are food and food wrappings all over the ground.

   a. What is the waste in this situation?

   b. What incentive could be given to reduce the amount of waste students produce?

2. Ms. Flowers' class is learning about businesses and production. Students have formed businesses and sell their products in the school hallway outside of the classroom. When they have business sessions, there is a lot of noise that disturbs Mr. Cooke's class. The janitor must clean a lot of sales receipts and cookie crumbs from the floor after the business sessions.

   a. What is the waste in this situation?

   b. What incentive could be given to reduce the amount of waste students produce?

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Standards and Benchmarks

Voluntary National Content Standards in Economics

Standard 1: Scarcity

- **Benchmarks: Grade 4**

  1. People make choices because they can't have everything they want.
  3. People's choices about what goods and services to buy and consume determine how resources will be used.
  4. Whenever a choice is made, something is given up because resources are limited.
  5. The opportunity cost of an activity is the value of the best alternative that would have been chosen instead. It includes what would have been done with the money spent and the time and other resources used in undertaking the activity.
  7. Natural resources such as land are "gifts of nature"; they are present without human intervention.

Standard 2: Decision Making

- **Benchmarks: Grade 4**

  1. Choices involve getting more of one thing by giving up something else.
  2. A cost is what you give up when you decide to do something. A benefit is what satisfies your wants.

- **Benchmark: Grade 8**

  1. To determine the best level of consumption of a product, people must compare the additional benefits with the additional costs of consuming a little more or a little less.

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Lesson 5:
Eggs-ternal Costs

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Standards and Benchmarks (see page 5.7)

Lesson Description

Students participate in an egg hunt. Through the activity, students recognize that some actions people take have external costs; that is, the actions impose costs on others. Students learn that property rights have a role in reducing external costs.

Grade Level

6-8

Economic Concepts

External costs (externalities or spillover costs)

Property rights (ownership)

Objectives

Students will be able to

- define external costs (externalities) and property rights,
- give examples of external costs, and
- explain the role of property rights in reducing external costs.

Compelling Question

How can property rights reduce external costs?

Time Required

45-60 minutes

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Materials

- A copy of Handout 5-1 for each student
- At least one plastic egg for each student, plus a few extras
- Pennies—twice the number of plastic eggs
- One nickel for each student
- Smelly food, such as a can/packet of tuna
- Resealable plastic bag large enough to hold the can/packet of tuna
- An orange

Preparation

Before class, hide plastic eggs throughout the classroom.

Procedure

1. Tell the class you've hidden plastic eggs throughout the classroom so that students can have an egg hunt. There will be two rounds in this egg hunt. The eggs will not be replenished between rounds. In the first round, you will pay two pennies for every egg that is found. Each time a student finds an egg, he or she must bring it to you. You will give the student two pennies and then the student may return to hunt additional eggs. Students may not have more than one egg in their hands at a time. At the end of 10 minutes, all students must return to their seats.

2. Explain that after students return to their seats, there will be a second round. The rules for the second round are the same as those in the first, except you will pay a nickel for each egg found. Students may participate in both rounds, just one of the rounds, or neither round—they choose. Students are not allowed to find an egg in the first round and then choose to turn it in during the second round. Eggs must be turned in as they are found.

3. Begin the first round, paying each student two pennies as an egg is turned in. Some students may plan to wait until the second round to receive the higher reward. However, when they realize that other students aren't waiting, they will probably join in. If the eggs are not hidden very well, all should be found during the first round. Once all eggs are found (or the 10 minutes are up), stop the first round.

4. Acting surprised, ask the students why they didn't wait until the second round to find eggs since you were willing to pay more in the second round. (*Students may reply that everyone else was finding eggs and that they were concerned there wouldn't be any left for the second round.*)

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5. Point out that students are correct. As each person joined the first round, fewer and fewer eggs were likely to be left for the second round. This is called an external cost. **External costs** happen when one person does something to benefit him- or herself but in doing so unintentionally makes another person worse off. In this case, the actions of the other egg hunters made it hard for anyone to wait to receive a nickel in the second round. Every egg found in the first round cost each student a nickel (an extra 3 pennies) because that is how much more money the students could have had if everyone had waited to hunt in the second round. Discuss the following:

    - Did you notice any other external costs (actions that other people took that made you worse off) during this activity? (*Answers may include the following: Someone ran into me, shoved me, or pushed me. Other hunters got in my way, which made it difficult for me to hunt eggs. The teacher and other classrooms in the area had to put up with the noise and commotion created by the hunters. The room is more disorderly than before the hunt because desks and other objects have been moved.*)
    - Can you think of external costs that occur in school, in your community, or in your home? (*Answers may include the following: Your sibling messes up the bathroom and you must help clean it up. The students in front of you are talking during class, and you can't hear what the teacher is saying. Some students talk in class, and the entire class must miss recess as a result. People throw their trash on the sidewalks and streets, and other people have to see and smell the mess and clean up the trash.*)

6. Conduct the second round of the egg hunt if there are eggs still hidden after the first round.

7. After the egg hunt is completed, tell students you are going to demonstrate a second way in which you can collect eggs from them. Give each student one egg. Explain that the student owns the egg and may do what he or she wishes with the egg.

8. Ask students to consider the same options that were available with the egg hunt: They could sell the egg right now for two pennies or wait 10 minutes and sell the egg to you for a nickel. Discuss the following:

    - How many would sell your egg right now? (*Only a few, if any, should raise their hands.*)
    - How many would wait 10 minutes? (*Most of the students should raise their hands.*)
    - Why are you willing to wait now, but you weren't willing to wait for the second round of the egg hunt? (*The egg is mine. When I wait 10 minutes, I am guaranteed a nickel. If I had waited for the second round of the egg hunt, I may not have found an egg.*)
    - If the person in the seat next to you sells his or her egg right now, does that affect your ability to wait and sell your egg? (*No, if others sell their eggs early, it doesn't affect those who wish to wait.*)

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9. Ask students what the difference is between your second method of collecting eggs from them and the egg-hunt method of collecting eggs from them. (*In the second method, the students own their eggs and may decide what to do with their eggs.*)

10. Explain that when you gave each student an egg, you told them they each owned the egg and could decide what to do with it. This means the students had property rights. Define **property rights** as the legal ownership of something with economic value.

11. Remind students that one student's decision to sell his or her egg didn't affect other students' ability to sell their eggs, because of property rights. Also, no one was running around trying to find eggs and sell them. As a result, there was less noise and less commotion. Students' property rights (ownership of eggs) reduced the external costs of collecting eggs. When property rights exist, external costs can be reduced.

12. Open the can/packet of tuna and allow it to sit on your desk for a while. Ask the students if they enjoy the smell of the tuna. Point out that no one owns the air. As a result, someone can use it in a way that might make others worse off. For example, people can produce a mixture that smells and other people have to put up with the smell—as you did with the tuna. Place the tuna in the plastic bag and seal it shut and then continue the discussion.

13. Peel the orange and throw the peel on the floor in the front of the classroom. Discuss the following:
    - Do you mind the smell of the orange in the air as you did the tuna? (*Answers will vary.*)
    - Is there anything else that bothers you about me having an orange as a snack? (*The peel on the floor*)

14. Point out that often people dump things on others' properties or fail to clean up after using picnic tables or land at a park. This also creates an external cost, just as having the orange peel on the classroom floor does. Ask students for other examples of external costs. (*Answers may include pollution in general: smoke from a factory; smoke from a cigarette; exhaust from a car, truck, or bus; noise from a construction site; or dog waste on the sidewalk.*)

15. Explain that external costs usually occur because there are no property rights or there are no rules about how something should be used. Remind students that when they owned their eggs, fewer external costs occurred. In the case of the tuna, no one owns the air and there were no rules about polluting the classroom air. In the case of the orange, there were no rules about polluting the classroom floor.

16. Explain that sometimes it is difficult to decide who owns a resource. For example, who owns the air, rivers, an ocean, or animals in an ocean? Ask the students who owns the classroom

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environment. (*Answers may vary. Students may say the teacher, the principal, or the students in the class.*)

17. Point out that when people can't decide who owns a resource, they may ask government to make rules about how a resource is used. These rules are made to reduce the external costs that some people pay. (NOTE: Government action can also affect private property rights and other individual rights.)

18. Give students the following example: In the past, people could smoke cigarettes in restaurants; other people who didn't smoke had to breathe air with cigarette smoke in it. This is an example of an external cost. In many places, governments made rules to keep people from smoking in restaurants. (NOTE: These rules affect the rights of the business owners to determine what happens in their restaurants, and they affect the personal rights of smokers.)

Closure

19. Review the main points of the lesson with the following questions:
    - What is an external cost? (*When one person does something to benefit him- or herself but in doing so unintentionally makes another person worse off*)
    - What are property rights? (*Legal ownership of something of economic value*)
    - How can property rights reduce external costs? (*When people own the rights to something, they are able to decide how to use it; the actions of others don't affect their use of the item.*)
    - What happens when people can't determine ownership of something, such as the air, ocean, and so on? (*They rely on governments to decide how the resources will be used.*)

Assessment

20. Distribute a copy of *Handout 5-1: Assessment* to each student. Read the directions with the students and instruct them to complete the work. Use the answers below to review their work.

    1. *Air pollution and road congestion: Rules that cause people to drive less would reduce external costs.*
    2. *Air pollution and risk of wild fire: A law that prevents people from burning leaves, trash, and other waste in their yards would reduce external costs.*
    3. *Water pollution: A law preventing people from or fining people for pouring chemicals and other waste in the river would reduce external costs.*
    4. *Noise pollution: The owner of the hotel has the right to ask the guest to stop making noise. If the guest refuses to stop, the owner can tell the guest to leave.*

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Handout 5-1: Assessment

For each situation listed below, identify the external cost(s) and write how property rights and/or rules could reduce the external costs.

1. People driving cars

2. People burning leaves in their yards

3. Someone pouring chemicals into a river

4. Someone playing drums in a hotel room at 3 am

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Standards and Benchmarks

Voluntary National Content Standards in Economics

Standard 10: Institutions

- **Benchmark: Grade 12**

    1. Property rights, contract enforcement, standards for weights and measures, and liability rules affect incentives for people to produce and exchange goods and services.

Standard 17: Role of Government and Market Failure

- **Benchmarks: Grade 12**

    1. Markets do not allocate resources efficiently if: (1) property rights are not clearly defined or enforced; (2) externalities (spillover effects) affecting large numbers of people are associated with the production or consumption of a product; or (3) markets are not competitive.
    2. An important role for government in an economy is to define, establish, and enforce property rights. A property right to a good or service includes the right to exclude others from using the good or service and the right to transfer the ownership or use of the resource to others.

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Lesson 6:
A Valuable Lesson

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Standards and Benchmarks (see page 6.10)

Lesson Description

Students are asked to decide which goods and services they would most want in various situations. They learn that the value of a good or service is the maximum price they are willing and able to pay for it and that the value of goods and services depends on how well the goods and services satisfy wants. Students also discover that valuable goods and services are provided by both the economy and the environment.

Grade Level

6-8

Economic Concepts

Goods

Price

Services

Value

Wants

Objectives

Students will be able to

- define wants, goods, services, price, and value;
- explain that the value of a good or service depends on its ability to satisfy wants;
- explain that goods and services provided directly by the natural environment are valuable; and
- distinguish between the value and the price of a good.

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Compelling Question

How do people value goods and services?

Time Required

45-60 minutes

Materials

- Visual 6-1
- Copies of Handout 6-1, cut apart so that there is a situation card for each student
- A copy of Handout 6-2 for each student
- A sheet of writing paper for each student

Procedure

1. Explain that students will participate in a role-play activity. Each student will receive a card and will read the card silently. Students should not share their information with anyone.

2. Distribute one situation card from *Handout 6-1: You Are There!* to each student so that (approximately) one-fifth of the students have the same situation card.

3. Tell students to imagine they are in the situation described on their card. Display *Visual 6-1: Items of Value* and tell students they may choose three of the items they would most want to have in their particular situation.

4. Distribute a sheet of writing paper to each student. Tell students to list the three items they want and to write a sentence explaining why they want each item.

5. Remind students they may not tell anyone which situation card they have. Tell them you are going to call on them one at a time and ask them to list the three items they have selected. Explain that they should not report why they chose the items at this time. As students report, keep track of the items chosen by placing tally marks next to the items listed on the visual.

6. After all students have reported their choices, ask one student from each of the five situations to read his or her situation card to the class. Discuss the following:

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- What choices did those of you who were alone in the forest make? (*Answers will vary; however, one possible choice is walking shoes, a compass, and a box of cereal.*)
- What choices did those of you who were in the desert make? (*Answers will vary; however, one possible choice is a bottle of water, a gallon of gas, and sunscreen.*)
- What choices did those of you who were in the rowboat make? (*Answers will vary; however, one possible choice is a box of cereal, a bottle of water, and a compass.*)
- What choices did those of you who were going to Mega Mall make? (*Answers will vary; however, one possible choice is a cell phone, clothes, and ten $1 bills.*)
- What choices did those of you who were alone in the space station make? (*Answers will vary; however, one possible choice is a tank of air, a bottle of water, and a tablet or phone*)
- Why did students in one situation make different choices than students in other situations? (*Items that were useful or nice to have in one situation weren't necessarily useful or nice to have in another. For example, air in a space station is important, but sunscreen and walking shoes are not. Similarly, a compass is not very useful in space or at the mall but would be very useful in the forest.*)
- Why did students in the same situations make different choices? (*Students have different tastes and preferences. For example, one student might prefer drinking bottled water to drinking from a stream in the forest situation. One student might choose stylish clothes for the mall, but another might think it is more important to have walking shoes.*)

7. Explain that the value of a particular item depends on the ability of the item to satisfy people's wants. Economic **wants** are desires that can be satisfied by consuming goods and services. **Goods** are objects that provide satisfaction. **Services** are actions that provide satisfaction. Both goods and services can satisfy people's wants. A good or service might have value to one person because it satisfies a want the person has. However, the same good or service might have little, if any, value to another person. Value, like beauty, is in the eye of the beholder; that is, one person's junk is another person's treasure.

8. Explain that producers in our economic system produce goods and services. The natural environment also produces goods and services that are valuable because they satisfy people's wants. All items listed on the visual (except the ten $1 bills) are goods made by producers in the economy. Ask for examples of goods and services the environment produces that could be valuable substitutes for items listed on the visual. The following are examples:

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Economy Produced	Environment Produced
Tank of air	Atmosphere with oxygen
Sunscreen	UV protection provided by the ozone layer, cloudy sky, or shady tree
Box of cereal	Nuts, berries, or edible plants
Bottle of water	Stream or rain water or a cactus with water in it
Walking shoes	Soft grass or soft sand
Tablet or phone	Singing birds, crashing waves, rustling leaves, babbling streams, or whistling wind
Gallon of gas	Energy from the sun
Compass	Navigating according to the observation of the sun and stars or seeing on which side of a tree the moss is growing

9. Explain that producers in our economic system use resources from the environment to produce goods and services that satisfy our wants (give us value). The environment also provides goods and services that give us value directly. The proper use of environmental resources requires us to recognize that we receive valuable goods from the economy *and* valuable goods from the environment. When we produce more goods and services in the economy, we give up goods and services provided by the environment. We must weigh the value of more goods and services produced by the economy against the value of goods and services provided directly by the environment and then choose carefully.

10. Tell students that a new tablet is available. It includes many new games with all types of special features as well as excellent graphics and special effects, multiple levels, and numerous player features. As a bonus for parents and teachers, the games are also educational; they require math and reading skills to play, and they help develop knowledge about geography and history. This tablet sells for a price of $250. Discuss the following:

    - On a scale of 1 to 5, what is the value of this tablet to you? Why? (*It depends on how well the tablet satisfies a student's wants. It will be very valuable to someone who loves playing games and is also interested in learning new skills. It will be less valuable to someone who likes playing games but doesn't want the educational stuff getting in the way. It would not be at all valuable to someone who doesn't like playing games.*)
    - If students value the tablet differently, how will they differ in their willingness to pay a price of $250? (*Those who value it most highly may be willing to pay even more than $250 for the tablet, if they are able. When they buy the tablet, they think they are getting a great deal. Those who value it less might still be willing and able to pay $250. When*

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they buy the tablet, they think they are getting a fair deal. Those people who value it least probably think that a price of $250 is outrageous and wouldn't buy it.)

11. Explain that there is a difference between the price and the value of a good or service. The **price** of a good or service is the amount someone must pay to buy it. The **value** of a good or service is the maximum price someone is willing and able to pay for the good or service. The value of a good or service depends on the amount of satisfaction the consumer would receive from the good or service.

12. Point out that the distinction between price and value is important because many goods and services provided by the environment have a price of zero, such as beautiful sunsets, clean air and water, watching an eagle fly, viewing an animal habitat, UV protection provided by the ozone layer, and erosion control provided by forests and plants. However, the value these environmental goods and services provide is *not* zero. Because these goods and services are valuable, people would be willing to pay a price greater than zero.

Closure

13. Review the key points in the lesson by asking the following questions:
    - What is the value of a good or service? (*The maximum price someone is willing to pay for something*)
    - What determines the value of a good or service? (*How well it satisfies people's wants*)
    - What is the price of a good or service? (*The amount people must pay to buy the good or service*)
    - What is the maximum price you would be willing and able to pay for purple cookies that taste like chalk? (*Zero*) Why? (*The cookies aren't valuable because they don't satisfy a want.*)
    - Why do people place different values on goods and services? (*Because they have different tastes and preferences*)
    - Can viewing a beautiful sunset be more valuable than viewing the latest movie? (*Yes, if viewing the sunset brings more satisfaction for a person than viewing a movie does.*)
    - Do you pay a price for breathing the air? (*No*) Does this mean that air has no value? (*No*) Why? (*Air satisfies people's want for oxygen, so it is very valuable.*)

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Assessment

14. Distribute paper and ask students to draw a picture of a good or service they receive from the natural environment that has zero price but has value for them. Instruct them to write several sentences explaining why this good or service has value for them.

15. Distribute a copy of *Handout 6-2: Assessment* to each student. Read the directions with the students and instruct them to complete the work.

    If students circle an item, they should write a value equal to or greater than the price. If students underline an item, they should write a value less than the price.

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Visual 6-1: Items of Value

CHOOSE THREE OF THE FOLLOWING ITEMS

Bottle of water

Walking shoes

Box of cereal

Sunscreen

Compass

Tablet or phone

Tank of air

Stylish clothes

Ten $1 bills

Gallon of gas

Motion-sickness patches

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Handout 6-1: You Are There!

Situation A

You are alone in a forest near a small stream. You're supposed to meet your friends at a campsite. Their campsite is over 10 miles from where you are right now.

Situation B

You are looking for buried ruins in a desert. You have narrowed your search to an area the size of a large city. You have a truck to drive from spot to spot.

Situation C

Your ship has sunk, and you are in a small rowboat in the middle of the ocean. You were able to radio for help, which should arrive in a day or so.

Situation D

Your mother is taking you to Mega Mall to keep her company while she shops. It will probably take her several hours.

Situation E

You are alone in a space station orbiting Earth. A meteor has hit the station and many of your basic supplies have been lost. A rescue shuttle has been prepared but will not arrive for at least a day.

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Handout 6-2: Assessment

Instructions:

1. Read the following list of goods and services produced in the economy.
2. Circle the goods and services you would buy.
3. Underline the goods and services you would not buy.
4. On the line next to each good or service, write its value to you.
5. Write a sentence explaining why you do or don't value each item.

The following is an example:

(Broccoli for 50¢) ___$3___

Broccoli is valuable to me because it tastes good and has lots of vitamins.

1. Cola drinks for $1 a can _____

_____

2. Brussels sprouts for 1¢ each _____

_____

3. Bubble bath for $3 a bottle _____

_____

4. Soccer ball for $25 _____

_____

5. Dry cleaning for $4 an item _____

_____

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Standards and Benchmarks

Voluntary National Content Standards in Economics

Standard 1: Scarcity

- **Benchmark: Grade 4**

  2. Economic wants are desires that can be satisfied by consuming a good (an object), a service (an action), or a leisure activity.

Standard 7: Markets and Prices

- **Benchmark: Grade 4**

  1. A price is what people pay when they buy a good or service, and what they receive when they sell a good or service.

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Lesson 7:
Cycling and Recycling Around the Classroom

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Standards and Benchmarks (see page 7.13)

Lesson Description

Students pretend to be natural resources moving through the cycle of production, consumption, and recycling.

Grade Level

6-8

Economic Concepts

Benefits
Capital resources
Consumption
Costs
Human resources
Natural resources
Production
Recycling
Resources
Scarcity

Objectives

Students will be able to

- define recycling, resources, production, natural resources, consumption, capital resources, scarcity, human resources, benefits, and costs;

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- explain that recycling allows people to produce more goods and services from a given amount of a natural resource;
- identify costs and benefits; and
- explain that activities should be undertaken if the benefits exceed the costs.

Compelling Question

How do societies benefit from recycling?

Time Required

60 minutes

Materials

- Visual 7-1
- Copies of Handout 7-1, cut apart to produce at least four times as many cards as there are "tetra" students
- A copy of Handout 7-2 for each student
- Five 11" x 14" pieces of poster board to create five signs: Resources, Production, Consumption, Recycling, and Waste Disposal

Preparation

Prior to the lesson, prepare the classroom so that there are two areas, each large enough for most students to stand in. Place the "Resources" sign in one area and the "Waste Disposal" sign in the other. In addition, prepare small stations (large enough for one to three students) for "Production," "Consumption," and "Recycling." There must be paths allowing students to move among all areas. A suggested classroom arrangement is to place all student desks or tables in the center of the room. Then use one side of the room for the resource area, the front of the classroom for the production and consumption stations, the other side of the room for the recycling station, and the back of the room for the waste disposal area. Place the appropriate sign in each area.

Procedure

1. Explain that the class will look at recycling in this lesson. Define **recycling** as the process of removing and reusing useful materials found in waste. Discuss the following:
   - What items do you and your family recycle at home? (*Newspapers, aluminum cans, glass bottles and jars, plastic containers, cardboard*)

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- Why do you recycle? (*Students will probably say that recycling reduces the amount of waste that is dumped into the environment.*)

2. Explain that **resources** are things that are used to make goods and services. The process of using resources to make goods and services is called **production**. One type of resource we use in production includes natural resources. **Natural resources** are things that occur naturally in and on the earth that are used to produce goods and services. Ask for examples of natural resources. (*Land, water, trees, plants, coal, oil*)

3. Point out that recycling helps us reduce the amount of natural resources needed to produce more goods and services.

4. Explain that students will investigate the benefit of recycling by role-playing as natural resources in the production process. They will participate in four production rounds.

5. Select a large group of students (most of the class). The number in this group should be divisible by four. (For best results, assign 12, 24, or 36 students to this group.) Explain that each student in this group represents a pound of "tetra." Tetra is an imaginary natural resource used to produce an imaginary product—widgets. One pound of tetra is used to produce one widget.

6. Select one to three students to act as widget producers and one to three students to work at the recycling station.

   NOTE: In a class of 25, 20 students would have roles as the tetra, three would have roles as widget producers, and two would have roles as recycling station workers.

7. Organize the class in the following way:

   - Tell the tetra students to go to the resource area and stand in a single-file line.
   - Give the cards from *Handout 7-1: Widget Cards* to the producers and tell them to go to the production station.
   - Tell students who recycle to go to the recycling station.

   NOTE: The teacher should also go to the recycling station because this is the best place from which to direct this activity and be certain that everyone plays his or her role correctly.

Round 1

8. Explain that the tetra students will walk in an orderly line from the resources station to the production station and will receive a widget card from one of the producers. Point out that this step indicates the tetra will be "used up" in the production of a widget.

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9. Explain that after leaving the production station, the tetra students (now widgets) will then move to the consumption area. Point out that **consumption** occurs when people use goods and services. As students pass through the consumption station, tell them to act used up, tired, or worn out.

10. Explain that the "used up" widget students will then walk toward the recycling area. Tell the students who recycle that they should point to the waste disposal area because there is no recycling at this time. The widget students will pass by the recycling station and continue to the waste disposal station.

11. Answer any questions students have about the procedure. Tell the tetra students to walk through the process.

12. Once all tetra/widget students are in the waste disposal area, count and collect the widget cards. In this first round, the number of widget cards equals the number of tetra students. Record this number of produced widgets in the first row of the third column on *Visual 7-1: Widget Production*.

Round 2

13. Return the widget cards to the producers. Tell all tetra students to return to the resources station. Explain that in this round, some tetra students will be recycled. They will walk through the stations as before—first to the production station to collect a widget card, then to the consumption station, and then to the recycling station.

14. Explain that in this round, as the tetra/widget students reach the recycling station, the recycling workers will act as traffic controllers. They will direct the first of every four tetra students back to the resource area and the remaining three to the waste disposal station as before.

15. Tell the tetra students that if they are directed back to the resources station, they should go immediately to the end of the resource line and pass through the production, consumption, and recycling stations again.

    NOTE: Students should stay in the order in which they were lined up in the first round; that is, they should not "pass" a student.

16. Begin the procedure and continue cycling the tetra students through the stations until all of them end up in the waste disposal station. Count and collect the widget cards. Those who were recycled will have more than one widget card. If there were 24 tetra students, there should be 32 widgets. Record the results on Visual 7-1 in the second row of the third column.

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Round 3

17. Tell all tetra students to return to the resources station. Explain that this round is the same as Round 2 except that the first two of every four students will be directed to the recycling station.

18. Begin the procedure and continue cycling the tetra students through the stations until all of them end up in the waste disposal station. Count and collect the widget cards. Those who were recycled will have more than one widget card. If there were 24 tetra students, there should be 48 widgets. Record the results on Visual 7-1 in the third row of the third column.

Round 4

19. Tell all tetra students to return to the resources station. Explain that this round is the same as Rounds 2 and 3 except that the first three of every four students will be directed to the recycling station.

20. Begin the procedure and continue cycling the tetra students through the stations until all of them end up in the waste disposal station. Count and collect the widget cards. Those who were recycled will have more than one widget card. If there were 24 tetra, there should be 96 widgets. Record the results on Visual 7-1 in the fourth row of the third column.

    NOTE: If n = the number of tetra students, then the number of widgets produced in each round can be calculated as follows. Round 1: number of widgets = n; Round 2: number of widgets = (4/3 × n); Round 3: number of widgets = (2 × n); Round 4: number of widgets = (4 × n).

21. Display Visual 7-1 and discuss the following:

    - In the first round, how many resources were recycled? (*Zero, there was no recycling in Round 1.*)
    - In the second round, how many resources were recycled? (*One out of four resources were recycled—25 percent.*)
    - In the third round, how many resources were recycled? (*Two out of four resources were recycled—50 percent.*)
    - In the fourth round, how many resources were recycled? (*Three out of four resources were recycled—75 percent.)*

22. Point out that with one out of four (1/4) resources recycled, production of widgets increased by 8. When resources were recycled at a rate of two out of four (2/4 or 1/2), production of widgets doubled. When resources were recycled at a rate of three out of four (3/4), production of widgets tripled. Discuss the following:

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- In any round, were there resources that didn't end up as waste? (*No, in every round all tetra students eventually ended up in the waste disposal station.*)
- In which round did resources end up as waste most quickly? (*Round 1—no recycling*)
- In which round did it take the most time for all resources to become waste? (*Round 4—3/4 recycling*)

23. Explain that recycling delays the creation of waste; however, all natural resources brought into a production process eventually end up as waste, and people must dispose of the waste.

    NOTE: Students may mistakenly believe that recycling allows natural resources to be used virtually forever; however, this is not the case. Only a 100 percent recycling rate would prevent resources from eventually ending up as waste. This, unfortunately, is not likely physically possible. As James R. Kahn wrote, "Some materials become mixed with other materials during the production process, rendering recycling extremely difficult. The point is that if a fraction of the material is lost every time a material is used and recycled, the material will eventually be exhausted." (Kahn, James R. *The Economic Approach to Environmental and Natural Resources, 3rd Edition*. South-Western College Publishing, 2004.)

24. Discuss the following:
    - Why do you think people don't recycle at a rate as high as 50 percent? (*Answers will vary.)*
    - What happens to items that you and your family recycle? (*They eventually become new products.*)

25. Using aluminum cans as an example, explain that the cans must be taken to a recycling center. They are placed in a truck and hauled to a reprocessing factory. At the factory, they are cleaned and melted down to form liquid aluminum. The aluminum can be used to make new cans.

26. Point out that transporting, cleaning, and melting the aluminum cans uses resources just as production does. Some resources are workers such as truck drivers, factory workers, and workers at the recycling center. Some of these resources are capital resources. **Capital resources** are goods that have been produced and are used to produce other goods and services. They are used over and over again in the production process. For example, the trucks used to transport the cans to the factory are capital resources. The buildings and machines used to melt the cans back into useable aluminum are also capital resources.

27. Explain that all resources are scarce. **Scarcity** is the condition that exists because there are not enough resources to produce everyone's wants. Society wants more goods and services than there are resources available. This means that when we use resources to produce one good or service, those resources can't be used to produce other goods and services.

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28. To illustrate this idea, select five students to represent scarce human resources. **Human resources** are people who do mental and/or physical work to produce goods and services. Tell the class that each of these human resources can make four widgets each day, or he or she can convert four used widgets back into useable tetra. Have all five students go to the production station and ask the following questions:

    - How many widgets could be produced in a day? (*4 widgets per student × 5 students = 20 widgets*)
    - How many of these widgets would be recycled? (*None because there are no workers at the recycling station*)

29. Ask one of the five students to move to the recycling station and repeat the two questions from above. Answers are as follows:

    - *4 widgets per student × 4 students = 16 widgets*
    - *4 widgets recycled into useable tetra × 1 student = 4 recycled tetras; i.e., a recycling rate of 1/4 or 25 percent*

30. Ask one of the four students in the production station to move to the recycling station and repeat the two questions from above. Answers are as follows:

    - *4 widgets per student × 3 students = 12 widgets*
    - *4 widgets recycled into useable tetra × 2 students = 8 recycled tetras; i.e., a recycling rate of 8/12 or 67 percent*

31. Point out that as more of the limited human resources are used for recycling (to get a higher recycling rate), fewer are available to produce widgets. The cost of more recycling is less widget production per day.

    NOTE: It is best to stop at this point, but note the following for your information. If yet another student were sent to work at the recycling center, the amount of widgets that could be produced would be 8 while the number that could be recycled would be 12. Since only 8 could be produced, only 8 could be recycled. The recycling rate is 100 percent but the extra recycling worker is not needed.

32. Explain that there are benefits and costs for recycling. **Benefits** are rewards gained from an action/activity. **Costs** are penalties that result from an action/activity. A benefit of recycling is that more can be produced from the same amount of natural resources. However, a cost of recycling is that other resources are required to recycle. So, while recycling saves some resources, society must weigh the benefits of recycling against the costs and decide how much recycling is best. If there isn't enough recycling, society could use up too many natural resources. If there is too much recycling, society could actually use up more resources than it saves.

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Closure

33. Review the key points in the lesson by asking the following questions:

- What is recycling? (*Using goods to produce materials that are used to produce new goods*)
- What are natural resources? (*Things that occur naturally in and on the earth that are used to produce goods and services*)
- Does recycling eliminate the creation of waste? (*No*) Then why do we recycle? (*To delay the creation of waste and to produce more goods from the same amount of natural resources*)
- What is production? (*The process of using resources to make goods and services*)
- What is consumption? (*People using goods and services*)
- What are human resources? (*People who do mental and/or physical work to produce goods and services*)
- What are capital resources? (*They are goods that have been produced and are used to produce other goods and services. They are used over and over again in the production process.*)
- Why are resources scarce? (*People want more goods and services than there are resources available to produce those goods and services.*)
- What is a benefit? (*A reward gained from an action/activity*)
- What is a benefit of recycling? (*Producing more goods with the same amount of natural resources*)
- What is a cost? (*A penalty that results from an action/activity*)
- What is a cost of recycling? (*Using other resources in the recycling process*)
- What decision must societies make about recycling? (*How much recycling to do so that natural resources are saved without using up too many other resources*)

Assessment

34. Distribute a copy of *Handout 7-2: Assessment* to each student. Review the instructions and tell students to complete the work. Use the information below to check students' answers.

Students should consider the benefits and costs of recycling aluminum cans and the benefits and costs of recycling toilet paper. They should conclude that the benefits of recycling aluminum outweigh the costs, but the costs of recycling toilet paper outweigh the benefits.

Recycling aluminum is less expensive than mining new ore, and recycling saves energy costs. The costs of storing, cleaning, and sorting aluminum cans are relatively low. The benefits of recycling aluminum include saving energy, saving natural resources, and obtaining more goods

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from the same amount of natural resources. Storing and reprocessing toilet paper have very high costs. These include the loss of aesthetic pleasure (odor created), potential health damages in dealing with the dirty paper, and the tremendous amount of resources required to actually separate the "good" paper fibers that could be reused. This means that more resources would be used recycling the paper than would be saved making recycled paper. The costs of recycling in this case are greater than the benefits.

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Visual 7-1: Widget Production

Round	Amount of recycling	Number of widgets produced
1	0 out of 4 = 0/4	
2	1 out of 4 = 1/4	
3	2 out of 4 = 2/4 = 1/2	
4	3 out of 4 = 3/4	

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Handout 7-1: Widget Cards

WIDGET	WIDGET	WIDGET	WIDGET
WIDGET	WIDGET	WIDGET	WIDGET
WIDGET	WIDGET	WIDGET	WIDGET
WIDGET	WIDGET	WIDGET	WIDGET

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Handout 7-2: Assessment

Read the information below and write a response using complete sentences.

Some things are recycled at a very high rate. Some things are recycled at lower rates.

Aluminum cans are recycled at a very high rate, but toilet paper isn't recycled at all. Explain why.

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Standards and Benchmarks

Voluntary National Content Standards in Economics

Standard 1: Scarcity

- **Benchmarks: Grade 4**

  7. Natural resources such as land are "gifts of nature"; they are present without human intervention.

  8. Human resources are the people who do the mental and physical work to produce goods and services.

  9. Capital goods are goods that are produced and used to make other goods and services.

- **Benchmark: Grade 8**

  1. Scarcity is the condition of not being able to have all of the goods and services that one wants. It exists because human wants for goods and services exceed the quantity of goods and services that can be produced using all available resources. Scarcity is experienced by individuals, governments, and societies.

Standard 2: Decision Making

- **Benchmark: Grade 4**

  2. A cost is what you give up when you decide to do something. A benefit is what satisfies your wants.

- **Benchmark: Grade 8**

  1. To determine the best level of consumption of a product, people must compare the additional benefits with the additional costs of consuming a little more or a little less.

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Lesson 8:
Eco-Cents

Author

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Standards and Benchmarks (see page 8.12)

Lesson Description

Students discover ways that businesses have reduced the impact of their production and products on the environment. They consider the role of consumer sovereignty in bringing about these changes. Working in teams, students are challenged to come up with their own ideas for new products or services and make a marketing presentation to the class.

Grade Level

6-8

Economic Concepts

Consumer sovereignty

Costs of production

Entrepreneur

Natural resources

Product

Profit

Revenue

Waste

Objectives

Students will be able to

- define product, natural resources, waste, profit, revenue, costs of production, consumer sovereignty, and entrepreneur;

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- explain ways in which businesses have reduced the impact of their production and products on the environment; and
- explain how and why businesses respond to consumer wants.

Compelling Question

Why do businesses seek to use environmentally friendly production methods and to make environmentally friendly products?

Time Required

130 minutes over 3 days

Day 1: 15-20 minutes

Day 2: 50 minutes

Day 3: 60 minutes

Materials

- A copy of Handouts 8-1, 8-2, and 8-3 for each student

Procedure

Day 1

1. Explain that production is the process of using resources to make products. **Products** are goods or services. Some resources used to produce goods and services are natural resources. **Natural resources** are things that occur naturally in and on the earth that are used to produce goods and services.

2. Explain that when goods and services are produced and consumed, waste occurs. **Waste** is the unavoidable material that remains after something has been consumed or produced. Some waste produced may be recycled to produce more goods and services, while other waste is put back into the environment in either the ground (landfill), our waterways, or the air (incineration). This waste can have harmful impacts on the environment.

3. Ask students why businesses produce goods and services. (*Answers will vary.*) Explain that businesses produce goods and services to earn profit. **Profit** is the difference between revenue and the costs of production. Profit is income for entrepreneurs. **Revenue** is the payment producers receive when consumers buy a product. **Costs of production** are the amount producers pay for the resources used to produce a product.

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4. Remind students that businesses want to earn profit. Ask them what would happen if a business produced a product that consumers did not want to buy. (*The business wouldn't sell the product and, therefore, wouldn't earn a profit. It would go out of business.*)

5. Explain that because businesses want to earn profit, they must produce products that consumers want the most and are willing and able to buy while keeping their costs of production as low as possible.

6. Explain that over time, people have become more aware that the production and consumption of goods and services result in waste that is put back into the environment. As a result, people have begun to ask both businesses and government for more environmentally friendly products.

7. Ask students what they think an environmentally friendly product is. (*One with a limited amount of packaging, one made from recycled materials, one that is reusable, one that uses less energy, one that uses fewer natural resources, one that produces less waste*)

8. Summarize that an environmentally friendly product is one whose consumption and production have only a small impact on the environment.

9. Tell students they are going to participate in an "environmentally friendly" scavenger hunt. Distribute a copy of *Handout 8-1: Eco-Search* to each student. Make certain that students understand the 10 categories listed on the handout by providing the following descriptions:

    - **Environmentally friendly or "causes no harm to the environment":** Some products announce or advertise they are safe for or cause no harm to the environment. Many cleaning solutions that no longer contain phosphates announce this on their labels.
    - **Energy saving or energy efficient:** Advertisements for new kitchen appliances often indicate the appliances use less electricity or water to operate than do older appliances.
    - **Produced with recycled materials:** Often paper products will include a note telling the consumer the product was made with recycled materials.
    - **Secondhand or used:** Perhaps you or one of your family members has purchased an item someone else used first—for example, from a garage or rummage sale.
    - **Lighter or smaller, using less material to produce the product now than before:** Cars are made with lighter materials than they used to be.
    - **Can be recycled:** Many products have a recycle symbol or a note on the label indicating the container/wrapper for the product can be recycled.
    - **Used in or with the natural environment:** Think about things you use to help you enjoy outdoor activities. For example, using water skis requires a lake.

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- **Uses solar energy:** Sometimes the power to operate a product comes from solar energy. For example, some calculators, outdoor lights, and flashlights are solar powered.
- **Effect of waste on the environment has been reduced:** Sometimes waste that is created when a product is made can be treated or cleaned so that it does less harm to the environment. For example, if dirty water from a factory is filtered before it is dumped into a river, it does less harm to the environment.
- **Helps educate:** There are magazines, programs, books, and other materials helping people learn about ways to protect the natural environment.

10. Challenge students to find at least one example of each of the items listed using the internet, magazines, store ads, stores, and other sources. Tell them they have two days to complete this task.

Day 2

11. Discuss the scavenger hunt results as follows:
    - Name some products that "cause no harm to the environment." (*Biodegradable cleaning solutions and non-aerosol dispensers*)
    - How have businesses changed their production processes so that these goods aren't harmful to the environment? (*They may use chemicals that aren't harmful or use pump dispensers instead of aerosol sprays to prevent harming the ozone layer.*)
    - How does this benefit the environment? (*Less waste or less-harmful waste is put into the environment.*)
    - Name some products that are energy saving or energy efficient. (*A new home, new appliances, a new water heater, and energy-efficient light bulbs*)
    - How have businesses changed their production process to make these products more energy efficient? (*They've produced additional insulation in homes, better seals and more-efficient motors in appliances, dishwashers and washing machines that require less water, and light bulbs that use less energy.*)
    - How does this benefit the environment? (*Fewer natural resources are used to operate appliances, and fewer natural resources are needed to heat and cool homes.*)
    - Name some products that are produced with recycled materials. (*Aluminum cans, some plastic containers, glass containers, some paper towels, and other paper products*)
    - How have producers changed their production processes to make these products? (*They buy used aluminum cans, plastic bottles, glass, and paper to create raw materials instead of using natural resources.*)
    - How does this benefit the environment? (*Fewer new resources are used and less waste is put into the environment because some resources are reused.*)

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- Name some products offered for sale that have already been used. (*Used cars, used clothing, and used tools and equipment*)
- How does this benefit the environment? (*New resources aren't used to produce these items, and no additional waste is created.*)
- Name some products that are lighter or smaller than they used to be. (*Automobiles, trucks, computers, irons, calculators, and lawn mowers*)
- How have producers changed their production processes to make these products? (*They have redesigned the product and/or product packaging.*)
- How does this benefit the environment? (*A lighter car uses less fuel, and lighter products require less fuel to transport.*)
- Name some products that are used in or with the natural environment. (*Backpacks, binoculars, cross-country skis, roller blades, hiking boots, fishing pools, and tents*)
- What are some products that operate using solar energy? (*Satellites, solar calculators, solar panels for heating homes and water, communication equipment that measures water levels in flash flood areas, railroad communications, and call boxes along the highway*)
- How does this benefit the environment? (*Fossil fuels aren't used, and less waste is produced.*)
- Name some products for which producers have reduced the harmful effects of the waste created during production. (*Electricity, fertilizer, and bus services*)
- How did producers change their production processes to reduce the harmful effects of waste created during production? (*Electricity: added scrubbers to smoke stacks and switched from high-sulphur to low-sulphur coal or to natural gas; fertilizer: return cleaner water used in production to the river; bus services: use natural gas or electricity instead of gasoline or diesel to run buses*)
- How does this be*nefit the environment? (*These changes reduce the amount of waste in the air and water.)
- Name some products that help educate people about ways to protect the environment. (*Documentaries about the environment; public service announcements on radio and television; and local, state, and federal environmental organizations*)

12. Point out that the scavenger hunt shows that businesses have responded to consumer desires for more environmentally friendly products. Discuss the following:
    - How have businesses responded? (*By producing goods with recycled materials, producing products that can be recycled, reducing the amount of waste created, treating/removing waste so that it doesn't get into the environment, producing goods that are more energy efficient, producing goods that are lighter, and so on*)

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- Why do businesses respond to consumer desires (wants)? (*Consumers won't buy products that they don't want.*)
- What happens to a business if it produces products that consumers don't want? (*The business will earn little or no profit.*)
- If consumers want businesses to produce goods and services that are more environmentally friendly, what can they do? (*They can refuse to buy less environmentally friendly products, write to companies and request that they change production so their products are more environmentally friendly, and encourage other consumers to take similar actions.*)

13. Explain that consumers have **consumer sovereignty**—the ability to influence what is produced and consumed in the economy through their consumption activities. Consumers have power because they determine the types and quantities of goods and services that are produced. If consumers won't buy a good, producers won't want to produce it. If consumers want to buy a good, producers will want to produce it to earn a profit.

14. Tell students that they are going to participate in a role-play activity. In this activity, students will work in groups and act as entrepreneurs. An **entrepreneur** is a person who is willing to take risks in order to develop new products and start new businesses.

15. Divide the class into groups of two to four students. Explain that the task for each group is to think of a new product or service or a way of improving an existing product or service. The new or improved product that the group devises must fit into at least one of the 10 categories on Handout 8-1.

16. Explain that once members of a group decide on a new or improved product, they must develop a five-minute presentation for the rest of the class.

17. Point out that during the presentation, each group must explain why its product would be profitable for the company to produce and why the product is environmentally friendly.

18. Distribute a copy of *Handout 8-2: Production Presentation* to each student. Explain that this is a guide for developing the presentation and review the information with the students. Encourage them to prepare visual aids that complement their oral presentations.

19. Allow at least one week for students to prepare their presentations.

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Day 3

20. Have the teams make their presentations.

21. Point out that new, environmentally friendly products can be developed and that existing products can be improved to be more environmentally friendly. Businesses, however, will only develop these new or improved products if consumers are willing and able to buy them. As a result, consumers have a lot of say about what gets produced. They have consumer sovereignty.

Closure

22. Review the key points of the lesson by asking the following questions:
    - What is production? (*The process of using resources to make products*)
    - What are natural resources? (*Things that occur naturally in and on the earth that are used to make goods and services*)
    - What is waste? (*The unavoidable material that remains after something has been consumed or produced*)
    - Why do businesses produce and sell goods and services? (*To earn profit*)
    - What is profit? (*The difference between the revenue a business receives and its costs of production*)
    - What is revenue? (*The payment producers receive when consumers buy their product*)
    - What are costs of production? (*The amount producers pay for the resources used to produce a product*)
    - What does consumer sovereignty mean? (*Consumers have power to influence what goods and services are produced.*)
    - What does environmentally friendly mean? (*When a product is produced and consumed, it has only a little impact on the environment.*)
    - What is an entrepreneur? (*A person who is willing to take risks in order to develop new products and start new businesses*)

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Assessment

23. Distribute a copy of *Handout 8-3: Assessment* to each student. Review the instructions and tell students to complete the work. Use the information below to check students' answers.

    1. *Revenue minus costs of production*
    2. *Willing and able to buy*
    3. *Consumer sovereignty*
    4. *Entrepreneur*
    5. *Waste*
    6. *Payment*
    7. *Natural resources*
    8. *Environmentally friendly*

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Handout 8-1: Eco-Search

You are going on a scavenger hunt! You are looking for information about environmentally friendly products (goods or services). Your goal is to find a specific example of each of the products described below. Write the name of the product, the company that produces it, and the source of your information (internet site, product label, and so on).

Product description	Product and company name	Source
1. A product that is described as environmentally friendly or "causes no harm to the environment" (or something similar)		
2. A product described as energy saving or energy efficient		
3. A product made with mostly recycled materials		
4. A product offered for sale that has already been used (secondhand)		
5. A lighter or smaller product made using less material than was used in the past		
6. A product that, in large part, can be recycled		
7. A product that people use in or with the natural environment		
8. A product that operates using solar energy		
9. A product for which producers have reduced the harmful effects of waste created when the product is made		
10. A product that helps educate about ways to protect the natural environment		

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Handout 8-2: Product Presentation

Your group's product presentation is limited to five minutes. The presentation should include answers to the following questions:

1. What is your product and what is its name? Describe, demonstrate, and/or show a sample of your product.

2. What want does the product satisfy?

3. Is this a new product or have you improved an existing product?

4. In what ways is this product environmentally friendly or more environmentally friendly than other products like it?

5. How is this product produced; what natural resources, workers, tools, and machines are needed?

6. Why do you think people would be willing and able to buy this product?

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Handout 8-3: Assessment

Use the Word Bank below to complete the following sentences.

1. Profit is _____ minus _____.

2. To earn profit, businesses must produce a product that consumers are _____.

3. Consumers influence what types of goods and services are produced. This is called _____.

4. A person who has an idea for a good or service that he or she thinks many people will like and who risks time and money to produce it is called a(n) _____.

5. _____ is the unavoidable material that remains after production and consumption.

6. Revenue is the _____ a business receives from selling a product.

7. Things that occur in nature or the natural environment are called _____.

8. _____ means that the production or consumption of a product has only a little impact on the environment.

Word Bank

Environmentally friendly	Willing and able to buy	Revenue
Natural resources	Consumer sovereignty	Entrepreneur
Waste	Costs of production	Payment

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Standards and Benchmarks

Voluntary National Content Standards in Economics

Standard 7: Markets and Prices

- **Benchmark: Grade 8**

    1. Market prices are determined through the buying and selling decisions made by buyers and sellers.

Standard 14: Entrepreneurship

- **Benchmarks: Grade 8**

    3. Entrepreneurs (as well as other sellers) earn profits when the revenues they receive from selling the products they sell are greater than the costs of production.

    4. Entrepreneurs (as well as other sellers) incur losses when the revenues they receive from selling the products they sell do not cover the costs of production.

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Lesson 9:
A Bad Deal for the Rain Forests

Author

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Standards and Benchmarks (see page 9.11)

Lesson Description

Students are given the opportunity to buy small snacks in three different situations. The first involves a choice between two different goods that have the same price. The second involves a choice between the same good offered at two different prices. The third involves a choice in which a good has public or "shared" characteristics or private or "me-only" characteristics.

NOTE: To achieve the results described in this lesson, the class size must be larger than 10 students.

Grade Level

6-8

Economic Concepts

Free rider

Negative incentives

Private ("me-only") goods

Public (shared) goods

Objectives

Students will be able to

- define private goods, public goods, free rider, and incentive;
- explain that price and people's tastes and preferences influence what people buy;
- identify examples of public and private goods; and
- explain why people may be unwilling to pay for something to happen even though they want it to happen.

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Compelling Question

Why are people unwilling to pay to protect the environment, even though they think protecting the environment is important?

Time Required

50 minutes

Materials

- Copies of Handout 9-1 cut apart to provide 10 tokens for each student
- A copy of Handouts 9-2 and 9-3 for each student
- A For Sale sign—"Chocolate-Covered Brussels Sprouts, 2 for $1.00"
- 30 small, individually wrapped snacks (candy, sticks of gum, boxes of raisins) or small items/toys (plastic rings, erasers, pencils, stickers) for each student
- Paper lunch bag for each student
- Two product signs, each advertising a different treat at a price of one token (for Round 1)
- Two product signs, each advertising the same treat—one at a price of one token, another at a price of two tokens

Procedure

1. Display the For Sale sign on the board. Discuss the following:
   - Would you be willing and able to buy chocolate-covered brussels sprouts, 2 for $1? (*Most will say no.*) Why? (*Most will say they don't like brussels sprouts, or they like brussels sprouts but don't want them dipped in chocolate.*)
   - If I open a chocolate-covered brussels sprouts business and no one buys my product, what will happen? (*You will probably have to go out of business.*)

2. Tell students that businesses producing and selling something that no one wants will soon go out of business. Take down the sign and explain that you won't be producing chocolate-covered brussels sprouts because no one was willing and able to buy them. Decisions about what goods will be produced in society depend on what people are willing and able to buy.

3. Explain that students will participate in a role-play activity as buyers. Each student will have the opportunity to role-play in three buying rounds. In each round, they will have 10 tokens and will have two choices. They may either spend all their tokens on one choice or spend some tokens on one choice and some on the other. They should choose to do whichever they think is best for them.

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Round 1

4. Distribute 10 tokens from *Handout 9-1: Tokens* and one paper lunch bag to each student. Instruct each student to write his or her name on the lunch bag. Explain that after making purchases, they should place the items in the paper bag. They may not eat anything from their bags until the lesson is completed.

5. Select two desks at the front of the room. Explain that each desk represents a market. In markets, sellers make goods and services available for sale to buyers. Display the two product signs for the different items with the same price.

6. Tell students to come up one by one to make their purchases. After each purchase, ask students to announce how much they spent on each treat. Discuss the following:

    - Did everyone buy the same amount of each snack? (*No*) Why? (*Students have different tastes; they like different things.*)
    - In general, was one item chosen more than the other? (*Answers will vary.*) If so, why did this happen? (*In general, students liked it better.*)

Round 2

7. Redistribute 10 tokens to each student. On the desks (markets), display the two product signs advertising the same treat at different prices.

8. Tell students to come up one by one to make their purchases. After each purchase, ask students to announce how much they spent on each treat. Ask why many students only purchased the lower-priced item. (*They could buy more treats at the lower price, and they get more satisfaction.*) Discuss the following:

    - What influenced your purchases in the first round? (*How much I liked the treats*)
    - What influenced your purchases in the second round? (*Only the price of the goods*)

9. Tell students that these are the same factors that influence what everyone buys—how much they like it (how much satisfaction is received from it) and its price. Of course, what people buy determines what is produced.

Round 3

10. Distribute a copy of *Handout 9-2: Looking for a Good Deal* to each student. Explain that in this third round, the markets will be a little different. In Market 1, students will be able to buy one treat for one token. However, in Market 2, everyone in the class will receive a treat for every 10 tokens paid—even those students who didn't pay anything. This time, the number of treats an individual student receives depends on his or her buying decisions *and* the decisions

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of the rest of the students. Ask students to read the options on Handout 9-2. Answer any questions the students may have.

NOTE: The number of treats for Market 2 is found by dividing the number of tokens by 10 and rounding down. Use the remaining treats, which may be a mix of the two different treats from Rounds 1 and 2.

11. Read the instructions on Handout 9-2 and have students complete Part A. Allow time for students to complete the work. When students have finished Part A, discuss the answers as follows:
    - How many treats would you receive in case #1? (*13 treats: 10 from Market 1 and 3 from Market 2; that is, 36 tokens/10 = 3.6 rounded down to 3*)
    - How many treats would you receive in case #2? (*9 treats: 5 from Market 1 and 4 from Market 2; that is, 41 tokens/10 = 4.1 rounded down to 4*)
    - How many treats would you receive in case #3? (*5 treats: 0 from Market 1 and 5 from Market 2; that is, 51 tokens/10 = 5.1 rounded down to 5*)
    - How many treats would you receive in case #4? (*The number of treats equals the number of students in the class. All tokens are spent in Market 2, so the total number of tokens paid equals 10 times the number of students in the class.*)

12. Remind students that in this round, the number of treats they will receive depends on what they decide and what the other students in the class decide. In this round, they can receive a treat from Market 2 whether or not they contribute tokens to Market 2.

13. Explain that this time, instead of coming to the front of the class to make choices, each student will secretly record his or her decision in Part B of Handout 9-2. Once they have recorded their decisions, they should fold the paper to hide their choices.

14. Remind students that they can spend all tokens in one market or spend some in each market, but they should do whatever they think is best for them.

15. After everyone is finished, ask students to come to the front of the class one at a time. Explain that you will give each student the number of tokens they chose to spend in Market 1 according to what they wrote in Part B of Handout 9-2. Next, each student may purchase the corresponding number of treats from Market 1. Explain that you are also collecting all tokens they chose to spend in Market 2. After everyone has had a turn, you will count the tokens in Market 2 and divide the number by 10, rounding down to determine how many treats each student will receive from the market. Distribute those treats to the class.

    NOTE: The expected and likely result here is that students will spend tokens in both markets whether or not they completely understand the incentives.

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16. Discuss the following:
    - Who ended up with the most treats? (*Because everyone received the same number of treats from Market 2, it will be the student(s) who spent the most tokens in Market 1.*)
    - Does this mean that Market 1 offers a better deal? (*No*)

17. Explain that Market 2 is clearly a better deal. In Market 1, if a student spent 10 tokens, he or she could receive 10 treats. However, if everyone in the class spent their 10 tokens in Market 2, each student would receive as many treats as there are students in the class.

18. Ask students to describe the difference in the distribution of treats between Market 1 and Market 2. (*In Market 1, the treats go only to those who pay. In Market 2, the treats are shared by everyone regardless of who pays. People who didn't contribute any tokens to Market 2 still received treats.*) Explain that most markets are like Market 1—only paying customers receive the goods. These goods are called **private goods** (or "me-only" goods) because only the person who pays receives benefits (satisfaction) from the goods.

19. Ask students for examples of private or "me-only" goods. (*Toys, cars, pieces of pizza, hamburgers, shirts, shoes*)

20. Market 2 is an example of shared or public goods. **Public goods** are goods from which many people benefit at one time and from which they can benefit whether or not they pay. Many goods we get from the environment are like those in Market 2. They are "shared" or public goods. Everyone receives the same benefit from the goods whether or not they pay to use them. Use the following example to clarify:
    - If an endangered species is preserved, who benefits? (*Everyone who may have an opportunity to see or read and learn about the animal*)
    - Who benefits if the ozone layer is protected? (*Everyone benefits because we all receive the UV protection the ozone layer provides. UV protection helps prevent us from getting skin cancer.*)
    - Who benefits if rain forests are preserved? (*Everyone does. We all benefit from the oxygen that healthy rain forests produce. We also benefit because the plants in the rain forest absorb harmful gases in the air and provide homes for many animals.*)
    - Who benefits from clean air? (*All of us benefit because our lungs stay healthier.*)
    - Who benefits from clean water? (*All of us benefit because we don't become sick from dirty water.*)

21. Ask students why they think societies don't produce more of these shared environmental goods. (*Answers will vary.*) Explain that the buying activity they completed can help them understand why. In Round 3, students knew that contributing tokens to Market 2 would

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result in the most treats for the whole class. The "shared" goods were a better deal; however, students also knew that even if they didn't contribute any tokens or only contributed a few tokens to Market 2, they would receive treats because other people would contribute to Market 2. In other words, they could be free riders. A **free rider** is a person who receives benefits from something for which he or she doesn't pay. So they had an incentive to contribute few or no tokens to Market 2 and use their tokens to buy treats ("me-only" goods) from Market 1. As a result, fewer shared goods were produced even though they were a better deal.

22. Point out that this response usually occurs. People respond predictably to incentives. An **incentive** is a reward or penalty that makes people better off or worse off, respectively.

23. Explain that even though everyone could benefit from protecting the rain forest (shared goods), people tend to let others use their money (tokens) to protect the environment while they use theirs to buy "me-only" goods (free ride). This is a bad deal for the rain forests, and it's the economic reason fewer environmental goods are produced than people say they want.

Closure

24. Review the key points of the lesson by asking the following questions:

    - What things determine what and how much you buy? (*The price of the good and how happy the things make me; that is, how much satisfaction I receive*)
    - What is a shared or public good? (*One that benefits [satisfies] many people at one time; one that people can use even if they don't pay for it*)
    - Name some examples of environmental goods that are public goods. (*Rain forests, air, water, UV protection from the ozone layer*)
    - Name some examples of other public goods in the community. (*Fire protection, police protection, public parks, public television*)
    - What is a "me-only" or private good? (*One that benefits [satisfies] the person who buys it; one that you can't use unless you pay for it*)
    - Name some examples of private goods. (*Bicycles, slices of pizza, hamburgers, shoes, socks, hats, baseball gloves, hockey sticks, ballet shoes*)
    - What is a free rider? (*Someone who benefits from a good for which he or she didn't pay)*

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Assessment

25. Distribute a copy of *Handout 9-3: Assessment* to each student. Read the directions and answer any questions the students have. Have students complete the assignment. Use the answers below to review students' work.

1.

Private goods (underlined)	***Public goods (shared)***
Hamburger and fries	*City park*
Toothbrush	*Police protection*
Pair of shoes	*Public library*
Movie ticket	*Fire protection*
Hat	*Street lights*
Ice cream cone	*Sidewalks*
	Ozone layer
	Air
	Bald eagles

2. *Answers will vary but should include that the good can be shared by many. People can use the good even if they don't pay for it.*

3. *Answers will vary but should include that the good can be used by one person and that you can be excluded from using the good if you don't pay for it.*

4. *Even though people think it is important to protect the environment, they may be unwilling to pay to do so. Environmental resources such as air, rivers, oceans, and the ozone layer are public goods. This means that many people benefit from these resources at one time, and they benefit even if they don't pay to use or protect. People recognize this and often choose to be free riders.*

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Handout 9-1: Tokens

One token	One token	One token	One token	One token
One token	One token	One token	One token	One token
One token	One token	One token	One token	One token
One token	One token	One token	One token	One token
One token	One token	One token	One token	One token
One token	One token	One token	One token	One token
One token	One token	One token	One token	One token
One token	One token	One token	One token	One token
One token	One token	One token	One token	One token
One token	One token	One token	One token	One token
One token	One token	One token	One token	One token
One token	One token	One token	One token	One token

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Handout 9-2: Looking for a Good Deal

In Round 3, you have the following two buying options:

Market 1: You receive one treat for each token you pay.

Market 2: You and everyone in the class receives one treat for every 10 tokens paid regardless of how many tokens each student pays.

Number of tokens paid	Each student receives
0-9 tokens	0 treats
10-19 tokens	1 treat
20-29 tokens	2 treats
30-39 tokens	3 treats
40-49 tokens	4 treats
50-59 tokens	5 treats
60-69 tokens	6 treats
70-79 tokens	7 treats
…and so on	…and so on

Part A: Calculate how many treats you would receive in the cases below.

1. You spend all of your tokens in Market 1, while the rest of the class spends 36 tokens in Market 2.

2. You spend 5 of your tokens in Market 1 and 5 tokens in Market 2, while the rest of the class spends 36 tokens in Market 2.

3. You spend all of your tokens in Market 2, and the rest of the class spends 41 tokens in Market 2.

4. Everyone spends all of their tokens in Market 2.

Part B: Make your choice. Write how many tokens you'll spend in Market 1 and how many you'll spend in Market 2. Remember you have only 10 tokens to spend.

_____ **Market 1** _____ **Market 2**

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Handout 9-3: Assessment

1. Read the list of goods below. Circle those goods that are public (shared) goods. Underline those goods that are private ("me-only") goods.

City park	Hamburger and fries	Toothbrush
Pair of shoes	Police protection	Public library
Fire protection	Movie ticket	Ice cream cone
Sidewalks	Air	Bald eagles
Ozone layer	Street lights	Hat

2. Choose one public good from the list and explain why it is a public good.

3. Choose one private good from the list and explain why it is a private good.

4. Explain why people might be unwilling to pay to protect the environment even though they think protecting the environment is important. Use the economic vocabulary of public goods and free rider in your response.

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Standards and Benchmarks

Voluntary National Content Standards in Economics

Standard 4: Incentives

- **Benchmarks: Grade 4**

  2. Penalties are negative incentives that make people worse off.
  3. Both positive and negative incentives affect people's choices and behavior.
  4. People's views of rewards and penalties differ because people have different values. Therefore, incentives can influence different individuals in different ways.

- **Benchmark: Grade 8**

  3. Incentives can be monetary or non-monetary or both.

Standard 16: Role of Government and Market Failure

- **Benchmark: Grade 8**

  1. Public goods and services provide benefits to more than one person at a time, and their use cannot be restricted to only those people who have paid to use them.

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Lesson 10:
The Lorax and What the Lore Lacks

Author

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Standards and Benchmarks (see page 10.15)

Lesson Description

Students read Dr. Seuss' *The Lorax*, a section at a time, stopping to discuss the economic assumptions and lessons of the story. These discussions are used to illustrate how the outcome of the story could have been avoided.

Grade Level

6-8

Economic Concepts

Capital resources

Cost of production

Goods

Human resources

Incentives

Natural resources

Opportunity cost

Price

Profit

Services

Value

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Objectives

Students will be able to

- define goods, services, value, resources, human resources, capital resources, natural resources, opportunity cost, price, cost of production, positive incentive, and profit;
- distinguish between price and value;
- distinguish between opportunity cost and cost of production;
- describe how the cost of producing a good affects its price;
- explain that ignoring costs leads to environmental problems; and
- explain the role of incentives in determining how the environment is used.

Compelling Question

How do incentives affect people's use of environmental resources?

Time Required

45 to 60 minutes

Materials

- A copy of the book *The Lorax*, by Dr. Seuss
- Visual 10-1
- A copy of Handouts 10-1 and 10-2 for each student
- One yellow and one green highlighter for each student

Procedure

1. Tell the students they are going to listen to the story *The Lorax*, a book by Dr. Seuss. Ask the students if they have read or listened to it before. (*Answers will vary.*) Explain that the book is about how greed leads to the destruction and pollution of the environment, but that hidden in the story is the secret to avoiding its sad ending.

2. Explain that you will describe some important economic terms before they listen to the story. These same terms are important to uncovering the secret.

3. Distribute a copy of *Handout 10-1: Economic Vocabulary* to each student and display *Visual 10-1: Economic Vocabulary*. Tell students to use the handout to take notes during the discussion. Discuss the following:

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- People have economic wants that can be satisfied by consuming goods and services.
- **Goods** are objects that satisfy people's wants. Goods are produced by people, businesses, or the environment itself.
- Give some examples of goods you consume. (*Cereal, milk, clothes, books, toys, water, air*)
- **Services** are actions that satisfy people's wants. Services are produced by people, businesses, or the environment. For example, when the school nurse takes care of a student, the nurse is providing a service.
- Give some examples of services you consume. (*Haircuts, watching a baseball game, shade from a tree, flowers in the woods*)
- The **value** of goods and services is measured by how much people are willing and able to pay for them. The value of a good or service depends on the amount of satisfaction a consumer would receive from it.
- **Resources** are things that are used to produce goods and services.
- **Human resources** are people who do mental and/or physical work to produce goods and services.
- Give some examples of human resources. (*Barber, doctor, teacher, clown, baseball player, doctor, nurse, lawyer, bus driver, mechanic, store clerk*)
- **Capital resources** are goods that have been produced and are used to produce other goods and services. These are things made by people and used over and over again, such as tools and machinery, in the production of other goods and services.
- To produce a haircut, a barber uses capital resources such as a barber chair, scissors, combs, and a clipper.
- Name some other examples of capital resources. (*Stethoscope, truck, bus, projector, desks, chairs*)
- **Natural resources** are things that occur naturally in and on the earth that are used to produce goods and services. Water is a natural resource.
- Name some other examples of natural resources. (*Land, trees, coal, gold, silver, air, oil*)
- All resources are scarce; that is, people want to produce more goods and services with resources than are possible. Because people can't produce all the goods and services they want, they must make choices.
- Choosing to use resources to produce one good or service means that these same resources can't be used to produce another good or service. For example, if a tree is used to produce pulp for making paper, that same tree can't be used to provide shade.
- **Opportunity cost** is the value of the next-best alternative when a decision is made. When a good or service is produced, the opportunity cost is another good or service the resources could have been used to produce. So in the tree example, the cost of producing paper is the value of the shade given up.

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- **Price** is the amount of money a buyer must pay to acquire a good, service, or resource. So the price of 200 sheets of paper might be $2.25. That's the amount a person pays to buy the paper at a store. The price of the trees needed to make the paper might be $100 per tree. That's the amount the business producing the paper must pay to use the trees.
- Businesses are only willing to produce goods and services if the price businesses receive for the goods and services they sell is greater than the amount they must pay for all the resources used to produce the goods and services. The amount producers pay for the resources used to produce a product is called the **cost of production**.

4. Discuss the following:
   - What is the value of a car? (*The amount people are willing and able to pay for the car*)
   - The amount people are willing and able to pay for a car varies among people. It depends on the satisfaction they gain from owning a car.
   - Why would a car have more value for a person living in Los Angeles than for a person living in New York City? (*In Los Angeles, a car is the primary means of transportation and highly valued. In New York, subways and trains are popular means of transportation.*)
   - What is the price of a car? (*The amount people pay to actually buy it*)
   - Name some resources used to produce a car. (*Steel, glass, autoworkers, assembly line, machines, tools, plastic, leather, cloth*)
   - What is the opportunity cost of producing a car? (*The highest-valued good or service these resources would have been used to produce*)
   - What is the cost of production for a car? (*The amount the car producer must pay for all the resources used to produce a car*)

5. Tell students they should think about the terms value, cost, and price as they listen to the story.

Section 1: Paying the Once-ler for a Story, pp. 1-10, ending with the line "such a long, long time back..."

6. Read or select students to read the first section of the book aloud. At the completion of this section, discuss the following:
   - What is the Once-ler willing to do if you pay him? (*He will tell the story about the Lorax.*)
   - Is the Once-ler willing to sell a good or a service? (*A service*)
   - Does this service have value for anyone? (*Yes, people who are like the boy in the story are willing and able to pay to satisfy their desire to know the story.*)
   - What price does the Once-ler charge for this service? (*15 cents, a nail, and the shell of a great-great-great grandfather snail*)

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- What human and capital resources are needed to provide the service? (*Human resource: the Once-ler; capital resource: the whisper-ma-phone*)

Section 2: Nature's Goods and Services, pp. 11-15, ending with the line "while splashing around."

7. Read or select students to read the second section of the book aloud. At the completion of this section, discuss the following:
   - What are goods? (*Objects that satisfy people's wants*)
   - Give some examples of natural resources in the area where the Truffula trees grow. (*Clean air, Truffula fruit, and homes for Swomee-Swans, Barbaloots, and Humming-fish*) NOTE: Air is categorized as a good because there are molecules in the air that aren't seen but are ingested—consumed like food.
   - What are services? (*Actions that satisfy people's wants*)
   - Give some examples of services provided by nature in the area where the Truffula trees grow. (*Shade, morning breeze, and natural beauty*)
   - Do these goods and services have value? (*Yes*) Why? (*People are willing and able to pay for clean air, food, and visits to beautiful places.*)
   - What price does nature charge for these goods and services? (*Nothing; zero*)

Section 3: Producing Thneeds, pp. 16-33, ending with the line "He didn't show up any more."

8. Read or select students to read the third section of the book aloud. At the completion of this section, discuss the following:
   - What good did the Once-ler decide to produce? (*Thneeds*)
   - What natural, human, and capital resources were used to produce thneeds? (*Natural: Truffula tufts; human: the Once-ler and family members; capital: shop/factory, knitting needles, and the Super-Axe-Hacker*) NOTE: Students might also mention that the air and the water (pond) were used to dump the waste created. That is exactly correct, but don't emphasize it at this point.
   - Why would anyone buy a thneed? (*It could satisfy many wants. It could be used as a shirt, sock, glove, hat, carpet, pillow, sheet, curtain, or bicycle seat cover. People are willing and able to pay for such things.*)
   - What price did the Once-ler charge for a thneed? (*$3.98*)
   - Why is the Once-ler willing to produce and sell thneeds? (*People are willing and able to buy them, so he expects to get rich.*)
   - If the Once-ler thinks he can get rich charging this price, what is his cost of production for thneeds? (*It must be less than $3.98 for each thneed.*)

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- Would people buy more or fewer thneeds if the Once-ler raised his price? (*Fewer*)

9. Explain that the Once-ler has a positive incentive to produce thneeds. A **positive incentive** is a reward that encourages people to behave in a certain way. The positive incentive for the Once-ler is the money he receives when he sells thneeds.

Section 4: The Opportunity Cost of Producing Thneeds, pp. 34-49, ending with the line "which everyone, EVERYONE, <u>EVERYONE</u> needs!"

10. Read or select students to read the fourth section of the book aloud. At the completion of this section, discuss the following:
    - What price does the Once-ler pay for each Truffula tree that he cuts down and uses? (*Nothing, the price is zero.*)
    - What price does the Once-ler pay to use the air as a place to dump his "smogulous smoke"? (*Nothing, the price is zero.*)
    - What price does the Once-ler pay to use the pond as a place to dump his "gluppity-glupp" and "schloppity-schlopp"? (*Nothing, the price again is zero.*)
    - Is there actually a cost to use these things? (*Yes, the opportunity cost*)
    - What is the opportunity cost to use these things? (*The lost value of the goods and services identified in Section 2, such as clean air, homes [habitat] for wildlife, shade, and so on that are given up as a result of his production*)
    - If the price the Once-ler had to pay to use these resources equaled the opportunity cost, what would happen to his cost of production for thneeds? (*The cost of production would be higher because he's paying for all the resources he uses.*)
    - If this cost of production were higher, what would he have to do to the price he charges for thneeds? (*He would raise the price enough to cover his higher cost of production.*)

Section 5: Unless..., pp. 50-61, ending with the last line of the book.

11. Read or select students to read the fifth section of the book aloud. At the completion of this section, discuss the following:
    - What did the Once-ler say must happen if things are to get better? ("*Someone like you cares a whole awful lot*")

12. Point out that many people, including the people in this class, care about the environment "a whole lot," and yet it still gets polluted and overused. Caring may not be enough.

13. Ask students why the Once-ler wanted to make thneeds in the first place. (*He could get rich. The encouragement or incentive for him to produce thneeds was to earn a lot of money.*)

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14. Explain that people who start businesses expect to earn profit. **Profit** is the money left over from selling goods or services after businesses pay their costs of production. Discuss the following:
    - Did the Once-ler probably earn a lot of profit? (*Yes*) Why? (*His cost of production was a lot lower than his price for a thneed.*)
    - Did he pay for all the resources he used to make thneeds? (*No*)
    - For which resources didn't he pay? (*He didn't pay for the use of the trees, air, and water.*)
    - If he had to pay for these resources, what would happen to his cost of production and his incentive or encouragement to produce? (*His cost of production would have been higher. His incentive to produce would have been less.*)
    - It is possible that if he had to pay for all the resources he used, no one would be willing and able to buy thneeds at the price he would have to charge to cover his costs. If that were the case, he wouldn't have produced thneeds in the first place.

15. Point out that the Once-ler says that unless someone cares a whole lot, nothing will change. However, the economics of the story tells us something else. Unless users of resources pay for all the resources they use, and pay the opportunity cost of using these resources, producers will have an incentive (encouragement) to overuse (use too many of) these resources. For example, the Once-ler didn't have to pay for the trees, water, and air he used, so he had an incentive to overuse or use too many of them. And, because these resources are scarce, using them involves opportunity cost.

16. Remind students that when they first began reading *The Lora*x, you said there was a secret to avoiding the story's sad ending. Does anyone know what that secret is? (*Making people pay the opportunity cost for all resources they use, even those provided by the environment such as air or water, will help reduce the destruction and pollution of the environment.*)

17. Ask students what a moral is. (*An important lesson taught by a story*) Explain that the real moral of *The Lorax* is what we learned from the hidden secret—when people use resources for which they do not have to pay the opportunity cost, there's an incentive (encouragement) for people, and Once-lers, to do things that later they probably wished they hadn't, such as polluting the air and water.

Closure

18. Review the key points of the lesson by asking the following questions:
    - What are goods? (*Material things that provide satisfaction*)
    - Name some goods that you use. (*Paper, books, pencils, watches, lunch boxes, shirts, pants, shoes, bikes, food*)

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- What are some goods provided by the environment? (*Fruits, vegetables, water*)
- What is a service? (*Actions that provide satisfaction*)
- What are some services that you use? (*Education, transportation to school, radio or television for entertainment, mom/dad washing your clothes*)
- Name some services provided by the environment. (*UV protection from the ozone layer, beautiful things to look at, shade, cool breezes*)
- What do we use to produce goods and services? (*Resources*)
- What are natural resources? (*Things that occur naturally in and on the earth that are used to produce goods and services*)
- Give some examples of natural resources. (*Water, sunlight, trees, soil, coal, oil, gold, silver*)
- What are human resources? (*People who do mental and/or physical work to produce goods and services*)
- Give some examples of human resources. (*Teacher, bus driver, computer programmer, engineer, mechanic, doctor, chef, truck driver*)
- What are capital resources? (*Goods that have been produced and are used to produce other goods and services. These are things made by people and used over and over again, such as tools and machinery, in the production of other goods and services.*)
- What are some examples of capital resources that a doctor would use? (*Stethoscope, x-ray machine, scale) A barber? (Barber chair, scissors, combs, clippers*) A chef? (*Oven, pots, pans, refrigerator, counter*)
- What is the price of a good or service? (*The amount a consumer pays to buy a good or service*)
- What is the value of a good or service? (*The greatest amount a person would be willing and able to pay for a good or service*)
- What determines the value of a good or service? (*The amount of satisfaction a consumer receives from the good or service*)
- What is the opportunity cost of producing a good or service? (*The value of the goods or services that could have been produced using the same resources*)
- What is the cost of production of a good or service? (*The amount of money actually paid for the resources used to produce the good or service*)
- What is an incentive? (*A reward or penalty that encourages people to behave in a certain way*)
- What is profit? (*Revenue [price for a unit of a good or service] minus the cost of production for a unit of a good or service; a positive incentive that encourages businesses to produce goods and services; income for the business owner*)

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- What will happen if producers don't pay the costs of all resources they use to produce a good or service? (*The producers' costs of production will be lower. As a result, producers will charge a lower price than they would if they paid all the costs for producing the good or service.*)
- How will buyers react to this lower price? (*They will be willing and able to buy more of the good or service than they would at a higher price.*)

Assessment

19. Distribute a copy of *Handout 10-2: Assessment* and a yellow and a green highlighter to each student. Read the directions and answer any questions the students may have. Have students complete the assignment. Use the answers below to review students' work.

Part A

- *Goods produced by people (circled): Shoes, pizza, ice cream, candy, jewelry, shirts*
- *Goods produced by the environment (yellow highlight): Fruit, flowers, water*
- *Services produced by people (underlined): Bike repair, entertainment, baseball game*
- *Services produced by the environment (green highlight): Shade, beautiful scenery, sunlight, UV protection (from the ozone layer)*

Part B

1. *Price is the amount people pay to buy a good or service.*
2. *The cost of producing a box of Wiggly Worms is $0.70. The cost of producing a box of Jelly Beans is $1.10. Cost of production is the amount a business pays for the resources it uses.*
3. *Willy's incentive is to earn a profit.*
4. *Wiggly Worms profit = $1.00 – $0.70 = $0.30 per box*
5. *Jelly Beans profit = $1.50 – $1.10 = $0.40 per box*
6. *He earns more profit for each box of Jelly Beans.*
7. *Factory, machines*
8. *Workers*
9. *Willy gives up the chance (opportunity) to produce Wiggly Worms with those resources.*

Part C

1. *Willy is using the river as a place to dump melted chocolate, sugar solution, and dirty water, and he's using the air to dump smelly, dirty smoke.*
2. *Environmental goods and services, such as clean water for drinking and swimming, clean air, and beautiful vistas.*
3. *If Willy had to pay for these resources, his cost of production would go up.*
4. *This would encourage Willy to use fewer resources from the environment.*
5. *There would be less pollution.*

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Visual 10-1: Economic Vocabulary

Goods: Objects that satisfy people's wants. Goods are produced by people, businesses, or the environment.

Services: Actions that satisfy people's wants. Services are produced by people, businesses, or the environment.

Value: Measured by how much people are willing and able to pay for goods and services. The value of a good or service depends on the amount of satisfaction a consumer would receive from it.

Resources: Things that are used to produce goods and services.

Human resources: People who do mental and/or physical work to produce goods and services.

Capital resources: Goods that have been produced and are used to produce other goods and services. These are things made by people and used over and over again, such as tools and machinery, in the production of other goods and services.

Natural resources: Things that occur naturally in and on the earth that are used to produce goods and services. Water is a natural resource.

Opportunity cost: The value of the next-best alternative when a decision is made. When a good or service is produced, the opportunity cost is the other good or service the resources could have been used to produce.

Price: The amount of money a buyer must pay to acquire a good, service, or resource.

Cost of production: The amount producers pay for the resources used to produce a product.

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Handout 10-2: Assessment (page 1 of 2)

Part A: In the list below, circle the goods produced by people, use the yellow marker to highlight the goods produced by the environment, underline the services produced by people, and use the green marker to highlight the services produced by the environment.

Fruit	Flowers	Shoes	Pizza
Shade	Ice cream	Bike repair	Entertainment
Candy	Baseball game	Beautiful scenery	Sunlight
Jewelry	Shirts	Water	UV protection

Part B: Read the paragraph below and answer the questions that follow.

Willy Wonder owns a candy factory. He produces many different candies, including Willy Wonder Wiggly Worms and Willy Wonder Jelly Beans. He uses sugar, water, corn syrup, fruit flavoring, machines, and many workers to produce Wiggly Worms and Jelly Beans. The price of Wiggly Worms is $1.00 for a 2-oz. box. The price of Jelly Beans is $1.50 for a 2-oz. box. Willy thinks he should begin producing more Jelly Beans. The cost of producing Wiggly Worms is $0.70 a box. The cost of producing Jelly Beans is $1.10 a box.

1. The price of Wiggly Worms is $1.00 a box. The price of Jelly Beans is $1.50 a box. Write a definition for price.

2. What is the cost of producing a box of Wiggly Worms? What is the cost of producing a box of Jelly Beans? Write a definition for cost of production.

3. What is Willy's incentive to produce candy?

4. How much profit does Willy earn for each box of Willy Wonder Wiggly Worms? (Show your work.)

5. How much profit does Willy earn for each box of Willy Wonder Jelly Beans? (Show your work.)

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Handout 10-2: Assessment (page 1 of 2)

6. Why does Willy think he should produce more Willy Wonder Jelly Beans?

7. What is a capital resource Willy uses to produce candy?

8. What is a human resource Willy uses to produce candy?

9. If Willy decided to produce more Jelly Beans with his resources, what does he give up?

Part C: Look carefully at the picture below and answer the questions that follow.

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1. Which resources is Willy probably not paying to use?

2. When Willy uses these resources, what is being given up?

3. What would happen to Willy's cost of production if he had to pay to use these resources?

4. Would paying a price to use these resources encourage Willy to use more or fewer resources?

5. Would paying for these resources result in more or less pollution?

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Standards and Benchmarks

Voluntary National Content Standards in Economics

Standard 1: Scarcity

- **Benchmarks: Grade 4**
  3. People's choices about what goods and services to buy and consume determine how resources will be used.
  4. Whenever a choice is made, something is given up because resources are limited.
  5. The opportunity cost of an activity is the value of the best alternative that would have been chosen instead. It includes what would have been done with the money spent and the time and other resources used in undertaking the activity.
  7. Natural resources such as land are "gifts of nature"; they are present without human intervention.
  8. Human resources are the people who do the mental and physical work to produce goods and services.
  9. Capital goods are goods that are produced and used to make other goods and services.

Standard 4: Incentives

- **Benchmarks: Grade 4**
  2. Penalties are negative incentives that make people worse off.
  3. Both positive and negative incentives affect people's choices and behavior.
  4. People's views of rewards and penalties differ because people have different values. Therefore, incentives can influence different individuals in different ways.
- **Benchmark: Grade 8**
  3. Incentives can be monetary or non-monetary or both.

Standard 7: Markets and Prices

- **Benchmark: Grade 4**
  1. A price is what people pay when they buy a good or service, and what they receive when they sell a good or service.

Standard 8: Role of Prices

- **Benchmark: Grade 4**
  1. Higher prices for a good or service provide incentives for buyers to purchase less of that good or service and for producers to make or sell more of it. Lower prices for goods or services provide incentives for buyers to purchase more of that good or service and for producers to make or sell less of it.
- **Benchmark 4, Grade 8**
  4. Scarce goods and services are allocated in a market economy through the influence of prices on production and consumption decisions.

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