Buy, Use, Toss?

A Closer Look at the Things We Buy

An Interdisciplinary Curriculum
Recommended for Grades 9–12

2-Week Curriculum Unit

Facing THE Future™

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Introduction for Educators

Some concepts just naturally engage students' curiosity. *Consumption*—how we "buy, use, and toss"—is one of those engaging concepts. Because consumption is *current, relevant,* and *real,* it is an ideal context for teaching core subject matter and 21st-century skills such as critical thinking and collaboration.

Consumption is by nature an interdisciplinary concept. Students can build math and science skills while calculating the carbon footprint of shipping blue jeans across the ocean, or they can engage in civic discourse during a discussion of how we dispose of our waste. *Buy, Use, Toss?* is a two-week unit that provides multiple entry points to help students think critically about consumption.

This series of ten fully-planned lessons will lead your students through an exploration of the system of producing and consuming goods that is called the *materials economy.* Students will learn about the five major steps of the materials economy: Extraction, Production, Distribution, Consumption, and Disposal. They will also be asked to analyze the sustainability of these steps, determining how consumption can benefit people, economies, and environments. While this unit was designed as a comprehensive whole, each lesson can also stand alone.

Buy, Use, Toss? includes a project-based assessment (Lesson #9) and a more traditional summative assessment in the form of a pre/post-test. Included in each lesson are ideas for action projects, extension activities, background readings, and additional resources. The lessons were pilot tested by classroom teachers and are aligned to national science and social studies standards.

A number of the lessons include links to *The Story of Stuff* (www.storyofstuff.org). If you choose to use *The Story of Stuff* video in conjunction with the lessons, suggestions for when to do so are provided.* The lessons are also designed to stand alone, in case you do not want to or are unable to show the video in your classroom. Only Lesson #10, a critical analysis of *The Story of Stuff,* is dependent on the video.

Thoughtful consumption can play a part in creating a sustainable future. Knowing the story behind the things we buy, use, and toss can help us to consume in ways that improve our lives and the lives of others. The intent of this unit is not to discourage students from buying "stuff" but rather to equip them with knowledge and skills to help them be informed and empowered consumers. These lessons will help you do just that in a uniquely engaging way.

* *The Story of Stuff* film is available to watch and download free at www.storyofstuff.org. If you plan to show the film, we recommend that you download it ahead of time. If you would rather obtain an actual DVD of the film, you may order one at www.storyofstuff.org. A transcript of the 20-minute video, along with an annotated bibliography, is also available on the website.

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Unit at a Glance

Grade Level: 9-12

Unit Length: 2 weeks

Subject Areas

- Science
- Social Studies
- Business/Finance
- English Language Arts
- Communications
- Journalism
- Mathematics

Key Concepts

- advertising
- carbon footprint
- consumption
- corporate social responsibility
- culture
- distribution
- ecological footprint
- environmental justice
- externality
- globalization
- marketing
- materials economy
- media literacy
- natural resource extraction
- production
- quality of life
- structural solution
- sustainability
- sustainable design
- system
- waste disposal

National Standards Addressed

National Council for the Social Studies

I (Culture)
III (People, Places, and Environments)
IV (Individual Development and Identity)
V (Individuals, Groups, and Institutions)
VI (Power, Authority, and Governance)
VII (Production, Distribution, and Consumption)
VIII (Science, Technology, and Society)
IX (Global Connections)
X (Civic Ideals and Practices)

National Science Education Standards

A (Science as Inquiry)
B (Physical Science)
C (Life Science)
D (Earth and Space Science)
E (Science and Technology)
F (Science in Personal and Social Perspectives)
G (History and Nature of Science)

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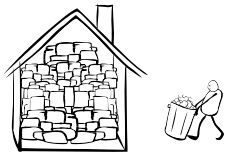
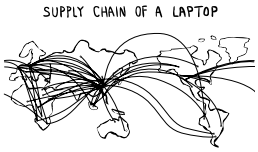
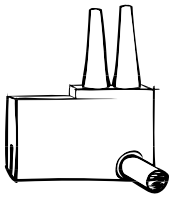
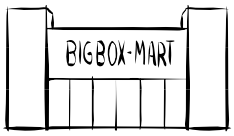
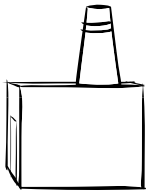
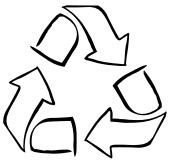
Unit Overview

Suggested Scope and Sequence

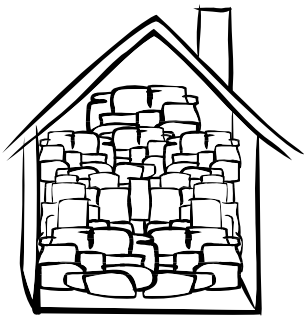
Introduction		Steps of Materials Economy		
Day 1 Pre-test Garbology	**Day 2** Mapping the Impact *optional activity for 2-day lesson	**Day 3** Drilling down to Sustainability	**Day 4** The Cost of Production	**Day 5** On the Road to Retail
				

Steps of Materials Economy (cont'd)			Conclusion	
Day 6 Why Buy?	**Day 7** Defining Happiness	**Day 8** It's a Dirty Job	**Day 9** A System Redesign *optional out-of-class research	**Day 10** Analyzing the Message
				

Lesson 1

Garbology

Students first analyze typical contents of a North American trash can in order to define "luxury" and "necessity" for themselves. They read a short article about trash typically found in a modern dump in North America. Using information from this reading, students will draw conclusions about how these artifacts reflect the lifestyle of those who used and disposed of the items.



Objectives

Students will:

- Engage in a critical analysis of consumption
- Examine trends of modern disposal of material goods in the United States
- Analyze ways in which consumption choices reflect people's lifestyle and culture

Inquiry/Critical Thinking Questions

- How do material goods reflect our way of life?
- How do our individual consumption habits compare to those of an average American?

Subject Areas

- Social Studies (Global Studies, Contemporary World Problems, Geography, Economics, Sociology)
- Science (Environmental, Biology)

Time Required

45 minutes

Key Concepts

material consumption—the purchase and use of resources and products

waste disposal—the act of getting rid of unwanted materials

culture—the behavior, art, beliefs, and traditions of a group of people

National Standards Addressed

National Council for the Social Studies

I (Culture)

III (People, Places, and Environments)

VII (Production, Distribution, and Consumption)

National Science Education Standards

A (Science as Inquiry)

F (Science in Personal and Social Perspectives)

Additional Vocabulary

luxury—a material good or service that is not essential to a person's life; an extravagance

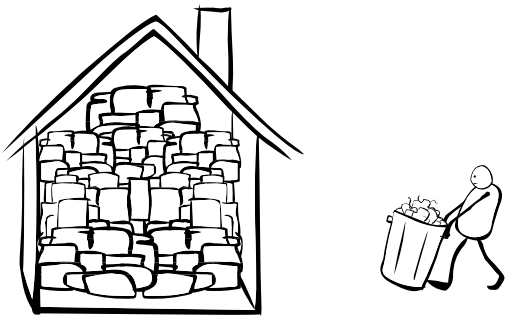
necessity—a material good or service that is essential to a person's life; something that is required

archaeology—the study of past human life and culture by an analysis of artifacts and material evidence

midden—a trash pile

Optional Background Reading

- Jared Diamond, "What's Your Consumption Factor?," *The New York Times,* January 2, 2008, www.nytimes.com/2008/01/02/opinion/02diamond.html—Diamond writes about the stark differences in per capita consumption across nations and the effects of these consumption patterns on the world.



- Kathy Marks and Daniel Howden, "The world's rubbish dump: a tip that stretches from Hawaii to Japan," *The Independent,* February 5, 2008, www.independent.co.uk/environment/the-worlds-rubbish-dump-a-garbage-tip-that-stretches-from-hawaii-to-japan-778016.html—Marks and Howden examine the impacts of the Great Pacific Garbage Patch, a mass of plastic waste floating in the Pacific Ocean that is twice the size of the continental United States.

Materials/Preparation

Reused plastic or paper bags, each with a small assortment of "trash" materials, such as an empty beverage container, a magazine, a packaged food container, a household battery, and an intact piece of fruit—1 bag per group of 4 students (Note: All items should be clean. Also, each bag does not need to contain identical items.)

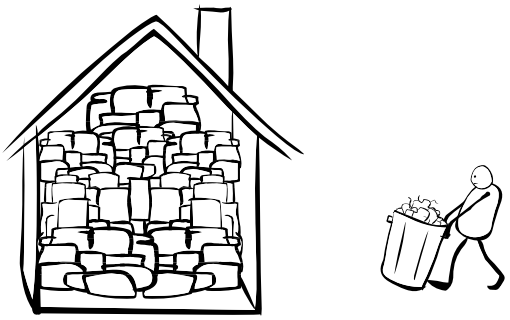
Handout: *Buried Treasure,* 1 per student or pair

(Optional) Computer access for showing *Story of Stuff* segment

Activity

Introduction

1. Divide students into groups of 4. Distribute one bag with assorted trash items to each group.
   - **Alternative 1:** Ask students to list all trash items they have discarded in the past 1-2 days.
   - **Alternative 2:** Save the contents of your classroom trashcan for a 24-hour period, and allow the class to view all trash contents spread across a large table covered in newspaper or plastic.
2. Ask students to consider as a group what all the items in the bag have in common. (Possible answers: *They are all material items we use. They are all things we throw away. They are all things that could be reused. They are all nonliving objects.*)
3. Now ask students to consider which, if any, of the materials in the bag are luxury items and which are essential items. Provide time for students to determine the difference between luxuries and necessities.
4. Ask each group to display to the class the contents of their bag, explaining which items are essential and which are luxuries. Have each group provide an explanation for how they determined which items are luxuries and which are essential. Allow no more than 1-2 minutes for each group to present.



5. After all groups have presented their findings, ask for volunteers to articulate working definitions of the words "luxury" and "necessity." Write these definitions in a place where all students can see.
6. Reveal to students that all of these items are found in our garbage. Ask students what information can be determined by looking at a person's garbage. Allow them 1-2 minutes to discuss their answers within their groups.

Steps

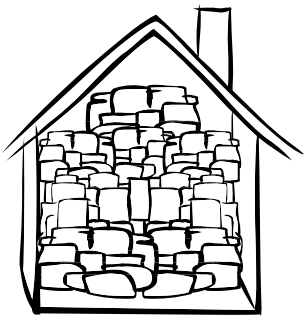
1. Pass out the handout, *Buried Treasure,* to each student or pair.
2. Have students read through the handout and answer the questions on the bottom of the handout based on the information in the reading. (Note: This is a fictional account. The trash contents are derived from published accounts of U.S. trash.[1])
3. Discuss student answers to the questions on the handout. Ask students to explain their answers. Encourage differences of opinion; there are no right or wrong answers to these questions.
4. Ask students where they think this mysterious midden might be located. (While this story is fictional, the numbers reflect waste disposal in the United States.)
5. Ask students to consider all the items that they throw out over a 6-month period of time. In a think-pair-share exercise, ask students: What might an archaeologist conclude about you from analyzing your trash?
6. (Optional) ***Story of Stuff*** **link:** Show the introductory segment of *The Story of Stuff* (2:30), or introduce the unit of study by showing the entire video (20:40). This is only the beginning of a lively unit of study about consumption!

Discussion Questions

1. How does the following cliché apply to the contents of the midden presented in the activity: "One man's trash is another man's treasure."
2. In the United States in 2006, 83% of people viewed a clothes dryer as a necessity, 50% viewed a cell phone as essential, and 33% believed a high-speed Internet connection was a necessity.[2] Do you agree that these items are essential? Do you think that people from other countries would agree?
3. What factors do you think drive consumption?

1 U.S. Environmental Protection Agency, "Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2006," www.epa.gov/waste/nonhaz/municipal/msw99.htm

2 The Worldwatch Institute, "2010 State of the World: Transforming Cultures: From Consumerism to Sustainability," www.worldwatch.org/files/pdf/Chapter%201.pdf, 9.



Geography Extension

Use the book *Material World: A Global Family Portrait* (Peter Menzel, 1995) to examine the material goods owned by representative families all over the world. Students could use some of the questions from the *Buried Treasure* handout to assess similarities and differences among the material goods associated with families in different countries. Short narratives from each country give clues to the culture and everyday life of each family. Each family's material wishes for the future are also reported.

Science Extension

Have students do a "trash carry" in which they collect all their trash for an entire day in a trash bag. Students can compare the contents of their trash to that of a typical American, who produces an average of 4.6 pounds of garbage each day. Have each student report on which type(s) of items in his/her trash bag could be reduced, reused, and/or recycled in your community. Research the savings of natural resources and energy associated with recycling different types of items. This will reveal the relative impacts that recycling different types of items would have. Then use that research to inform the development of a plan for reducing, reusing, and recycling materials, either at home or at school. Execute the plan, and encourage others to join the new recycling movement.

Information can be researched at:

- www.recycling-revolution.com/recycling-facts.html
- www.aluminum.org
- www.napcor.com/plastic/bottles/funfacts.html

Action Project

Instead of reading the fictional *Buried Treasure,* have students analyze trash contents at their school by using questions from the handout. For example, they could use these questions to analyze the contents of the classroom trashcan, or they might analyze the contents of a cafeteria trashcan after lunch. Visit http://greenschools.net for related ideas and resources.

Additional Resources

- **Photography:** www.chrisjordan.com Chris Jordan is an artist whose work focuses on mass consumption and waste. His website features photographs from his book, *Running the Numbers* (Prestel Publishing, 2009).
- **Videos:** "Throw away Britain" video series Four short video clips from BBC News show how people from four different countries (Italy, South Korea, the United States, and Belgium) dispose of household waste. http://news.bbc.co.uk/2/hi/7746001.stm

Buried Treasure, page 1

Last May a modern archaeologist, known in some circles as a "garbologist," came across a midden in an extremely remote location. A midden is a collection of household waste. Most people these days would use the term "dump" to describe a midden. This midden is located 20 yards from an abandoned two-story house.

The location has not been publicly revealed for fear that other interested parties would loot or otherwise destroy the archeological site. Thanks to the geography of this remote location, which is quite dry and cold, the materials are mostly intact. According to newspapers found in the midden, the trash was produced and buried during a 6-month period in 1999.

Dr. Julia Johnston is the archaeologist in charge of cataloguing the discarded items and inferring information about the people who produced them. Johnston has deduced from the contents of the garbage that three or four individuals at most contributed to the midden. In all, an estimated 3400 pounds of garbage were found in the midden.

Dr. Johnston recently released a summary of the items found at the site. Here is the breakdown of the trash items she found:

- 34% paper, a mix of newspapers, glossy magazines, and office paper (more than half the paper appears to have been used for packaging materials such as boxes)
- 13% organic materials from the landscape, including dried leaves and grass clippings
- 12% food, including many items still inside plastic bags and other packaging
- 12% plastic, including food containers and containers that once held liquid cleaning substances
- 8% metal, including aluminum and tin cans
- 7% textiles, rubber, and leather, including discarded clothing, a used tire, and a small rug
- 6% wood (2 broken chairs)
- 5% glass, including beverage and food containers, as well as fragments of other glass items
- 2% personal items, including diapers, cosmetics, and pharmaceuticals/medicines
- 1% electronics (a cell phone and a TV remote)

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Buried Treasure, page 2

Now Johnston and her team are trying to learn more about the people who inhabited this remote location. They are looking to the midden contents for clues. Questions they hope to answer include the following:

- Why were the items discarded?
- Did these people have ample resources to survive, or did they struggle?
- What appeared to be important to them?
- How might they have spent their time?
- Did they have a relatively high or low standard of living compared to people in other places around the world?

Instructions

Answer the following questions to begin your own analysis of the midden and the people who created it.

1. Divide the contents into the following two categories:

Luxuries	Necessities

2. Are the contents of the midden mostly essential items, or are they mostly luxuries?

3. Why do you think these items were discarded in the midden instead of being reused inside the house?

4. Based on the contents of the midden, how might you characterize the lifestyle of the people who created it?

5. What other conclusions could be drawn about these people? (For example: What was important to them, or how did they spend their time?)

6. How does the waste from the midden compare to the waste produced by your own household?

Lesson 2

Mapping the Impact

Students create a web diagram to illustrate environmental, social, and economic impacts associated with everyday items. This activity expands the concept of "ecological footprint" to consider impacts of a given lifestyle on people and societies. Students develop ideas to reduce the ecological footprint and associated impacts related to an everyday item.

KEITH MASON

SUPPLY CHAIN OF A LAPTOP

Objectives

Students will:

- Identify resources, processes, and impacts embodied in material goods
- Analyze interconnections among lifestyle, population, economy, and environment
- Determine ways to reduce ecological footprint and other impacts associated with material goods

Inquiry/Critical Thinking Questions

- What are environmental, economic, and social impacts of commonly used items?
- What can we do to reduce negative impacts associated with resource consumption?

Subject Areas

- Social Studies (Global Studies, Contemporary World Problems, Geography)
- Science (Environmental, Biology)

Time Required

Two 45-minute periods; to make this a one-day lesson, omit the Steps for Day 1

Key Concepts

sustainability—meeting current needs without limiting the ability of people to meet their needs in the future

ecological footprint—the area of Earth's productive surface that it takes to produce the goods and services necessary to support a particular lifestyle

resource consumption—the process of using natural resources, materials, or finished products to satisfy human wants or needs

National Standards Addressed

National Council for the Social Studies

III (People, Places, and Environments)

VII (Production, Distribution, and Consumption)

IX (Global Connections)

National Science Education Standards

F (Science in Personal and Social Perspectives)

Additional Vocabulary

ecology—the study of relationships among organisms with each other and with their environments

natural resources—things found in nature that are useful to humans, such as trees and fish

climate change—a change in long-term weather patterns (including precipitation, temperature, and wind) over time

lifestyle—the way an individual or a group of people lives

population—the total number of people living in a country, city, or other defined area

SUPPLY CHAIN OF A LAPTOP

Optional Background Reading

- Louise Story, "The Hidden Life of Paper and Its Impact on the Environment," *The New York Times,* October 25, 2006, www.nytimes.com/2006/10/25/business/media/25adco.html—Story writes about the impacts of the paper industry on the environment and what some companies are doing to decrease these impacts.
- Evan Osnos, "The hidden cost of your hardwood floor," *Chicago Tribune,* December 18, 2006, www.chicagotribune.com/news/watchdog/chi-china-timber-htmlstory,0,5318153.htmlstory—Osnos writes about the extraction, production, and distribution of wood exported to the United States to make hardwood floors and the environmental and human impacts that result.

Materials and Preparation

Handout: *Hamburger, Fries, and a Cola,* 1 per student

(Optional) Cards: *What Does It Take to Make?,* 1 per group of 3-4 students

Large sheets of butcher or chart paper, 1 per group

Colored marking pens, 3-4 per group

Activity

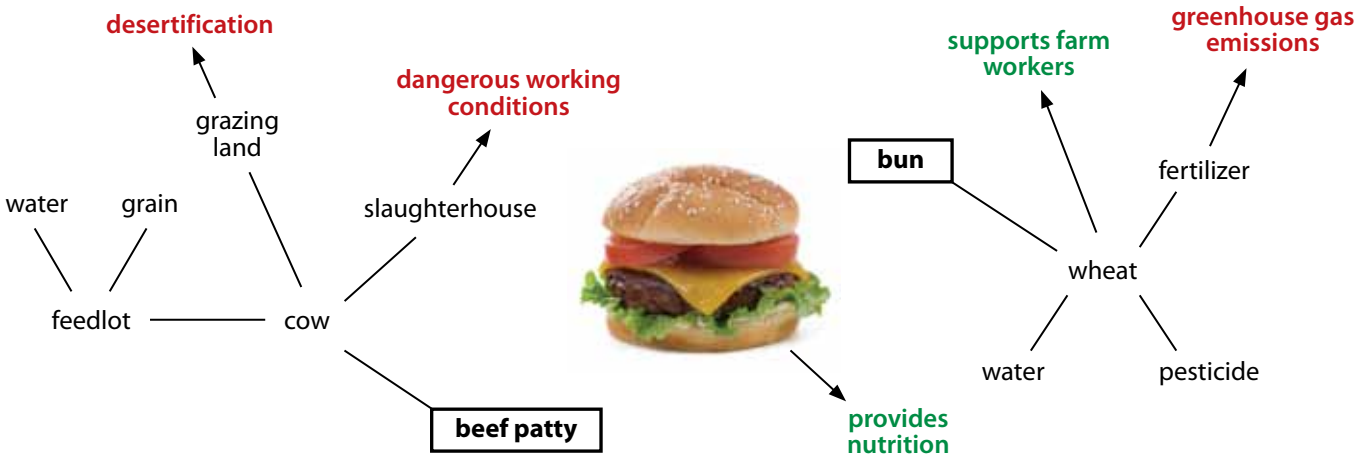
Introduction—Day 1

1. Introduce the idea of "ecological footprint" to students by first asking them what they think the term might mean, based on their knowledge of the terms "ecology" and "footprint." *(The term "ecological footprint" refers to the area of the earth's productive surface, both land and sea, that it takes to support a person's or a population's lifestyle. Ecological footprint includes natural resources needed from the environment, plus space for infrastructure, recreation, and waste disposal. A more resource-intensive lifestyle results in a larger ecological footprint.)*
2. Ask students what sorts of impacts from consumption are left out of this type of measurement. *(An ecological footprint measures environmental impacts, rather than impacts on human societies.)*
3. Let students know that they will be creating a web diagram to illustrate the ecological footprint and human impacts associated with an everyday item. But first, you will do an example together.

Steps—Day 1

1. Ask students to raise their hands if they have eaten a hamburger in the last week. Has anyone eaten a hamburger today?

Sample Impact Diagram: Hamburger



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2. Distribute the handout, *Hamburger, Fries, and a Cola,* to each student. Give students 5–10 minutes to read through the handout. Ask them to circle or highlight the following as they read: resources required to produce the meal and impacts to the environment and people.

3. Draw a hamburger in the middle of a board or other location where all students can see it. Then proceed through the following exercise to diagram the impacts associated with producing the hamburger. [See the Sample Impact Diagram above if you need ideas to get started.]

a. Ask them what basic ingredients are needed to create a hamburger. (e.g., *cow, bun*)—Draw or write student answers around the hamburger.

b. There are several steps required to raise the cow. What are they? (e.g., *grazing land, feedlot*)—Write student answers on your example.

c. Between the cow and the burger, what else happens? (e.g., *slaughterhouse, processing/grinding the meat, transportation of the beef to the restaurant, the energy to heat the stove to cook the burger*)—Write student answers on your example.

d. What impacts result from each of the processes and technologies required to produce the hamburger? (e.g., *soil erosion, pesticide runoff, climate change, high injury rates among workers*)—Include these impacts on your diagram wherever appropriate.

e. Lastly, have students consider additional impacts that have not yet been shared, perhaps ones beyond those mentioned in the reading. What are some impacts of hamburger consumption on people and societies, including people involved in producing it and people who consume it? (e.g., *safety concerns for workers, health concerns from consumption, waste from disposable wrapping*)—Write these impacts on your diagram where they seem most appropriate.

4. Option: You may also want to have students identify positive consequences of producing and consuming the hamburger, such as economic benefits. Include these on your diagram in a way that distinguishes them from negative impacts (such as by writing them in a different color.)

SUPPLY CHAIN OF A LAPTOP

Steps—Day 2

1. Give the following directions before grouping students: "In groups, brainstorm and diagram all of the resources, processes, and impacts associated with one everyday object, such as an item of clothing or a piece of sports equipment. For example, if you decide to diagram the impacts of a cell phone, you would write and/or draw it in the center of the paper, and then write and/or draw the resources and processes required to produce each part of the phone and all the impacts you can think of that might be related to producing and using it."
   - **Note:** There is no single "right" way to do this activity. A simple web diagram could include lines or arrows connecting the various components of an item to all of the related inputs and impacts. This activity could also be expanded to include student research on the materials required to produce a given item and how the production of the item affects the lives of people in various places.
2. Arrange students in groups of 3-4. Provide each group with a large sheet of paper and marking pens.
3. Ask each group to decide on one item that will be the focus of their web diagram. They might want to create an impact diagram for a favorite meal, an article of clothing, a favorite object, or a mode of transportation.
   - **Alternative:** If you want to make this activity more structured, distribute one *What Does It Take to Make?* card to each group. Groups can use information from these cards to get started. Note that information on these cards is just a starting point; there are many inputs and resources not listed.
4. If students need help organizing their thoughts, you may want to create a chart on the board like the following example to get them started.

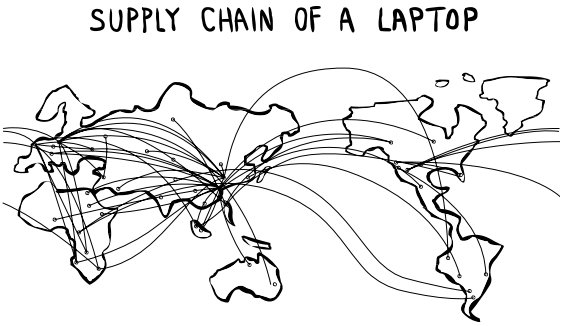
Component/ Part	**What is it made of?**	**What resources are needed?**	**Is transportation required?**	**What are possible environmental, social, and economic impacts?** (positive or negative)

SUPPLY CHAIN OF A LAPTOP

5. Allow about 20 minutes for this portion of the activity. Encourage students to be creative and think of everything that is related to the object. Remind them to consider impacts related to transportation of a product, the marketing of popular brand items, health issues, and waste disposal.
6. After completing their diagrams, have students brainstorm and list ways to reduce the ecological footprint and other impacts associated with creating or using the object. Give them 5-10 minutes to brainstorm. Students might come up with an alternative to the item, or an alternate way of producing or using it that might impact people and the planet in more positive ways. Ask them to record this information on their sheet of paper.
   - **Note:** Be sure to emphasize that they do not need to give up everything they like, but rather should focus on positive ways to reduce their impacts. For example, instead of saying that people should never drive cars, they could suggest that people ride a bike or carpool to school when possible.
   - Also, you may want to have students think here about how products can have both negative *and positive* impacts on consumers. What are ways of consuming products that can have positive impacts on the environment, societies, and/or economies?
7. Have groups present their diagrams and their proposed ideas for reducing the item's negative impacts on people and the planet.
8. **Option:** Post the impact diagrams around the room or in a hallway where other students can view them.

Reflection

1. How is the ecological footprint of a person's lifestyle connected to social and economic impacts?
2. Would the production, use, and disposal of these everyday items be sustainable if only a small number of people purchased the items?
3. How would the impacts associated with an item change if everyone in the world purchased or used it?
4. Does lessening our impacts necessarily mean reducing our quality of life? Why, or why not?
5. How might businesses be encouraged to produce these items in ways that have more positive impacts on the environment and on people?
6. Often negative impacts associated with an item are not paid directly by the people who purchase and use the items. Who might end up paying for those impacts? Why do you think these impacts are not included in an item's purchase price?



History Extension

Have students research how ecological footprint size has changed throughout history, either in the U.S. or in other countries, by finding evidence of past and present lifestyles and consumption patterns. How has humanity's ecological footprint changed over time? What might be causing these changes?

Action Project

Have student groups research social, environmental, and economic impacts of the items from the *What Does It Take to Make?* cards (or other products they are interested in learning more about). Each group can write an engaging article about all the impacts associated with the item and ways that people can use the product or an alternative in a way that results in more positive impacts. Compile the articles into a 'zine that can be shared with other students through the school's newspaper or website. Students might even ask a local newspaper to publish one or more of their articles in order to educate community members about the hidden impacts of what we buy.

Resources for research:

- *Good Stuff?: A Behind-the-Scenes Guide to the Things We Buy* (www.worldwatch.org/taxonomy/term/44)
- EPA poster: *The Life Cycle of a CD or DVD* (www.epa.gov/waste/education/pdfs/finalposter.pdf)
- EPA poster: *The Life Cycle of a Cell Phone* (www.epa.gov/osw/education/pdfs/life-cell.pdf)
- Global Exchange website, Fair Trade Coffee (www.globalexchange.org/campaigns/fairtrade/coffee/)
- *Stuff: The Secret Lives of Everyday Things* by John C. Ryan and Alan Thein Durning (Sightline Institute, 1997)
- "The Secret Life" film series, paper and cell phones (www.secret-life.org)
- Water Footprint Network (www.waterfootprint.org)

Additional Resources

- **Website:** www.myfootprint.org
  Students can calculate their own ecological footprint and compare it to average footprints from around the world.
- **Website:** www.goodguide.com
  The Good Guide provides information about the health, social, and environmental impacts of products. Students can click on "Browse Product Ratings" to learn more about specific impacts of everyday items.

Hamburger, Fries, and a Cola,
What Did It Take to Produce This American Meal?*

The meat came from cattle grazed initially on public or private land, and later fed grain. Some of the public lands in the western United States have been turned to desert by overgrazing, which happens when livestock eat so much vegetation that it no longer grows back. Streamside lands where cattle graze have been especially damaged.

It took approximately 2 pounds of grain to produce that quarter pound of meat. Grain production from unsustainable farming methods results in topsoil loss due to erosion. Producing that grain also took substantial amounts of pesticides and fertilizers (half of all fertilizer in the United States is applied to feed corn for animals), some of which ran off into surface water or seeped into groundwater supplies. Commercial fertilizers have been linked to climate change. The creation of nitrogen fertilizers releases the greenhouse gas nitrous oxide, which can combine with other greenhouse gases in the atmosphere to make temperatures on Earth warmer.

At a feedlot, where cattle are fattened before they are slaughtered for food, a typical steer will eat about 3,000 pounds of grain to increase in weight 400 pounds. By the time the steer was finished in the feedlot, it took 600 gallons of water to build that hamburger patty. At the meatpacking plant where the steer was slaughtered and butchered, most of the workers receive low wages and no health insurance or vacation days. These workers face high injury rates.

Once slaughtered and processed, the meat was frozen, shipped by truck, kept cold, and then cooked on a grill using natural gas. Both the diesel fuel to run the truck and the natural gas grill require burning fuels that contribute to climate change.

The 5-ounce order of fries came from one 10-ounce potato grown in Idaho on half a square foot of soil. It took 7.5 gallons of water to raise that potato, plus quantities of fertilizer and pesticides, some of which ran off into the Columbia or Snake Rivers. Because of that, and dams that generate power and divert water for irrigation, the Snake River sockeye salmon is virtually extinct.

* Unless otherwise noted, environmental impacts adapted from *Stuff: The Secret Lives of Everyday Things* by John C. Ryan and Alan Thein Durning (Seattle: Sightline Institute, 1997), and human impacts derived from *Fast Food Nation* by Eric Schlosser (New York: Perennial, 2002).

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Beef cattle in a feedlot

Farmers receive a small fraction of the price of the fries, maybe 1 or 2% of the price a customer paid for the fries. Most potatoes are now grown on large farms that require large potato-harvesting equipment. This reduces the number of potato farmers that are required to produce potatoes.

The potato was dug with a diesel-powered harvester and then trucked to a processing plant where it was dehydrated, sliced, and frozen. The freezing was done by a cooling unit containing hydrofluorocarbons (HFCs), some of which escaped into the atmosphere where they may contribute to global climate change. The frozen fries were then trucked to a distribution center, then on to a fast-food restaurant where they were stored in a freezer and then fried in corn oil heated by electricity generated by hydropower.

The meal was served in a fast-food restaurant built on land that was originally forest, then farmland, and then converted to commercial/industrial uses as the city expanded. Many of the workers in the fast-food restaurant are teenagers and young adults who work part-time for minimum wage.

The cola came from a Seattle processing plant. It is made of 90% water from the Cedar River. The high-fructose corn syrup came from Iowa, as did the carbon dioxide used to produce the fizz, which is produced by fermenting corn. The caffeine came from a processing plant that makes decaffeinated coffee. The cola can was made from one-third recycled aluminum and two-thirds bauxite ore strip-mined in Australia. It came to Washington State on a Korean freighter, and was processed into aluminum using an amount of energy equivalent to a quart of gasoline. The energy came from some of the same dams mentioned earlier that have contributed to an estimated 97% decrease in the salmon runs of the Columbia Basin.

Cola has been called "liquid candy" because of its high sugar content. In the late 1950's a typical fast-food cola was 8 ounces. Today a large cola might be 32 ounces, containing over 300 calories and a third of the daily maximum amount of sugar recommended for an adult. High amounts of calories and sugars can lead to conditions like obesity and diabetes. In the United States an estimated 34% of adults are obese.[1] Cola is extremely profitable for fast-food restaurants. It costs a restaurant just 9 cents to buy the syrup needed for a medium cola that sells for around $1.29.

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Fresh potatoes in the field

The typical mouthful of food consumed in the U.S. traveled 1,200 miles for us to eat it. Along the way, it required packaging, energy, roads, bridges, and warehouses. Both people and machines were required for each step of the food production.

1 National Center for Health Statistics, "Health, United States, 2008," www.cdc.gov/nchs/data/hus/hus08.pdf, 32.

What Does It Take to Make?

Cup of Coffee

Beans
- Beans grown in Colombia
- Pesticide from Germany applied to beans
- Beans roasted in New Orleans

Sugar and Cream
- Sugar produced in Florida
- Cream from dairy near Seattle

Disposable Cup
- Made from 10% recycled paper
- Virgin paper from trees grown in Canada
- Cup lined with a thin layer of plastic, made from oil drilled in Venezuela

T-shirt

T-shirt is 50% cotton / 50% polyester.

Polyester
- Crude oil drilled in Venezuela
- Crude oil refined in Curacao
- Refined oil processed in Delaware to create polyester fiber

Cotton
- Cotton grown in Mississippi
- Cotton fibers spun into yarn in North Carolina

Assembly
- Shirt sewn in Honduras

Computer

Computer Chip
- Made of silicon mined in Washington State
- Silicon processed in Oregon
- Sent to chip manufacturer in California
- Copper from Arizona and gold from South Africa applied to chip

Circuit Board
- Made of tin from Brazil and lead obtained from recycled car batteries in Houston

Monitor
- Assembled in Japan
- Plastic created from oil drilled in Saudi Arabia and processed in the U.S.

Athletic Shoes

Athletic shoes are made of leather and synthetics.

Leather
- Cows raised in Texas
- Cow hides shipped to South Korea for tanning (to make leather soft and durable)

Synthetics
- Synthetic insole made of oil drilled in Saudi Arabia and refined in South Korea
- Synthetic rubber sole made of oil drilled in Saudi Arabia and refined in Taiwan

Cardboard Box
- Made from recycled paper in New Mexico

Newspaper

Newspaper is made of recycled and virgin paper.

Virgin Paper
- Trees grown in British Columbia

Recycled Paper
- Recycled paper processed in Michigan

Assembly
- Virgin and recycled paper are made into newsprint in a Detroit paper mill

Ink
- Made from petroleum drilled in Gulf of Mexico

Bicycle

Metal frame
- Recycled steel from Chicago
- Manufactured and painted in Wisconsin

Aluminum gears, brakes, and spokes
- Made from ore mined in Australia and smelted (where metal is pulled from the ore) in Russia
- Manufactured in Japan

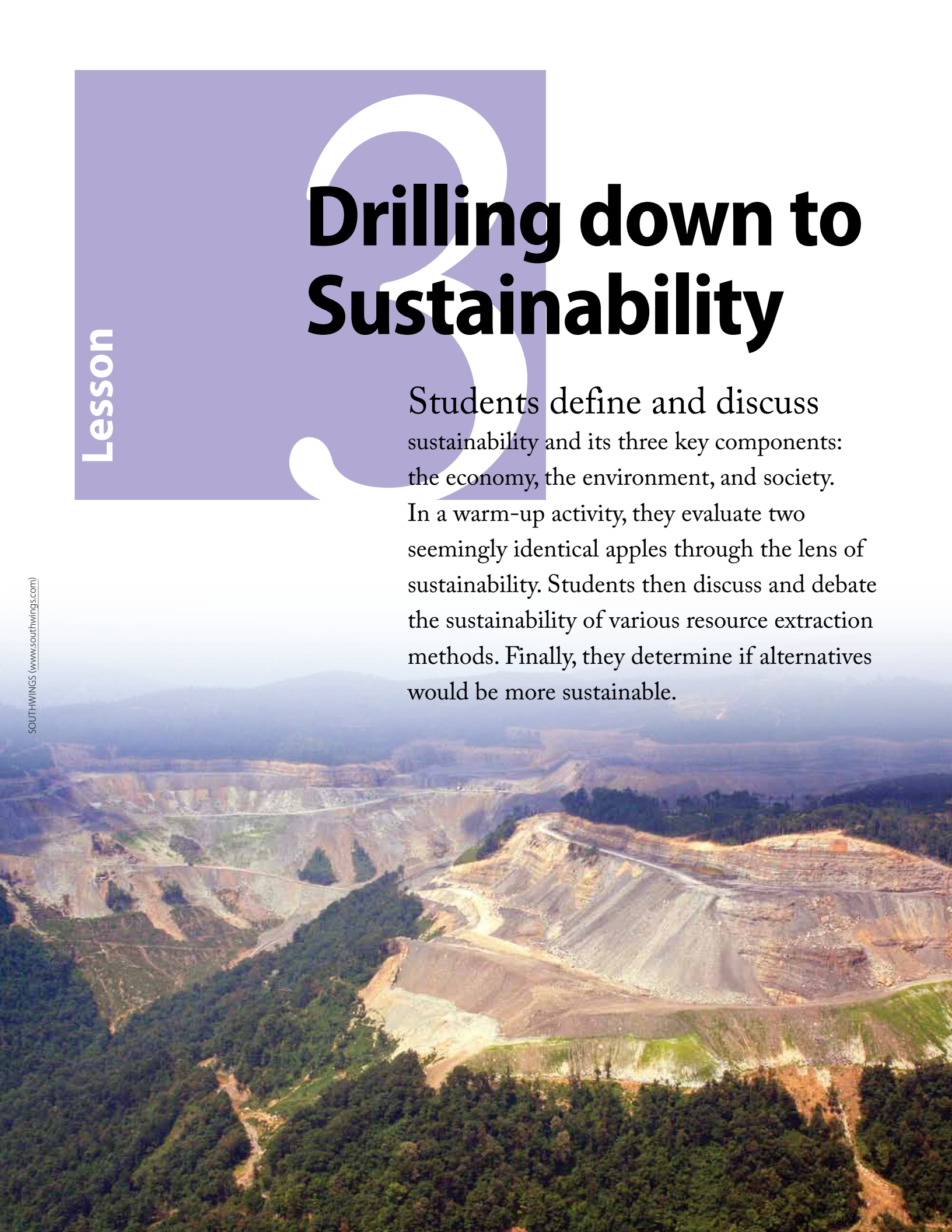
Tires
- Synthetic rubber made in Taiwan from petroleum

* Information adapted from *Stuff: The Secret Lives of Everyday Things* by John C. Ryan and Alan Thein Durning (Sightline Institute, 1997).

Lesson 3

Drilling down to Sustainability

Students define and discuss sustainability and its three key components: the economy, the environment, and society. In a warm-up activity, they evaluate two seemingly identical apples through the lens of sustainability. Students then discuss and debate the sustainability of various resource extraction methods. Finally, they determine if alternatives would be more sustainable.



SOUTHWINGS (www.southwings.com)

Objectives

Students will:

- Define sustainability and its three key components: the economy, the environment, and society
- Identify methods by which natural resources are extracted and the ways in which these methods affect people and places
- Determine the sustainability of natural resource extraction
- Make connections between resource extraction and consumer demand

Inquiry/Critical Thinking Questions

- What does "sustainability" mean and how does it apply to human activity?
- What are impacts of natural resource extraction on societies, environments, and economies?
- How do our consumption habits contribute to resource extraction?
- How can an activity be made more sustainable?

Subject Areas

- Social Studies (Global Studies, Contemporary World Problems, Geography, Economics, Civics)
- Science (Physical, Earth, Biology, Environmental)

Time Required

60 minutes

Key Concepts

sustainability—meeting our own needs now without limiting the ability of future generations to meet their needs

three components of sustainability— economy, environment, and society

natural resource extraction—the process of removing materials from the earth for use by humans

National Standards Addressed

National Council for the Social Studies

I (Culture)

III (People, Places, and Environments)

V (Individuals, Groups, and Institutions)

VI (Power, Authority, and Governance)

VII (Production, Distribution, and Consumption)

VIII (Science, Technology, and Society)

IX (Global Connections)

X (Civic Ideals and Practices)

National Science Education Standards

B (Physical Science)

C (Life Science)

D (Earth and Space Science)

E (Science and Technology)

F (Science in Personal and Social Perspectives)

Additional Vocabulary

economy—a system that includes the production, distribution, and consumption of goods and services

environment—the physical surroundings, including living and nonliving factors, in which we live

society—a community, nation, or other group of people who have common interests, institutions, or culture

Optional Background Reading

- Brook Larmer, "The Price of Gold," *National Geographic*, January 2009, http://ngm.nationalgeographic.com/2009/01/gold/larmer-text/1—Larmer writes about different cultures' perspectives on gold and how gold extraction around the world has had serious impacts on both humans and the environment.
- "Mountaintop Mining Poisons Fish," *Science Daily,* March 1, 2010, www.sciencedaily.com/releases/2010/02/100226214742.htm—Selenium pollution from mountaintop mining in West Virginia has led to fish deaths and deformities.

Materials/Preparation

Two apples (or tomatoes or other locally available produce): 1 organic from a different state or country and 1 conventionally grown in-state

Overhead: *Components of Sustainability,* displayed as an overhead or with a document camera

Cards: *Extraction & Sustainability,* 1 set of cards for each group of 5 students (for each sheet, cut out the role cards and give 1 to each student in a group)

Handout: *Is It Sustainable?,* 1 per group

(Optional) Computer access for showing *Story of Stuff* segment

Activity

Introduction

1. Before beginning an exploration of resource extraction, this introductory activity will help familiarize students with the concept of sustainability. To begin, review the definition of *sustainability* with students.
2. Show the class the two apples, but do not reveal anything about them. (Apple 1 is the organic, non-local apple. Apple 2 is the conventional, locally grown apple.) In a class discussion format, ask students which apple they think was produced in the most sustainable manner and why. (At this point, they are only guessing based on each apple's appearance.) Also, what information would change their minds? Alternatively, you could ask students to write their answers down rather than express them verbally.
3. Reveal the following pieces of information, one category at a time. After each "reveal," ask students which apple is most sustainable and why. There is no right or wrong answer as to which apple is most sustainable—for example, Apple 1 is grown with no pesticides, but Apple 2 requires less fuel for transportation.

	Apple 1 (Organic, Non-Local)	**Apple 2** (Conventional, Local)
1. Price to consumer	$1.00	$0.50
2. Amount of money received by farmer	$0.50	$0.25
3. Miles traveled (from farm to grocery store)	1000	200
4. Pesticides used	none	insecticides to kill insect pests (side effects include damage to aquatic invertebrates, pollinator insects, farm workers' health, and groundwater quality)
5. Impact of production on soil health[1]	good soil quality	poor soil quality

1 Soil quality is defined as "the capacity of a soil to sustain biological productivity, maintain environmental quality and promote plant and animal health." J.P. Reganold et al., "Sustainability of three apple production systems," in *Nature*, April 2001

4. Students will likely change their minds at least once about which apple they believe to be most sustainable. Ask them the following questions:
   - What piece of information was most helpful in informing you about the sustainability of the apples?
   - Do you think people should be given more information to help them make more informed decisions about what to consume?
   - If yes, who should provide that information and where? (At supermarkets? In the news? At school?)
5. **Optional:** Allow students to taste samples of each apple.

Steps

1. Define the three components of sustainability using the overhead, *Components of Sustainability.* Explain that in determining whether an action or product/service is sustainable, many people who study sustainability take into account three key elements: the environment, the economy, and society. In order to determine whether or not something is sustainable, the activity/item being evaluated would be assessed in relation to each of these principles, or "standards of sustainability." This assessment will reveal how the activity/item impacts the long-term viability of the economy, the environment, and society in negative, positive, or neutral ways.
   - **Note:** You may need to define *economy, environment,* and *society.* (See "Additional Vocabulary" section.)
2. (Optional) ***Story of Stuff*** **link:** Show the second segment of *The Story of Stuff,* **Extraction** (2:30-4:37). During the remainder of this lesson, students will be evaluating the sustainability of the first step in the materials economy, extraction.
3. Divide the class into groups of 5 students each. Give students the following instructions: "When a resource is extracted, it is removed from the environment so that it can be used to create products that we buy. Each of you will receive a role card that provides some information about your perspective on the extraction of a particular resource. Each person should read aloud their role card to the group; during this activity, try to retain the perspective presented on your role card. You will work together as a group to determine how resource extraction impacts the long-term well-being of people and the planet. As a group, work together to complete the handout, *Is It Sustainable?* You will have to reach consensus as a group to

recommend whether or not extraction of the resource should continue. Choose one person in your group to record answers on the handout and another person to report to the class your group's analysis of the sustainability of resource extraction."

4. Hand out *Extraction & Sustainability* role cards to each group so that one group has 5 different role cards for gold, another group has 5 different role cards for timber, and so on.
   - **Note:** These cards represent just a few types of natural resource extraction and perspectives on them.
5. Pass out one *Is It Sustainable?* worksheet to each group.
6. Allow groups ample time to read their roles and work through the handout together. Leave 10-15 minutes at the end of class for each group to share their analysis of the sustainability of the resource extraction method(s). What is the resource, and how is it currently extracted? Is it extracted sustainably? If not, how could it become more sustainable?
7. Wrap up with a short class discussion using one or more of the following questions.

Discussion Questions

1. Are any natural resources extracted near where you live? If so, how does that extraction affect the local environment, economy, and society?
2. What drives natural resource extraction? What part does consumption play?
3. What are positive results of resource extraction?
4. What are some negative impacts of resource extraction?
5. What possible action could consumers take to support sustainable extraction?
6. Based on the different perspectives you heard in your groups, what are challenges to enforcing sustainable extraction of natural resources?

Writing Extension

Choose a specific natural resource to study further. Develop a policy for sustainable resource extraction that can be used by countries that want to ensure that their citizens are only buying sustainably extracted (mined, harvested, drilled, etc.) resources. Include ideas for making extraction better for individuals and communities, local and global economies, and the environment. Have students share their ideas with appropriate stakeholders (government representatives, nonprofit organizations, retailers, consumers, etc.).

Action Project

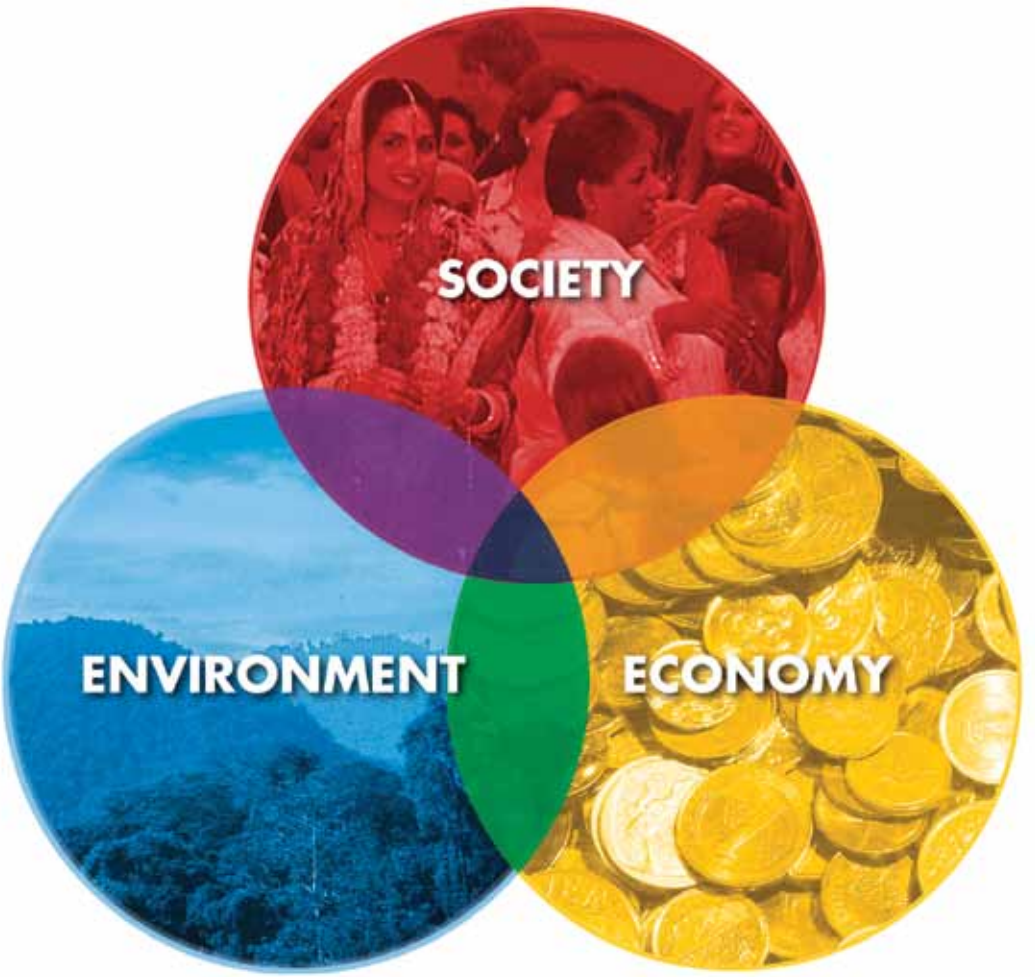
Join a campaign for sustainable resource extraction. Have students learn about different campaigns that promote sustainable extraction and use of natural resources (from water to minerals). Students can start by researching one of the organizations below. Then, ask them to determine one or more ways they can take action through this organization and then actually implement this action. All student ideas could be compiled in a "take action campaign," which could take the form of a pamphlet, a bulletin board, or an advertisement in a local newspaper.

- Monterey Bay Aquarium (seafood)—www.seafoodwatch.org
- Global Exchange (coffee, chocolate)—www.globalexchange.org/campaigns/fairtrade/
- World Diamond Council (diamonds)—http://diamondfacts.org
- No Dirty Gold (gold)—www.nodirtygold.org
- Global Witness (coltan)—www.globalwitness.org
- World Wildlife Fund (timber)—www.panda.org/what_we_do/footprint/forestry/
- Earth Justice (coal)—www.earthjustice.org
- National Resource Defense Council (petroleum, coal)—www.nrdc.org/energy/default.asp

Additional Resources

- **Video:** "Congo's Bloody Coltan"
  This short video produced by the Pulitzer Center focuses on how the extraction of the mineral coltan (for use in electronics like cell phones) has helped to support the current civil war in Congo. www.pulitzercenter.org/openitem.cfm?id=177
- **Website and Video:** www.goldmanprize.org/2009/northamerica
  2009 Goldman Environmental Prize Winner, Maria Gunnoe, witnessed the pollution of her homeland and drinking water by toxic coal mining waste. She was able to stop future environmental devastation by testifying against the practice of mountaintop removal. This website includes a 5-minute video about Maria's work, alongside information about the impacts of mountaintop removal mining on West Virginia communities.

Components of Sustainability



Society

- How are people's lives affected?
- How are cultures affected?
- Do some people benefit at the expense of others?

Environment

- How are plants and animals affected?
- How are air, water, and soil affected?
- What is the long-term impact on the environment?

Economy

- How are local, national, and international economies affected?
- Are meaningful job opportunities provided?
- Is there a long-term economic gain for people and communities?

Extraction & Sustainability

Group A: **Gold**

I am a **gold miner** in Indonesia. I work at a large open-pit mine owned by a foreign company. Each day, I operate a machine that digs out thousands of pounds of ore (rocks and dirt that contain tiny amounts of gold). I have never actually seen the gold. The ore is transported somewhere else, where people extract the gold. The area where we remove the ore has become a giant pit that cannot be used for anything else. I make more money than most of my neighbors. In fact, I'm paid over $600 each month. I have a house and a television, thanks to this job.

I am the vice president of a **cell phone company**. Most people think that gold is only used for jewelry, but our engineers have found small quantities of gold to be extremely useful in cell phones. Gold is a good conductor, meaning that electricity can run through it. This is why gold is used in many electronics. We only use a tiny amount in each cell phone. Cell phones are very important because people can use them anywhere in the world. People in rural areas can use cell phones to communicate in places that don't even have land-line telephones. If we didn't use gold, we'd find another metal conductor that also has to be mined. Each year more and more people are buying cell phones, and we have to keep up with the demand. That's why we continue to buy gold.

I am an employee of the **national government** in Indonesia. We have seen more and more gold companies come to our country to mine gold for products that will be made and sold in other countries. Since we have been blessed with this resource, why not sell it to make money for our country? It is true that the areas where we currently allow open pit mining are becoming toxic. However, we will make sure that those areas are safely enclosed so that they don't hurt anyone. We want to make sure that foreign companies continue doing business in our country so that we can invest the money into improving the lives of our citizens.

I am an **environmental scientist**. I worry about how open pit mining is permanently altering the environment. The deep pits that are created are so large they can be seen from space. Also, this type of mining relies on a process called cyanide leaching. A chemical called cyanide is sprayed on dirt and rocks that are removed from the pit. The cyanide bonds to tiny bits of gold and silver as it trickles down through the ore. Cyanide is very toxic – it is a killing agent used in gas chambers. If it leaks into soil or water, it can contaminate streams, killing fish and other wildlife. Some companies recycle and reuse the cyanide to reduce their environmental impacts.

I am a **resident** of a small community in Indonesia next to a large open-pit mine. At first I thought the mine would be great because it can provide many jobs. Unfortunately, the cost of living is now much higher. The miners make good money, so they are able to pay higher prices for food, electricity, and land to build homes. Those without mining jobs can no longer afford all of these things. We have also watched the devastation of our environment. The mining company dumps waste rocks onto our beautiful rainforests. What will be left when the company is finished?

Extraction & Sustainability

Group B: **Timber**

I am a **forester** in Canada. I make my living by harvesting trees. These trees can be used for all sorts of things everyone needs, like furniture, construction materials, magazines, tissues, and toilet paper. Our company cuts down large areas of trees and then lets those areas grow back for twenty years or more. We even speed the process up by planting tree seedlings in areas we've harvested. We prefer to plant fast-growing tree species, like pines. When these trees get large enough, we go back and cut them again. So long as people need wood and paper products, I'll have a job.

I am a salesperson at a large **paper company**. We sell paper to companies that print newspapers and magazines. Some of our customers now want paper that has been recycled instead of paper made only from new trees. We find that the best paper is still made mostly from new trees, but we also want to make sure our customers are happy. If people are willing to pay more for recycled paper, we will start making more of it. Our company wants to make a profit, so we will do what we need to do to make our customers happy.

I am a **furniture maker**. Whereas some wood can be recycled, that's not always true for furniture. Some builders recycle wood to build new homes and businesses. However, I need large, beautiful trees to create luxurious dining tables and chairs. As long as people pay me well to create these items, I will continue to make them. I prefer working with hardwood trees, which are typically older and more valuable than pine trees. I don't really care where the wood comes from so long as it holds up well. A good piece of furniture can be passed down from generation to generation until it becomes an antique. Cheap furniture, on the other hand, tends to break more easily. I don't want my customers to have to keep buying new tables and chairs because their old ones broke.

I am a **wildlife biologist**. I'm concerned about the effect that large-scale timber harvesting has on ecosystems. There are many species of animals that can't survive without a healthy forest. For example, in the southeastern United States the red-cockaded woodpecker can only be found in older forests. They create nests in dead trees in mature pine forests. These birds are considered a keystone species because many other forest species (including insects, birds, lizards, and squirrels) use their nests. Scientists know that each species is important because it is connected to the lives of other species in a food web.

I am an **indigenous person** whose family has lived in the same forest for over 100 years. The forest provides us with food, shelter, and medicines. Trees are one of our most valuable natural resources, physically and culturally. Last year a portion of the forest in which my community lives was cut down by a logging company. That forced several families to move from their homes. We must protect what remains of our forests so that they can continue to provide us with essential resources and help us maintain our culture.

Extraction & Sustainability

Group C: **Coal**

I am a site manager for a **coal mining company** in West Virginia. Most of the people I know also work for the mining company. Some of us used to work in mine shafts that went deep underground. The company I work for now prefers to get coal through mountaintop removal. It is a lot faster and doesn't require as many people. Plus, now I don't have to worry about dying if a mine shaft collapses. In mountaintop removal, we use giant machines to basically blow the top off of a mountain to make it easier to get to the coal inside the mountain. I know my job is important because many power plants in the United States burn coal to create electricity.

I am a **coal miner**. I work in a shaft mine. It's what my father and grandfather did. I don't know how to do anything else. As soon as I graduated high school, I started working as a coal miner. Right now I work in a mine that is 700 feet deep. It is dangerous work, but the number of job-related deaths of miners is a lot lower than it was in my father's time. Once I was in a mine that partially collapsed. Luckily, emergency crews were able to get me and my coworkers out before we ran out of air. I'm hoping I can stay healthy and safe so that I can continue to provide for my family.

I am a **citizen of a small mountain community** in the Appalachian Mountains of West Virginia. Our state has long been known for its beautiful mountains. Lately, however, these mountains have been scarred by mountaintop removal. Not only does mountaintop removal destroy the beauty of the mountains, but it's also ruined my well, which is my family's only source of drinking water. The dirt and rocks that are exposed during mountaintop removal are usually dumped into nearby valleys. In my community, a company dumped the rubble in a valley where a stream runs through. Now the stream is discolored and cloudy. A lot of people I know have cancer and other diseases that no one used to have. We have complained, but the mining companies keep doing business as usual.

I am the Chief Executive Officer for a company that owns several **coal-fired power plants**. Coal is an ideal fuel source. For one thing, we have tons of it right here in the United States. That makes it much easier and safer to access than oil that has to be imported from the Middle East or South America. For another thing, coal contains more energy that can be turned into electricity than competing fuels, like natural gas. Our country was built on coal. Some of these people who want to use renewable fuels like wind and solar energy just don't understand how much better coal is. So many power plants are already set up to burn coal that it doesn't make sense to change things while we still have plenty of coal.

I am a **mechanical engineer**. I believe that we can and should stop mining coal. We have other technologies available right now – such as wind turbines and solar cells – that could supply us with all the electricity we need. Burning coal for electricity releases air pollution, including greenhouse gases that result in climate change. The earth is already getting warmer from our use of dirty fuels like coal. Let's invest in clean alternative fuels now!

Extraction & Sustainability

Group D: **Coffee**

I am a **coffee grower** in Ethiopia. Coffee is a wonderful crop to grow because everyone loves coffee! Unfortunately, I cannot get a fair price for my coffee. I sell the beans to a man who then sells them to a company that will roast them to make coffee for drinking. I make hardly any profit. I feel like I have to sell my beans so cheaply because otherwise I won't sell them at all. My son and daughters have had to drop out of school because I can't pay their fees. The village school requires money to pay for books, uniforms, and teachers. Instead of attending school, my children now help me in the field. I enjoy their company, but I worry that they will grow up to be poor like me.

I am a **shade-grown coffee farmer** in Costa Rica. Coffee is a shrub that grows well in rainforests, where there are tall canopy trees that shade the coffee bushes. This is how coffee was meant to be grown. Unfortunately, some of the major companies selling coffee want coffee growers to grow a type of coffee that can survive in full sunlight. They can get higher yields for growing coffee in the sun, but the higher yields come at the price of the rainforest ecosystem. To grow full-sun coffee, first all the trees and shrubs have to be cleared from an area. Once they are cleared, the rainforest ecosystem takes many, many years to regrow.

I am a **coffee supplier**. Some people call me the "middleman" in the coffee industry. I talk to coffee growers and buy their beans for as low a price as I can. Then I resell those beans to companies that roast them to make coffee for drinking. I make my living by being the person in the middle of the transaction between the people who produce coffee beans and the people who sell them to coffee drinkers. Some coffee roasters are starting to engage in direct trade, whereby they send a representative to make deals with coffee growers directly. That means no money for me. I know that coffee growers should make more money because for a long time they haven't been paid fairly for what they grow. But how will I make a living if I'm squeezed out of the process?

I am the **owner of a coffee shop**. I have heard about "fair trade" and "direct trade" programs that provide coffee growers with more money. It makes sense – why should a coffee farmer make only pennies for a cup of coffee I sell for $2? However, fair trade coffee is more expensive than the coffee I can get from my supplier. The same goes for organic coffee that has been grown without pesticides or harmful chemicals. My customers complain any time I increase my prices. Since I have never heard a customer ask for organic or fair trade coffee, I'm guessing no one would even care if I did buy those types of coffee beans.

I am an **eco-tourism guide** in Costa Rica. I make my living by providing tours through the rainforest. People from all over the world come to Costa Rica to visit our rainforests. They are eager to see beautiful plants and animals that live in the forest. Sun-grown coffee threatens my business because it requires cutting down forests to let in sunlight. Forests don't have to be cleared to grow shade-grown coffee, which is good for the animals that rely on the forest and also for people like me who make a living from the rainforest.

Extraction & Sustainability

Group E: **Petroleum**

I am a **marine biologist**. I study organisms that live in the oceans. Petroleum drilling like the kind that happens off the coast of Texas and Louisiana worries me. When hurricanes blow over oil rigs (structures that house the machinery that drills into the ocean floor to get petroleum), petroleum can spill into ocean waters. Oil spills can also happen when oil is being transported by boat from one place to another. When oil enters a marine ecosystem, it can be disastrous. Aquatic birds, mammals, and fish can all become covered in the thick oil, leading to death in some cases. The use of petroleum also has been linked to climate change. Climate change causes oceans to become more acidic, which can kill sensitive species like coral.

I am an **oil company spokesperson**. I believe that petroleum is hands-down the most efficient fuel source for our nation's transportation needs. We already have the technology in place to use petroleum for creating diesel, gasoline, and jet fuel. By drilling off the coast of the United States, we reduce our need for foreign oil. This is much safer for our country than relying on oil from countries that may have unstable governments. Oil drilling is a relatively safe industry; very few accidents have occurred in recent years. Plus, it provides many jobs in the U.S.

I am a **roughneck on an oil rig**. You have to be in good shape to work on an oil rig, that's for sure! I help set up and carry out the drilling. I'm responsible for maintaining the pipes that carry the oil; I constantly check to make sure there are no leaks. I also help with mechanical maintenance, like making sure the engine is working right. Our rig runs all the time, so I work long hours. I don't really mind, but my family wishes I spent more time at home. Every once in a while I hear about an accident where a rig blew up or about a storm that sank a rig into the ocean. Those accidents can be fatal for the crew on the rig. I hope I can keep working on the oil rig, though, because it pays pretty well. All of the factory jobs in my hometown have been moved overseas, so this job is even more important now.

I am an **alternative fuels investor**. I fund research on alternative fuels so that we can do all the things we love to do without relying on petroleum. While most people think the only way we can move our cars is with gasoline made from petroleum, I have found that there are quite a few other options that could be profitable. Electric cars could be the wave of the future, especially in places where the electricity is provided by renewable fuel sources like wind power. These cars simply need to have their batteries recharged after use, and they don't require any gasoline. Another possibility is hydrogen fuel cells. The fuel cells convert hydrogen and oxygen into water, producing electricity in the process. Most alternative fuels don't produce air pollution like gasoline does. This could help fight climate change and smog.

I am a **parent** with three children. We have a large vehicle so that everyone has plenty of room when we need to go somewhere. Unfortunately, it takes quite a lot of gasoline to power such a large vehicle. I hope that our country will continue to have enough oil for everyone's needs. I'm afraid that if our oil supply starts declining, gas prices will go up. If we have to pay any more for gas than we already do, our family will have to cut back on other expenses. We don't have much money left after we pay our monthly bills, so I don't know how we could afford higher gas prices. I understand there might be environmental consequences from oil drilling, but my family and I try to minimize our environmental impacts in other ways.

Name _____ Date _____

Is It Sustainable?

Group members: _____

Natural resource discussed: _____

1. What are impacts of resource extraction on the environment?

2. Overall, is extraction of this resource environmentally sustainable?

a. Why, or why not?

b. How could it be made more sustainable?

3. How does resource extraction affect local and national economies?

4. Overall, is extraction of this resource economically sustainable?

a. Why, or why not?

b. How could it be made more sustainable?

5. How does extraction impact people and communities?

6. Overall, is extraction of this resource socially sustainable?

a. Why, or why not?

b. How could it be made more sustainable?

7. On a scale of 1-5, where 1 is not sustainable at all and 5 is completely sustainable, rate the overall sustainability of extracting this resource.

NOT SUSTAINABLE **COMPLETELY SUSTAINABLE**

1 2 3 4 5

8. Should the natural resource you discussed continue to be extracted?

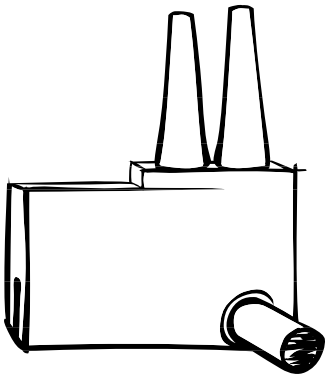
- If yes, is there a particular method that is most sustainable? What is it?
- If not, why should this resource no longer be extracted?

Lesson 4

The Cost of Production

Students consider where most of our imported material goods are assembled and the environmental and social impacts of production. In small groups, students develop policies that a company might use in working with foreign manufacturers, considering pros and cons of each policy. The class votes on the most essential policy and advocates for business and government leaders to adopt or enforce this policy.

MJ KLEIN



Objectives

Students will:

- Explain various factors that might contribute to a company's sourcing decisions
- Describe real-life working conditions
- Weigh the pros and cons of corporate manufacturing policies
- Develop corporate policies with sustainability in mind
- Identify costs and benefits of global trade

Inquiry/Critical Thinking Questions

- How does production of material goods impact people and places where those goods are produced?
- What policies might change these impacts, and in what ways?
- What are pros and cons of manufacturing goods in foreign countries?

Subject Areas

- Social Studies (Global Studies, Contemporary World Problems, Economics, Civics)
- Science (Biology, Environmental)
- Business/Finance

Time Required

45 minutes

Key Concepts

production—the process of manufacturing or creating material goods and products

globalization—the interconnection of economies, societies, and cultures across the globe

corporate social responsibility—an approach to business whereby a company holds itself responsible for the impact of its actions on consumers, workers, communities, and the environment

National Standards Addressed

National Council for the Social Studies

I (Culture)

III (People, Places, and Environments)

V (Individuals, Groups, and Institutions)

VI (Power, Authority, and Governance)

VII (Production, Distribution, and Consumption)

IX (Global Connections)

X (Civic Ideals and Practices)

National Science Education Standards

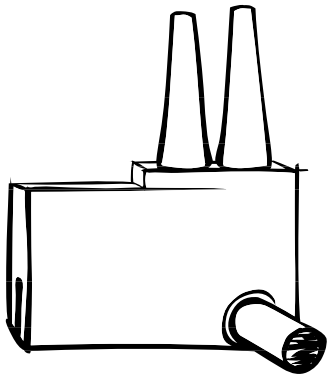
F (Science in Personal and Social Perspectives)

Additional Vocabulary

manufacturing—the making of goods and products, usually on a large scale

labor laws—laws designed to protect the health and well-being of workers

corporate policy—a set of guidelines that states a company's response or strategy regarding particular situations and circumstances



Optional Background Reading

- Elizabeth Becker, "Labor standards help Cambodia keep customers," *The New York Times,* May 11, 2005, www.nytimes.com/2005/05/10/business/worldbusiness/10iht-textile.html—A labor program in Cambodia has improved working conditions in the garment industry in addition to keeping Cambodia's 1.5 billion dollar apparel industry alive and thriving.
- Steven Greenhouse, "Labor Fight Ends in Win for Students," *The New York Times,* November 17, 2009, www.nytimes.com/2009/11/18/business/18labor.html—An anti-sweatshop movement in the United States convinced a sportswear company to reopen a factory in Honduras that shut down after workers unionized.

Materials/Preparation

Handout: *Working for a Living?*, 1 per student

Handout: *You're the Boss,* 1 per group of 3 students

(Optional) Computer access for showing *Story of Stuff* segment

Activity

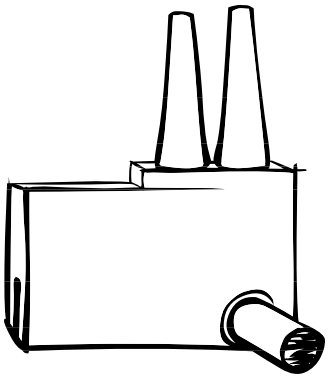
Introduction

1. (Optional) ***Story of Stuff* link:** Show **Production**, the third segment of *The Story of Stuff* (4:36-8:10).

Steps

1. Ask students if they know where the clothes they are wearing were made.
2. Have students work with partners to determine where their shirts (or jackets, shoes, etc.) were made. Ask each student to report to the class where his or her shirt was made. Record answers on the board.
3. Let students know that we import more material goods from China than from any other country.[1] Ask students: Why do you think we import so many of our goods from China? Why not the U.S. or somewhere closer?
4. Distribute one *Working for a Living?* handout to each student.
5. Give students time to read the handout.

1 U.S. Census Bureau, "Top Trading Partners – Total Trade, Exports, Imports," www.census.gov/foreign-trade/statistics/highlights/top/index.html (accessed May 19, 2010).



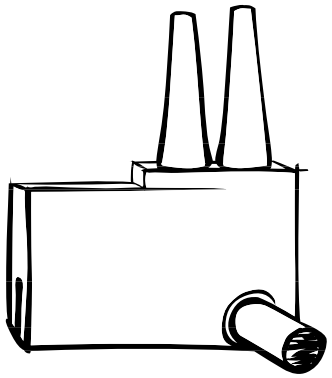
6. Next write the following scenario on the board: "If you were an executive at a U.S. company that sells clothing sewn in China, what policies would your company require Chinese factories to follow?"
7. Divide students into groups of 3.
8. Provide each group with the handout, *You're the Boss.* Allow them time to work through and discuss the questions on the handout.
9. Have each group report to the class their two proposed policies, explaining pros and cons of each choice. Ask them to explain why they believe their proposed policies are essential.
10. Take a vote on which policy is most important to students. See the Action Project suggestion in order to turn this recommendation into action.
11. Conclude with a discussion using the following questions.

Discussion Questions

1. Why might some countries *not* want to enforce minimum wage and worker safety laws?
2. One business professor says that trade is "an instrument of peace and understanding" because it requires countries to cooperate with each other.[1] Based on what you know, do you agree with this statement? Does it change your opinions about globalization?
3. If workers are to be paid higher wages, who should bear that cost? Should CEO's be paid less? Should the costs be absorbed by the consumer?
4. Kofi Annan, the former Secretary General of the United Nations, stated, "We must ensure… that all the world's people share the benefits of globalization." Do you think all countries benefit equally from globalized production (that is, making and shipping products all over the world)? If not, what would allow for more people to benefit?
5. Human rights journalist Nicholas Kristof has said that sweatshop labor would be a dream for the poorest people in the world, such as those who survive by scavenging through garbage.[2] Do you think that working in a sweatshop (a factory with substandard working conditions) would be a significant improvement in the lives of people who dig through garbage to survive?

1 Pietra Rivoli, "The Travels of a T-Shirt," eJournal USA, February 2006, www.america.gov/st/econ-english/2008/June/20080821174002XJyrreP0.7469751.html.

2 Nicholas Kristof, "Where Sweatshops Are a Dream," *The New York Times,* January 14, 2009, www.nytimes.com/2009/01/15/opinion/15kristof.html.



If so, should sweatshops be given a break? Do you have other ideas about how the lives of people living in poverty could be improved?

6. Should consumers be better informed about working conditions? What about environmental impacts of manufacturing? What are some ways that consumers could have access to more information about where and how their goods were made?
7. When you purchase a product, what sorts of "costs" are *not* included in its price?

Writing Extension

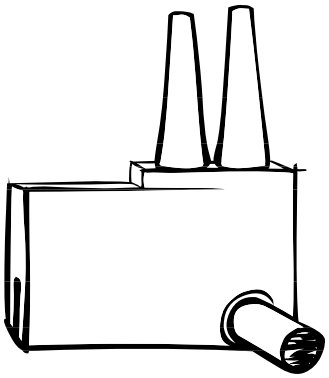
Ask students to research the product trail of an item. Where are the raw materials produced? Where are those materials processed and assembled? Who is involved at each step of the process? Then have students write a first-person product trail from the point of view of the item. This might be in the form of an essay, a short story, or a poem. The writing should answer the following questions:

- What item are you?
- Where and how were you created, and by whom?
- Who will buy you?
- How do you feel about the way in which you were created?
- How do you wish you had been created instead?
- What do you wish people knew about you and how you were produced?

Action Project

Work with students to make their #1 policy priority a reality. Have students research the corporate policies for popular apparel companies. If these companies do not have corporate policies that take into consideration people, places, and the environment, students can write letters to those companies expressing their major concerns about production. A few examples of corporate policies regarding labor and the environment include:

- Nike (www.nikebiz.com/responsibility/workers_and_factories.html)
- Gap, Inc. (www.gapinc.com/public/SocialResponsibility/socialres.shtml)
- Patagonia (www.patagonia.com/pdf/en_US/CoC_English.pdf and www.patagonia.com/web/us/footprint)



Students could also develop a campaign to educate the public about the hidden costs of producing material goods and about how to be thoughtful consumers. Part of this campaign might include publishing "good shopping guides" to provide community members with information about which manufacturers and stores adhere to policies that protect workers, consumers, and the environment.

Additional Resources

- **Film:** *China Blue*
  This documentary tells the tale of 17-year-old Jasmine, a worker in a Chinese garment factory, and the conditions she must work in. www.pbs.org/independentlens/chinablue
- **Website:** www.globalexchange.org
  Global Exchange hosts a Fair Trade online store where consumers can make purchases that ensure the producers are paid fair wages. Additionally, the website provides information on how to support "sweat free" communities.

Working for a Living?, page 1

If you bought a pair of jeans for $50, how much money would you expect the worker who sewed the jeans to receive? $25? $10? $5? You might be shocked to learn that a laborer might receive only $1 from the sale of those jeans. That's just 2% of the retail price.[1]

So where does the rest of that money go? Much of it goes to advertising, corporate salaries, store rental fees, and "middle men" (people who connect manufacturers with retailers). Some of it is spent on raw materials, like cotton. Very little goes to the people who actually make the clothing.

American companies import more goods from China than from any other country. Much of China's wealth comes from investment from foreign companies. These companies hire factories in China to make products that will be sold in the United States. In the year 1998, exports from China to the United States were around $71.2 billion. Over the past decade, exports have increased to over $287.8 billion. Growing exports over the years have been products such as computers, apparel, household items, and furniture.[2]

THE NATIONAL LABOR COMMITTEE

A teenage worker in an electronics factory takes a nap.

Like many countries, China has labor standards designed to protect its workers. According to the International Labour Office, China has laws related to worker hours (generally 8 hours per day), overtime compensation (50-200% greater than the base pay rate), and required rest days (2 per week). Minimum wage is set by each region of the country. The lowest minimum wage is 270 yuan per month (about $40/month) in the Province of Jiangxi. The highest is 750 yuan per month ($110/month) in Shanghai City. China also has labor unions that protect workers' rights.[3]

China is an attractive location for manufacturing for several reasons. Chinese factories are able to keep costs low for foreign corporations. Also, China has a number of major ports and terminals to make shipping easy. And they have the largest labor force of any country in the world.[4]

The True Cost of Labor

The unattractive side of manufacturing reveals the real-life working conditions for Chinese laborers and the toll that production of material goods is taking on the environment. Although China has restrictive labor laws, these laws are often broken. Some factories maintain two sets of books in order to evade inspectors who visit the factories. One estimate suggests that over half of Chinese suppliers submit false pay records to inspectors, and only a

1 *China Blue* website, "The Blue Jeans Business," www.pbs.org/independentlens/chinablue/ (accessed November 11, 2009).
2 Loretta Tofani, "American Imports, Chinese Deaths," Part one of four, *The Salt Lake Tribune,* October 21, 2007, www.pulitzercenter.org/temp/China_Series.pdf.
3 International Labour Office, Minimum Wages Database and Working Time Database, www.ilo.org (accessed November 2, 2009).
4 CIA World Factbook, https://www.cia.gov/library/publications/the-world-factbook/ (accessed November 2, 2009).

small fraction of Chinese factories obey limitations on daily working hours. Apparel manufacturers often do not pay workers for mandatory overtime and may not allow workers more than a few days off each month.[5]

The toxic chemicals that are used to make products impact the health of factory workers. On a daily basis, workers in many factories in China inhale or are exposed to toxic materials like lead, mercury, cadmium, and benzene. Benzene is a colorless and flammable liquid that can be used to make materials like ink, paint, and plastic. Excessive benzene exposure can lead to leukemia, bone marrow damage, and a damaged immune system.[6]

Direct exposure to other industrial materials can result in lung cancer and silicosis, a lung disease. Epidemiologists estimate over 4 million workers throughout China have developed silicosis by ingesting toxic air. A lack of proper ventilation in factories allows these carcinogens (cancer-causing substances) to circulate in the air without proper disposal. Health protections such as good ventilation systems and protective masks could reduce the number of workers who develop diseases and illnesses from working in factories.[7]

In some factories, workers also risk losing fingers and limbs by working with unsafe machines. Within the province of Guangdong, for example, 360,000 workers have lost limbs since 1995. Because of this, the government created a law in 2002 ordering factories to replace unsafe machines over time.[8]

In addition to impacts on workers' health and safety, factories can take a large environmental toll. Factory wastes discharged into rivers and into the air cause pollution, which leads to illness among people who do not even work at the factories. China's primary energy source for providing electricity to factories is coal, which is a fossil fuel that contributes to climate change and smog. Hundreds of thousands of premature deaths have been traced to China's environmental degradation, of which factories play a significant role.[9]

The Bottom Line

The low costs of labor and land in China are a tempting option that can save the United States millions of dollars when importing products. However, the true cost of production in China has had impacts on people and the environment that are not included in the price of products. Governments, businesses, and consumers all play a role in these impacts. Enforced labor practices around the world can result in improved health for the environment, workers, and consumers.

What's a Concerned Shopper to Do?

If you want to buy products that improve the lives of the people who make them, by providing a fair income and a safe workplace, how can you put your money where your mouth is?

For one thing, you can look into the labor and environmental practices of companies that sell products you want to buy. Many companies publish these policies online.

You can also let companies know that the way workers and the environment are treated matters to you. Would you prefer to buy products that are made by workers who are paid a fair wage? Would you prefer to buy products that were produced without causing environmental harm? If so, let companies know!

If you've ever heard the expression "money talks," you know that how you choose to spend money sends a message. Send a message by buying products from companies that you want to support.

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5 "Secrets, Lies, and Sweatshops," *BusinessWeek,* November 27, 2006, www.businessweek.com/magazine/content/06_48/b4011001.htm.
6 Loretta Tofani, October 21, 2007.
7 Ibid.
8 Loretta Tofani, "American Imports, Chinese Deaths," Part two of four, *The Salt Lake Tribune,* October 22, 2007, www.pulitzercenter.org/temp/China_Series.pdf.
9 BBC News, "China 'buried smog death finding,'" July 3, 2007, http://news.bbc.co.uk/2/hi/asia-pacific/6265098.stm.

Name Date

You're the Boss

Group members: _____

Guiding Question: If you were an executive at a U.S. company that sells clothing sewn in China, what policies would your company require Chinese factories to follow?

Directions: Work through the questions on this page to construct two potential corporate policies.

1. Of the following, which two things do you think are most important?

Labor Standards	Environmental Impacts
• Maximum number of hours in a work day • Guaranteed rest days each week • Required breaks during work day • Health insurance for workers • Safety training and equipment • No child workers • No harassment or discrimination by managers • Other: _____	• Recycle and reuse waste materials • Use locally sourced materials • Purchase sustainably extracted raw materials • Set and enforce limits for air and water pollution • Find alternatives to replace toxic materials • Record and report on disposal of all wastes • Create durable materials that will not break • Other: _____

2. For the two most important things, write a policy statement for each.

For example: *Our company is going to require any factories it works with to limit workers to a strict 50-hour work week.*

Policy Statement #1: _____

Policy Statement #2: _____

3. For each policy, determine its pros and cons.

For example: ***Pro****—Limiting workers to a strict 50-hour work week could increase the productivity and health of workers.* ***Con****—Limiting workers to a strict 50-hour work week could increase prices for consumers.*

Policy Statement #1 Pro: _____

Policy Statement #1 Con: _____

Policy Statement #2 Pro: _____

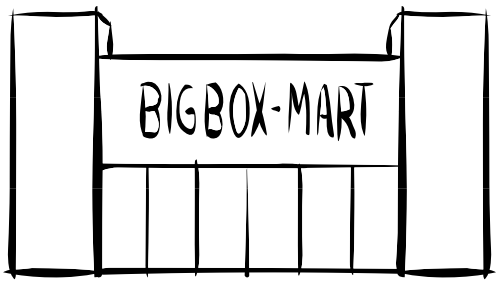
Policy Statement #2 Con: _____

Lesson 5

On the Road to Retail

Students read about different components of product distribution in a scenario. They analyze information related to environmental and social impacts of distribution to determine opportunities for making distribution more sustainable. This lesson also provides an opportunity for students to explore the concept of externalities, or "hidden costs" of a product.

NANCY CIOCCA



Objectives

Students will:

- Identify the processes and people involved in product distribution
- Evaluate the sustainability of distribution methods and practices
- Analyze data in order to determine ways to increase sustainability of a distribution system

Inquiry/Critical Thinking Questions

- How does the distribution of material goods impact the environment?
- How are people directly and indirectly impacted by distribution?
- What part do consumers play in determining distribution systems?

Subject Area

- Social Studies (Global Studies, Contemporary World Problems, Geography, Economics)
- Science (Earth, Physical, Biology, Chemistry, Environmental)
- Business/Finance

Time Required

60 minutes

Key Concepts

carbon footprint—a tool for measuring the impact of a person, product, or process on Earth's climate; it refers to the amount of greenhouse gases released

distribution—the transport and delivery of material goods from production to consumers

externality—an external effect, often unforeseen or unintended, accompanying a process or activity; often used to describe a cost that is not directly paid, such as pollution or stress

National Standards Addressed

National Council for the Social Studies

III (People, Places, and Environments)

VII (Production, Distribution, and Consumption)

VIII (Science, Technology, and Society)

IX (Global Connections)

National Science Education Standards

D (Earth and Space Science)

E (Science and Technology)

F (Science in Personal and Social Perspectives)

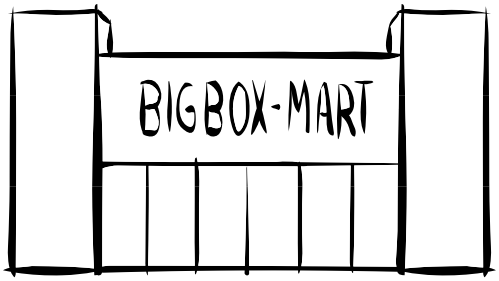
G (History and Nature of Science)

Additional Vocabulary

carbon emissions—releases of carbon, often in the form of the gas carbon dioxide (CO_2), into the atmosphere; these emissions can enhance Earth's greenhouse effect, raising average temperatures on Earth

transportation—the carrying of people or goods from one place to another

retail—the sale of goods to consumers



local living economies—economic systems that prioritize human and community needs and interests by providing local resources, fair wages, and low environmental impacts

Optional Background Reading

- Larry Rohter, "Shipping Costs Start to Crimp Globalization," *The New York Times,* August 3, 2008, www.nytimes.com/2008/08/03/business/worldbusiness/03global.html—For some companies, high costs of shipping products across the globe is leading them to consider more local options.
- Andrew Martin, "How Green is My Orange?," *The New York Times,* January 21, 2009, www.nytimes.com/2009/01/22/business/22pepsi.html?_r=1—PepsiCo measured the amount of carbon emissions it takes to create a half-gallon of orange juice. A graphic divides the carbon footprint into different stages of the product life cycle.

Materials/Preparation

Handout: *A Better Way?*, 1 per student

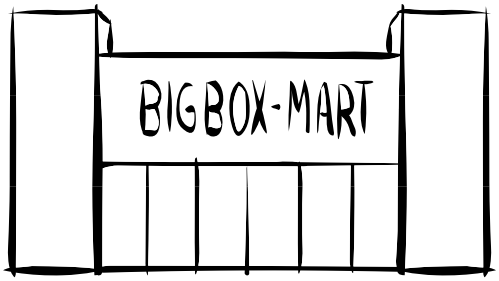
Handout: *Distribution Recommendations,* 1 per pair

(Optional) Computer access for showing *Story of Stuff* segment

Activity

Introduction

1. Ask students to recall the previous steps of the materials economy that you have studied. (*extraction, production*)
2. Ask: What do you think happens after production? (*e.g., the materials have to be transported to a store where they are sold; retailers advertise products; consumers buy products*) Let them know that this lesson will focus on the next step in the materials economy, distribution.
3. Tell students that you will specifically be studying the distribution of blue jeans. Have students think for a moment about how much jeans actually cost when they are sold in a store. (They can do this activity independently/silently.)
4. On the board, write the following two headings: *Included* and *Hidden*. First, lead students in a brainstorm about what sorts of things are included in the cost of a pair of jeans. (*e.g., money to buy fabric, money to pay factory workers, rent for retail store, money to pay store employees*) Now ask students to brainstorm some "costs" that are probably not included in the price of the jeans. These could be costs to people, to the environment, or to local and national economies. (*e.g., environmental*



impacts, employee health) It's ok if students can't think of many costs at this point; after this activity students will have a greater idea about both included and hidden costs.

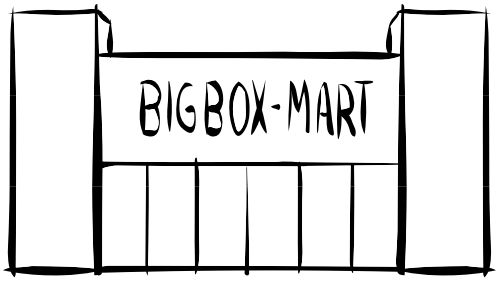
Steps

1. Distribute one handout, *A Better Way?*, to each student.
2. Let students know that they will be working through the handout with a partner.
3. Divide students into pairs. Distribute one *Distribution Recommendations* worksheet to each group. Have each pair answer the questions together.
4. Allow each pair to present to the class one or several of their recommendations for improving the company's system of distribution.
5. (Optional) ***Story of Stuff* link:** Show **Distribution**, the fourth segment of *The Story of Stuff* (8:06-10:05). This segment introduces the term "externalized costs."

Discussion Questions

1. Do you think it is reasonable to require companies to provide information about their carbon footprint on clothing labels or in stores? Explain why or why not.
2. A t-shirt sewn in California from cotton grown in Turkey and shipped to a distribution center in Reno travels 7840 miles before ever reaching a store.[1] Why might a company choose to spread out its distribution and production all across the globe?
3. Do you think hidden costs, such as pollution and employee health, should be included as part of pricing products like jeans?
4. Would you be willing to pay more money for a product if you knew it contributed substantially to the local economy, such as if it was made locally by citizens who pay local taxes?
5. Many people have no idea what goes into distributing goods to consumers. Why do you think that is? Would more information influence your purchasing decisions?
6. How can you as a consumer work to influence components of distribution systems?

1 T-shirt from Patagonia, "Environmentalism: The Footprint Chronicles," www.patagonia.com/web/us/contribution/patagonia.go?assetid=23429 (accessed March 28, 2010).



Additional Resources

- **Website:** www.foodroutes.org
  The FoodRoutes website is a project of the FoodRoutes Network, a national nonprofit. The website gives information about why buying local food helps to support the local economy, protect the environment, and promote healthy eating.
- **Website:** www.planning.org
  The American Planning Association (APA) is a nonprofit public interest and research organization committed to urban, suburban, regional, and rural planning. On their site you will find information about community planning for a variety of audiences: professional planners, educators, and students. They also publish *ResourcesZine,* an online newsletter with feature articles and ideas for involving youth in planning efforts. Have students visit this website to learn about local living economies and ways communities can sustainably develop.
- **Website:** www.nature.org/initiatives/climatechange/calculator
  The Nature Conservancy hosts an online carbon footprint calculator to help individuals and/or households measure their impact on climate change, as well as visualize positive changes that they can make to reduce their impacts on climate change.

Action Project

"Local living economies" include socially responsible, locally-owned businesses that meet the needs of individuals and local communities. Have students visit the Business Alliance for Local Living Economies website (www.livingeconomies.org) to learn more about how local living economies can help to support sustainable agriculture, green building, community capital, zero-waste management, and independent retail. Have students research what types of businesses and services are available in their community to support a living economy.

Either in groups or together as a class, have students develop a public service announcement (PSA) around the relevance of local living economies. A PSA might be designed for viewing on television or the Internet, or it might be a message intended for radio listeners. This PSA should educate viewers about what a local living economy is, how it can help citizens, and how community members can support this kind of economy. Share this PSA with local community members, including citizens and government representatives.

A Better Way?, page 1

Scenario:

A large company that designs and sells blue jeans in the U.S. recently received some bad publicity. The bad publicity started when a report was released showing how high employee turnover is; the company loses dozens of employees every month. More recently, an environmental watchdog group named the company as a "climate menace," alleging that it had one of the highest carbon footprints of any similar-sized company. To top it all off, one city is now trying to prohibit the company from locating a new store there, claiming that the company does not appear to care about the communities where it does business.

You have been hired as a consultant to help the company improve its distribution system. That means you will have to investigate the procedures involved in getting the jeans from the factory where they are made into consumers' hands. The company wants to:

- Lower its carbon footprint
- Retain good employees
- Positively contribute to local economies

Your task is to determine where and how you can improve distribution according to these three goals. First, you need to know how the company currently operates.

Your investigation begins in Vietnam, where the jeans are sewn. Because the company wants to provide its customers with the latest styles, it flies shipments of the jeans from Vietnam to an airport in Denver at least once a month.

In Denver, the jeans arrive at your company's distribution center. This is essentially a giant warehouse. The jeans are then loaded onto trucks that travel all over the United States and Canada, delivering the jeans to stores. Turnover among the truck drivers is pretty low. They work long hours but make good money. Some of them are members of a union that works to protect their rights; the union established minimum pay rates and maximum working hours for the drivers.

Once the jeans arrive at any of the forty-five retail stores your company owns, they are carefully folded and displayed by retail workers. Most of these workers are young and willing to work part-time. This is cheaper for the company because it does not offer health care and other benefits, such as paid sick days and vacation time, to part-time employees. Usually store managers are the only retail employees who work full time and receive health care. The part-time retail employees, who work between 8 and 32 hours a week, earn anywhere from $7.50 to $12 an hour.

More than half of the stores are located in suburban areas, in large shopping centers. Currently about 20% of the company's entry-level retail positions are vacant. One reason is that people looking for this type of work often live far from shopping centers in places without public transportation options, like buses or trains. 30% of the company's retail employees live more than 15 miles from the stores where they work. In several cities, there are large numbers of unemployed workers in inner-city areas that cannot reach the company's suburban stores.

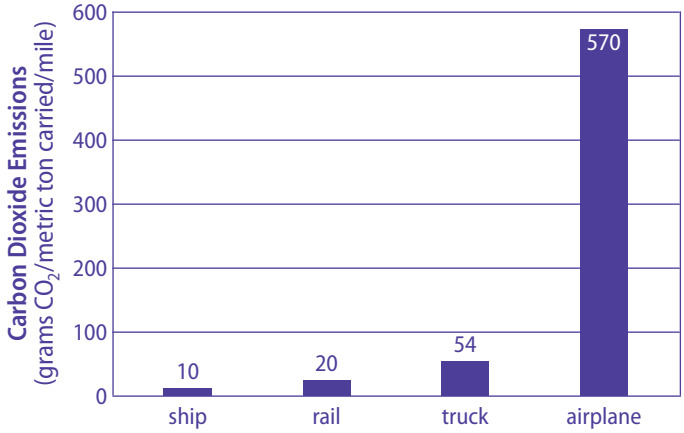
Four stores currently participate in recycling programs. These stores, located in cities that have established recycling programs, recycle the cardboard boxes that the jeans arrive in.

A Better Way?, page 2

Transportation is responsible for 17% of the world's carbon dioxide (CO_2) emissions, second only to electricity and heat production in the amount of greenhouse gases released.[1] The vast majority of transportation fuels (such as gasoline, diesel, and jet fuel) are made from petroleum. When petroleum fuels are burned, carbon dioxide is released.

Carbon dioxide is a greenhouse gas linked to climate change. As the amount of carbon dioxide in the atmosphere goes up, so does the earth's average temperature. Climate change has warmed the earth so that glaciers and areas that have been frozen for thousands of years are now melting. It has also caused sea levels to rise around the world.

Greenhouse Gas Emissions from Transportation[2]



Greenhouse Gas Emmissions from Solid Waste[3]

Recycling and Source Reduction	Emissions Prevented
2000 pounds cardboard recycled	3.1 metric tons of CO_2
2000 pounds cardboard source reduction	5.6 metric tons of CO_2

Employee Wages[4]

People in Family	1	2	3	4	5	6	7	8
Poverty Guidelines	$10,830	$14,570	$18,310	$22,050	$25,790	$29,530	$33,270	$37,010

1 Samantha Putt del Pino, Ryan Levinson, and John Larsen, "Hot Climate, Cool Commerce: A Service Sector Guide to Greenhouse Gas Management" (Washington, D.C.: World Resources Institute, 2006), 5. http://pdf.wri.org/hotclimatecoolcommerce.pdf

2 Estimates in the graph based on the Greenhouse Gas Protocol Initiative, as cited by Nelly Andrieu and Lee Weiss in "Transport Mode and Network Architecture: Carbon Footprint as a New Decision Metric," June 2008, Thesis (Master of Engineering in Logistics), Massachusetts Institute of Technology.

3 U.S. Environmental Protection Agency, "Measuring Greenhouse Gas Emissions from Waste," www.epa.gov/climatechange/wycd/waste/measureghg.html (accessed March 29, 2010). "Source reduction" refers to eliminating use of cardboard to begin with.

4 U.S. Department of Health and Human Services, "The 2009 HHS Poverty Guidelines," http://aspe.hhs.gov/poverty/09poverty.shtml (accessed March 18, 2010). The HHS poverty guidelines are used by a number of federal programs, such as Head Start and the National School Lunch Program, to establish who is eligible to receive these programs that serve people living in poverty.

Name Date

Distribution Recommendations

Group members: _____

Guiding Question: As a consultant, what recommendations would you make to improve the distribution system according to the considerations below?

1. Carbon Footprint

In what ways could the company reduce its carbon footprint (its CO_2 emissions) during distribution? List at least two ideas, and explain how each results in a lower carbon footprint.

_____

_____

_____

2. Worker Retention

In what ways could the company retain its employees for longer periods of time? List at least two ideas, and explain why each promotes greater employee retention.

_____

_____

_____

3. Local Economies

In what ways could the company contribute more positively to local economies where its stores are located? List at least one idea, and explain how it contributes to local economies.

_____

_____

_____

4. What challenges might a company face when considering a sustainable approach to improving its system of distribution?

_____

_____

_____

Lesson 6

Why Buy?

Students begin by considering the purpose of advertising. Each student critically analyzes an advertisement that appeals to him or her, weighing advertised information against their needs as consumers. Students discuss whether additional information should be included in product advertisements and how advertising connects to consumption choices.

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Objectives

Students will:

- Recognize the connections among advertising and consumption choices
- Become critical consumers of youth-directed marketing and advertising
- Determine whether corporations have a responsibility to disclose information to consumers

Inquiry/Critical Thinking Questions

- What kinds of ad techniques appeal to youth?
- How does advertising influence consumption?

Subject Areas

- Social Studies (Global Studies, Contemporary World Problems, Psychology)
- Science (Environmental)
- Language Arts
- Communications
- Journalism
- Business/Finance

Time Required

45 minutes

Key Concepts

media literacy—the ability to locate, evaluate, and understand messages from any media source (television, radio, newspapers, etc.)

marketing—activities that promote the transfer of goods from a seller to a buyer

advertising—persuasive messages that inform the public about a product or service for sale

National Standards Addressed

National Council for the Social Studies

I (Culture)

IV (Individual Development and Identity)

VII (Production, Distribution, and Consumption)

National Science Education Standards

F (Science in Personal and Social Perspectives)

Optional Background Reading

- Kendra Marr, "Children Targets of $1.6 Billion in Food Ads," *The Washington Post,* July 30, 2008, www.washingtonpost.com/wp-dyn/content/article/2008/07/29/AR2008072902293.html—Food companies spend great sums of money creating ads for children. $492 million alone has been spent on carbonated-beverage advertisements.
- Jenna Schnuer, "Billion Dollar Babie$," *American Way,* December 1, 2005, www.americanwaymag.com/juliet-schor-teenage-research-unlimited-president-peter-zollo-1—Tweens and teens have become a marketer's dream because of their impact on consumption in America. Schnuer references Juliet Schor, author of *Born to Buy,* who claims the way to understand consumer culture is through understanding youth.

Materials/Preparation

Before Class: Each student needs to bring an advertisement that appeals to him or her. This could be a print or online ad, or it might be a recorded television or radio ad. Any commercial advertisement, from bumper stickers to t-shirts, can be analyzed.

***Agree and Disagree* signs:** In large letters, print *Agree* on a piece of paper and *Disagree* on another piece of paper. Tape the *Agree* sign to one wall in your classroom and the *Disagree* sign to the opposite wall.

Handout: *Analyzing an Ad,* 1 per student

(Optional) Computer access for showing *Story of Stuff* segment

Activity

Introduction

1. Refer to the Materials/Preparation section for instructions regarding *Agree* and *Disagree* signs. Write on the board the following statement: "The point of an advertisement is to make us unhappy with what we have." (This statement is adapted from *The Story of Stuff*.)
2. Ask students to decide whether they agree or disagree with this statement. Those who agree should stand by the *Agree* sign. Those who disagree should stand by the *Disagree* sign.
3. Ask for volunteers from each group to explain why they agree or disagree. Make sure that no one has spoken twice before everyone has spoken once. If a student makes a persuasive case for one side, other students are welcome to switch to that side.
4. After the sides debate, ask students to return to their seats.
5. Share with students the following statistics:
   - The average young person in America watches around 40,000 television ads per year.[1]
   - Companies spent $100 **million** advertising to kids in 1983. By 2007, they were spending $17 **billion** per year.[2] (Write out these numbers on the board to emphasize the growth: $100,000,000 and $17,000,000,000.)
   - 8- to 12-year-olds spend $30 billion each year.[3]
6. Ask students why they think youth advertising has boomed so much in recent years.
7. Ask students to identify some positive effects of advertising. Conversely, what are some negative effects?

1 American Academy of Pediatrics, Committee on Communications, "Children, Adolescents, and Advertising," *Pediatrics* 118 (2006): 2563-2569.
2 Christine Lagorio, "Resources: Marketing to Kids," *CBS Evening News* online, May 17, 2007, www.cbsnews.com/stories/2007/05/14/fyi/main2798401.shtml.
3 Ibid.

Steps

1. (Optional) ***Story of Stuff*** **link:** Show the fifth segment of *The Story of Stuff,* **Consumption** (10:07-16:44).
2. Tell students that they are going to discover how advertising impacts their own consumption. Distribute the handout, *Analyzing an Ad,* to students.
3. Ask each student to use the handout to analyze the ad he or she brought to class.
   - If students are struggling to answer question #10, encourage them to think broadly. Alternatives might be more sustainably produced products, or they might not be new products at all. An alternative to buying a product might be to repair something, to borrow an item, or to do without it altogether.
4. **Option:** Have each student present his/her ad and analysis to the class.
5. Conclude with a discussion using one or more of the following questions.

Discussion Questions

1. How does advertising relate to consumption?
2. If you lived in a different country, and your only knowledge of U.S. culture came from watching American commercials, what would you think were the most important values of our society? What would you think were the most important values of teenagers? Do you think these are accurate reflections of your culture?
3. Should sustainability concerns, including the true environmental and social costs of a product, be included in advertisements? Why, or why not?
4. How could the unseen side of production of a consumer product be highlighted to a company's *advantage?*
5. Would having more information about the unseen side of production influence what you buy? Why, or why not?
6. Do you think we are sufficiently informed about the sustainability of our consumption habits? If not, how can we become more informed about the global impacts of our consumption?
7. Whose responsibility is it to ensure products are safe and that people know the ingredients? Consumers/citizens? Government? Companies/manufacturers?

Drama/Art Extension

Have students produce two different commercials for the same product—one telling only the positive side of a product and one revealing its negative impacts. Both ads should use the same technique to appeal to consumers. Ads might take the form of commercials acted out as skits, print ads that employ graphic design, or short videos.

Communications Extension

Have students keep an ad diary for 24 hours in which they record the number and types of ads that they encounter during a day. Types of ads might include print or television ads, ads on buses or billboards, product placement in a movie, a t-shirt or "walking advertisement," and bumper stickers. Remind students to keep their eyes open to even the most subtle advertisements. We are inundated daily with ads that we might not even be aware of. Ask each student to tally the total number of ads they viewed in one day. Have students report their totals, and find a class average. (For comparison, the average young American views approximately 110 television ads daily.[1])

1 American Academy of Pediatrics, Committee on Communications, "Children, Adolescents, and Advertising," *Pediatrics* 118 (2006): 2563-2569.

Science Extension

Research a product that claims to be "green" or have a positive impact on the environment (for example "no CFC's" or "all natural"). What do those claims mean? Who holds companies accountable for these claims? How do those claims stack up to available evidence? A helpful site is www.greenerchoices.org, where consumers can learn more about product labels such as "organic" and "cruelty free."

Additional Resources

- **Website:** www.goodguide.com
  GoodGuide provides information on the health, environmental, and social impacts of everyday products.
- **Website:** http://broweryouthawards.org
  Brower Youth Awards features the story of 2006 award winner Jessica Assaf, a teenager who worked on the Teens for Safe Cosmetics Campaign and lobbied senators to pass a bill promoting the creation of safe cosmetics.
- **Video:** *America the Beautiful*
  This documentary takes a look at the beauty industry and the effects of this industry on American society. (105 minutes, directed by Darryl Roberts, PG-13 version available)
  www.videoproject.com

- **Book:** *Fast Food Nation*
  Chapter 2, "Your Trusted Friends," discusses the history of fast-food marketing to kids. Eric Schlosser, *Fast Food Nation* (New York: Perennial, 2002), 30-57.

Action Project

Create a consumer's guide to locally available sustainable products. Compile a list of all the neighborhood stores and restaurants that sell and/or use sustainably produced items such as Fair Trade certified products, organic food, renewable energy sources, non-sweatshop clothing, etc. Then design a pamphlet, website, or poster to make this information accessible to the school or neighborhood community. If there are only a few sources of sustainably produced products available in your community, lobby one or more local business owners to offer more sustainable choices.

If you need ideas to get started, check out these consumer resources:

- www.newdream.org/buyingwisely/index.php—local buying guides
- www.newdream.org/walletbuddy.pdf—key questions for consumers
- http://sustainablechoices.stanford.edu/card/index.html—sustainability measures at home, at the store, and on the road
- www.montereybayaquarium.org/cr/cr_seafoodwatch/download.aspx—sustainable seafood guides

Name Date

Analyzing an Ad, page 1

1. What product or service is being advertised?

_____

_____

2. What advertising technique does the ad employ? Choose from one of the following:

- **Humor**—Is the ad funny?
- **Celebrity Endorsement**—Does a celebrity promote the product/service?
- **Personal Testimonial**—Is a user of the product/service promoting it?
- **Image**—Will the product/service enhance your image? Does it look cool or sexy?
- **Product Quality**—Is the product/service of high quality?
- **Sale or Promotion**—Is there a special sale or limited-time offer advertised?
- **Other** (explain): _____

3. What is the message of the ad?

_____

_____

4. What about the ad immediately appeals to you?

_____

_____

5. What demographic (age and sex) do you think the ad is targeting?

_____

_____

6. Does the ad provide you with information related to what is most important to you when choosing what to buy? (If not, why do you think this information is not included?)

_____

_____

7. Do you think the ad is misleading? Why, or why not?

_____

_____

Analyzing an Ad, page 2

8. What are ways you would change the ad to make it meet your needs as a consumer?

9. Do you think the product/service advertised would improve your life? Why, or why not?

10. Are there more sustainable alternatives to buying this product/service—that is, alternatives that would more positively impact local and global economies, societies, or environments?

11. Think about things you have bought recently (in the last few weeks). Which one of the following MOST influences what you buy?

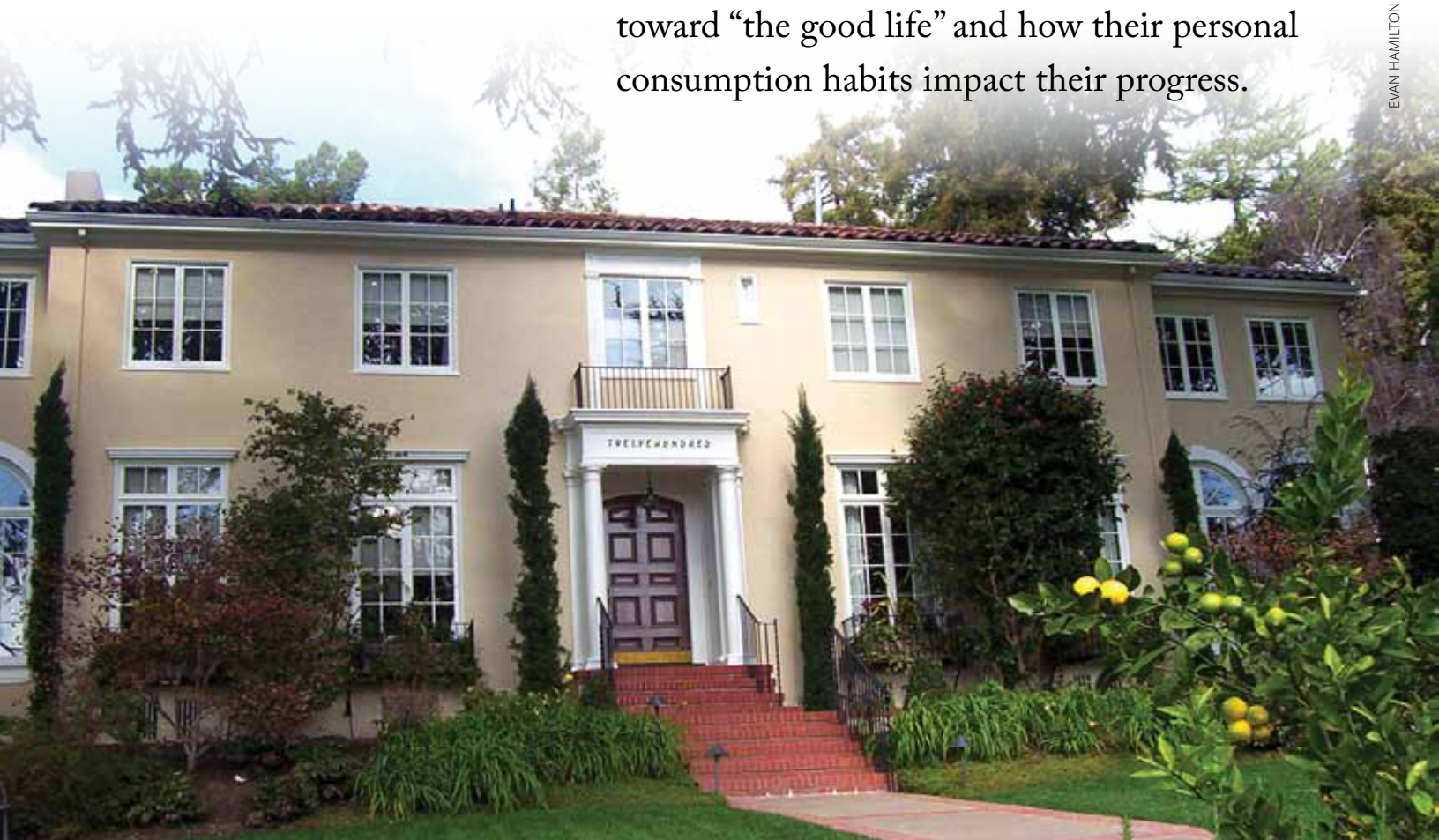
- **Advertising:** Encouragement from a company to buy its product
- **Appearance:** How a product looks
- **Brand loyalty:** You have a commitment to a certain brand and continue to buy this brand repeatedly
- **Country of origin:** Where a product was made
- **Durability:** How long something lasts
- **Environmental impact:** Environmental damage caused by creating the product
- **Labor:** How the workers who made the product are treated and paid
- **Popularity:** Bought and used by many people
- **Price:** How much something costs
- **Product warranty/guarantee:** A promise from a company to repair or replace something that breaks
- **Recommendation:** Someone you know encouraged you to buy a product that he/she uses

12. Do you think this is a good reason to buy a product? If not, how will you shop differently in the future?

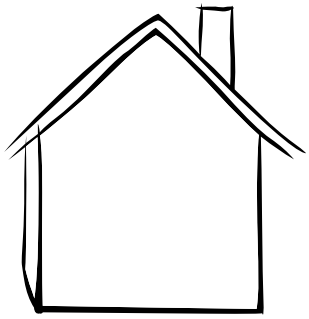
Lesson 7

Defining Happiness

Students individually decide what types of things positively contribute to their quality of life. They compare their ideas about quality of life to national statistics related to how Americans spend their time, and determine how Americans could restructure their time to improve quality of life. Students also evaluate their own progress toward "the good life" and how their personal consumption habits impact their progress.



EVAN HAMILTON



Objectives

Students will:

- Identify factors that improve quality of life
- Evaluate how time use and personal choices impact quality of life

Inquiry/Critical Thinking Questions

- What factors contribute to quality of life?
- How closely do our lifestyles reflect our personal values?
- Do our consumption choices contribute positively to our quality of life?

Subject Areas

- Social Studies (Global Studies, Contemporary World Problems, Economics, Civics, Psychology)
- Science (Environmental)

Time Required

45 minutes

Key Concept

quality of life—the level of well-being of an individual or group of people

consumption—the process of using natural resources, materials, or finished products to satisfy human wants or needs

National Standards Addressed

National Council for the Social Studies

I (Culture)

IV (Individual Development and Identity)

V (Individuals, Groups, and Institutions)

VII (Production, Distribution, and Consumption)

X (Civic Ideals and Practices)

Background Reading

- Carol Graham, "The Economics of Happiness," *The Washington Post,* January 3, 2010, www.washingtonpost.com/wp-dyn/content/article/2009/12/31/AR2009123101153.html—How do we accurately measure well-being? Graham poses questions around national well-being such as whether happiness should supplant economic growth as part of government policy.
- Damien Cave, "In Recession, Americans Doing More, Buying Less," *The New York Times,* January 2, 2010, www.nytimes.com/2010/01/03/business/economy/03experience.html—As a result of the recent recession, some Americans are spending less time buying nonessentials and more time participating in activities with other people.

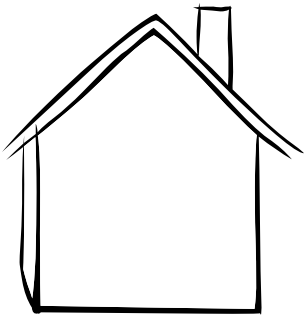
Materials/Preparation

Handout: *Pick 5,* 1 per student (plus 1 displayed by an overhead or document camera)

Blank sheets of paper, 1 per group of 2-4 students

Graph: *How Americans Spend Their Time,* displayed by an overhead or document camera

(Optional) Computer access for showing *Story of Stuff* segment



Activity

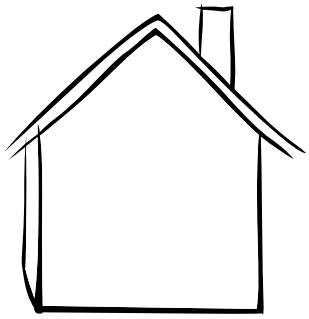
Introduction

1. (Optional) ***Story of Stuff* link:** Show the fifth segment of *The Story of Stuff*, **Consumption** (10:07-16:44), if you did not do so during Lesson 6.

Steps

1. Ask students to think about what the term "quality of life" might mean. Discuss student ideas, and develop a working definition that everyone can agree on. (*One basic definition is "the level of well-being and physical conditions in which people live."*) You may want to ask students to consider how "quality of life" and "happiness" are related, and how they could be different.
2. Give each student a *Pick 5* handout. Ask them to circle or otherwise choose five of the options listed on the handout that they think are most essential to have a good quality of life. Tell students not to put their names on these handouts in order to remain anonymous.
3. Collect the handouts.
4. Tally student responses for each choice on the *Pick 5* overhead displayed where students can see it. Place a tally mark in each box for each vote that choice receives.
5. Discuss the results with students:
   - Which choices received the most votes?
   - What do those choices say about students' values?
   - How do you think these choices compare to the average U.S. youth? (80% of youth ages 12-24 say that having lots of close friends is important.[1])
   - Would your choices look different if you were 30 years older?
   - Do you spend your time and energy according to the things you think will improve quality of life?
6. Divide students into groups of 2-4 students. Ask each group to determine how a person could divide 8 hours of daily "free time" to reflect the class's quality of life goals. Ask each group to draw a pie chart to indicate roughly how those 8 hours should be divided, keeping in mind the class's top five values. (8 hours of "free time" is based on a 24-hour day with 8 hours of sleep and 8 hours of work/school time.)
7. Allow groups to share their ideas. Create a large pie chart on the board or on an overhead to display student ideas.

1 MTV and Social Technologies, "Happiness," www.mtv.com/thinkmtv/research/pdf/MTV_Happiness_FINAL.pdf (accessed May 17, 2010).

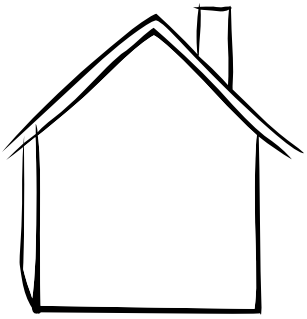


8. Display the graph, *How Americans Spend Their Time,* on an overhead or with a document camera.
9. Use the following questions for a class discussion related to the graph:
   - How does your group's pie chart compare to the graph, *How Americans Spend Their Time?*
   - According to the graph, what is the main activity Americans do outside of work and sleep? (*watch TV*) Does this surprise you?
   - How does American time use compare to your ideas about quality of life? Do you think the ways in which we spend our time contribute positively to our quality of life?
10. Continue the discussion with the following reflection questions, or use one or more of the questions as a prompt for journaling.

Reflection Questions

1. Do you actively try to achieve the five things you said are most essential to your quality of life? (Note: You may want to point out that some "down time" can be beneficial. Many of the goals are long-term in nature, meaning you might not spend time on them every day.)
2. Why might some people not be able to spend time or money on things that would improve their well-being?
3. How do your consumption patterns relate to the five things you said were most important for a good quality of life? How could you consume differently to better meet your quality of life goals?
4. In 2004, the United States accounted for less than 5% of the world's population and 33% of global consumption. The rise in consumption has *not* led to a rise in happiness among U.S. consumers. Only one-third of people in the U.S. report being "very happy," the same fraction as in 1957, when they had half the wealth.[1] If people make more money and own more stuff, why do you think they are not happier? Why might people buy more and more "stuff" if it doesn't make them happier?
5. In what ways does consumption contribute *positively* to quality of life?
6. In what ways does consumption *negatively* impact quality of life?

1 Worldwatch Institute, "Richer, Fatter, and Not Much Happier," January 8, 2004, www.worldwatch.org/node/1785.



7. How might consumption contribute to a better quality of life for some people while reducing the quality of life for others?
8. People whose basic needs are not met may not even consider the quality of life categories discussed in this activity. What are things each of us can do to help provide *all* people with the opportunity to live "the good life"?

Math Extension

What types of activities and things are most important for a good life? Have students create quantifiable indicators for assessing quality of life (for example, number of vacation days per year, or number of family meals per week). They can use these indicators to create, administer, and analyze a quality of life survey. Students could administer this survey to themselves, their peers, and adults in order to determine how each group's quality of life stacks up according to the indicators. A full lesson plan for this activity (called "Livin' the Good Life?") can be downloaded from the book *Engaging Students through Global Issues* at www.facingthefuture.org.

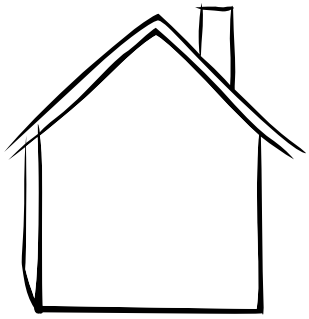
History Extension

Have students create a timeline of consumption in the U.S. or elsewhere in the world. How have the types and amounts of goods we use changed over time? (For example, 70% of the U.S. GDP is attributed to personal consumption.[1] Was it always this way?) What important historical events shaped the types and amounts of things we buy? What factors might change our consumption patterns in the future?

Writing Extension

Ask students to eliminate 1 hour of television time each day for a week and to write a daily journal entry about those missing 7 hours. Did students feel they were missing out on something by losing an hour of TV time each day? How did they spend their extra hour each day? Did anything positive happen as a result?

1 Hoover Institution, Stanford University, "Facts on Policy: Consumer Spending," December 19, 2006, www.hoover.org/research/factsonpolicy/facts/4931661.html.



Additional Resources

- **Website:** www.newdream.org
  The Center for a New American Dream strives to help Americans consume responsibly to protect the environment, enhance quality of life, and promote social justice.
- **Report:** "The Happy Planet Index 2.0"
  Read about how different countries stack up according to the Happy Planet Index, developed by the New Economics Foundation. This index shows how certain nations with high life satisfaction use the planet's resources. http://neweconomics.org/publications/the-happy-planet-index-2.0
- **Video:** *The Cost of Cool: Youth, Consumption, and the Environment*
  The video looks at the pressures of consumerism and how being "cool" can have environmental and social costs. (27 minutes, directed by Michael Tobias)
  www.videoproject.com

Action Project

Have students create a service learning project guide for young people in their community. They can research local organizations that are addressing community needs and contact them to find out what service opportunities they provide for youth. If students need general ideas to get started, they can visit Youth Service America at www.ysa.org. Have students compile the information in a format that is accessible for other young people and share it through a website, local school district, or in a printed resource.

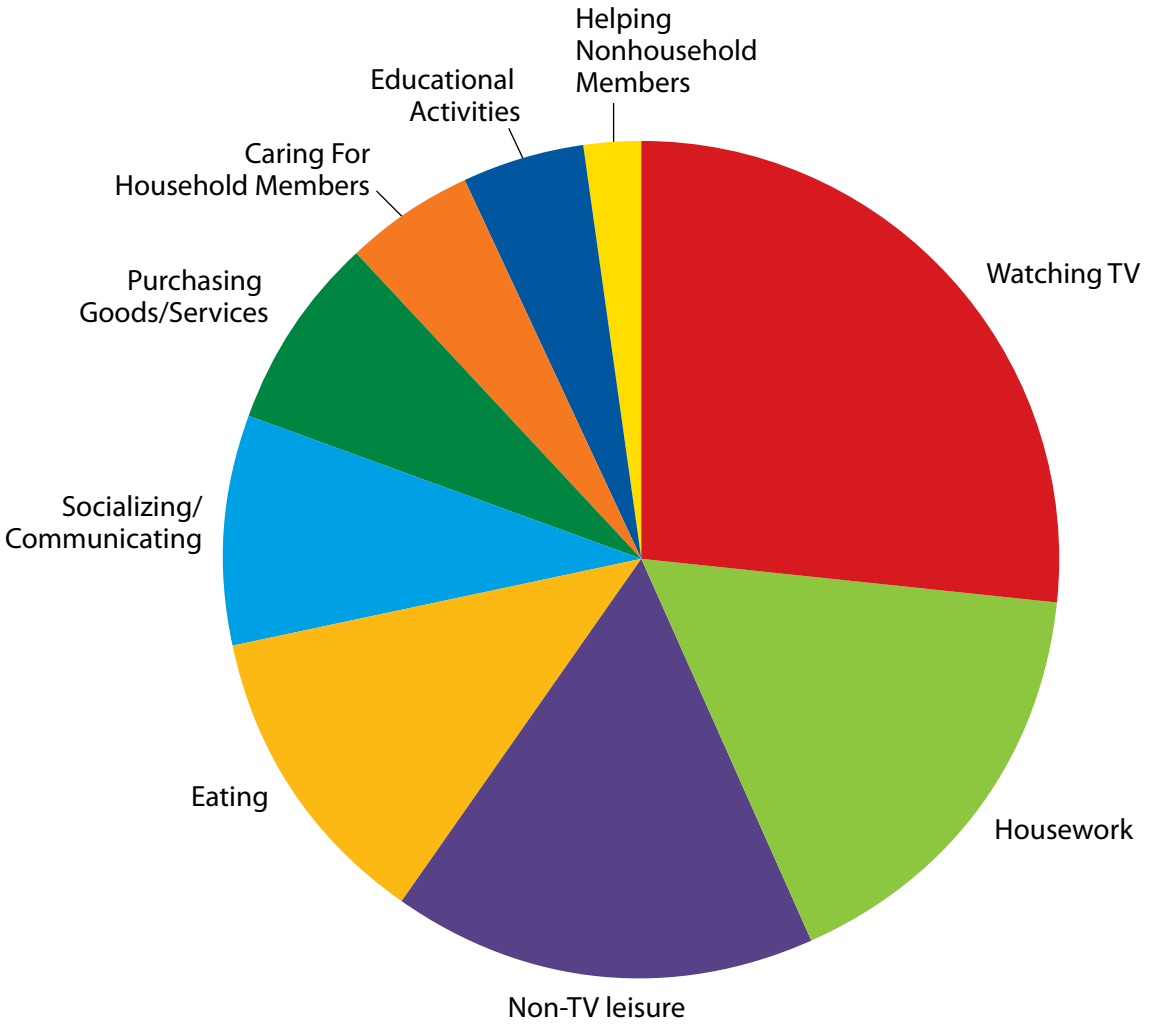
Name Date

Pick 5

In your opinion, which five of the following options are most essential to a good quality of life?

democratic government	**good physical and mental health**	**healthy natural environment**	**spending time with family and friends**
monetary wealth	**having a nice home**	**volunteering or helping others**	**participating in local or national politics**
spirituality/religion	**being famous**	**living in a clean and safe neighborhood**	**time for watching television**
time for hobbies and recreation	**travel and vacation time**	**participating in community events**	**education**
being able to buy nice things	**a rewarding job**	**saving money for retirement**	**peace and security**

How Americans Spend Their Free Time



Notes:

- This graph excludes time spent working and sleeping.
- Information from U.S. Department of Labor, Bureau of Labor Statistics, 2008 American Time Use Survey, www.bls.gov/news.release/atus.nr0.htm. Values are shown for the average daily expenditure of time on particular activities.
- *Housework* includes home, lawn, and garden care.
- *Non-TV leisure* includes sports and exercise, reading and working on the computer for personal enjoyment, listening to and playing music, and playing games.
- *Socializing/communicating* includes both face-to-face socializing and communicating by telephone, mail, and e-mail.
- *Purchasing goods/services* includes shopping and all other activities related to buying goods and services.

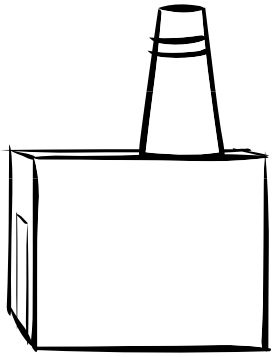
Lesson

It's a Dirty Job

Students take on perspectives

of different stakeholder groups involved in determining how to deal with a community's growing trash. Stakeholder groups are encouraged to form alliances in order to reach consensus on the plan that will be best for the community.

D'ARCY NORMAN, http://www.flickr.com/photos/dnorman/3590939898/



Objectives

Students will:

- Understand economic, social, and environmental factors connected to waste disposal
- Take on perspectives of community stakeholders

Inquiry/Critical Thinking Questions

- What are different options for disposing of or reducing solid waste?
- What are pros and cons of different methods for dealing with consumer waste?
- How does waste from consumer products affect people, environments, and local economies?
- What are sustainable solutions for waste management?

Subject Areas

- Social Studies (Global Studies, Contemporary World Problems, Economics, Civics)
- Science (Environmental, Biology)

Time Required

60 minutes

Key Concepts

waste disposal—the act of getting rid of unwanted items or things that are no longer useful

sustainable design—the practice of creating products, buildings, and communities in such a way that negative impacts on the environment and human health are minimized, while economic benefits are maximized

environmental justice—the fair treatment of all persons in regards to creating and enforcing environmental laws, and the equitable protection of all persons from environmental and health hazards

National Standards Addressed

National Council for the Social Studies

III (People, Places, and Environments)

V (Individuals, Groups, and Institutions)

VI (Power, Authority, and Governance)

VII (Production, Distribution, and Consumption)

VIII (Science, Technology, and Society)

X (Civic Ideals and Practices)

National Science Education Standards

E (Science and Technology)

F (Science in Personal and Social Perspectives)

Additional Vocabulary

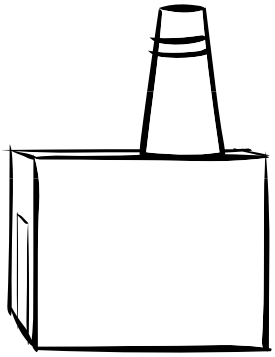
stakeholder—a person who has an interest in something and is affected by its well-being, such as a business or a community

solid waste—trash or garbage

landfill—a place where garbage is buried; a typical landfill is lined with plastic to protect the surrounding soil and groundwater, and new garbage is covered with soil each day

incinerator—a facility in which waste is burned

recycling—the process of turning used materials into new products



Optional Background Reading

- Rachel Tuinstra, "Green Schools Save Money and Energy," *The Seattle Times,* November 15, 2007, http://seattletimes.nwsource.com/html/education/2004015249_greenschools15e.html—A school district in Washington State saved more than $550,000 over a two-year period by doing activities such as reducing waste and recycling more.
- Jesse McKinley, "In California Town, Birth Defects, Deaths, and Questions," *The New York Times,* February 6, 2010, www.nytimes.com/2010/02/07/us/07kettleman.html—A rural farm community in California questions why a number of their children have been born with birth defects. The community is situated close to a 1,600-acre landfill, one of the largest hazardous waste treatment sites in the U.S.

Materials/Preparation

Handout: *Scenario,* 1 per group of 4-5 students

Handout: *Group* worksheets, 1 per group

(Optional) Computer access for showing *Story of Stuff* segment

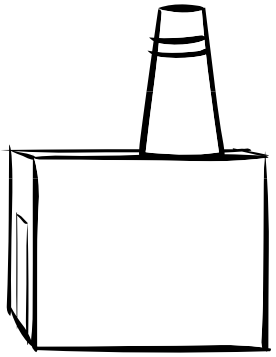
Activity

Introduction

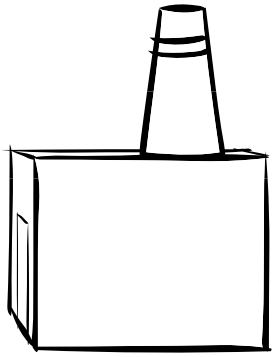
1. Ask students to respond to the following statement with a "thumbs up" (if they agree) or a "thumbs down" (if they disagree): "When I throw something away, I know where it is disposed of."
2. Ask for a thumbs-up volunteer to tell the class where garbage travels after it's thrown away. If no one knows, or if many people responded with a thumbs down, ask student volunteers to conjecture about why they don't know more about their garbage.
3. (Optional) ***Story of Stuff* link:** Show the sixth segment of *The Story of Stuff,* **Disposal** (16:44-19:02)

Steps

1. Tell students that the majority of waste in the U.S. is disposed of in landfills. Ask if anyone can describe what a landfill is. Better yet, has anyone visited a landfill or seen one on TV? *(A landfill is a place where garbage is buried. They are lined with plastic, and dirt is used to cover each day's new garbage. Landfills are different than dumps, which are not lined and not covered with dirt.)*
   - **Option:** Contact the nearest landfill to see if they would allow your students to tour the facility.



2. Distribute one *Scenario* handout to each student. Read through this scenario with the class.
3. Divide the class into groups of 4-5 students. Each student will take on the role of a particular stakeholder group in Ashland. Distribute one *Group* worksheet to each group. (There are six total.)
4. Give students 10-15 minutes to read through the worksheet and respond to the questions with their group members. Encourage students to think of "costs" in a broader sense than only money. What sorts of costs might residents pay that don't have an assigned dollar value?
5. Tell students that today you are the Mayor of Ashland. Each group will present to you their idea for dealing with Ashland's waste. Tell them that you will choose the plan from the group with the most points. Let them know that they will get 1 point for clearly articulating their plan in a compelling manner. They will get additional points for reaching consensus, or agreement, with at least one other group. In order to determine which group(s) they might want to work with, they should take notes on each group's presentation.
6. Allow each group to explain their perspective and share their position in just a few minutes.
7. As teams present, give each team 1 point for clearly articulating their plan in a compelling manner. Mark the points somewhere visible, like a board where everyone can see them.
8. After each group has presented, give students 5-10 minutes to form an alliance with at least one other group. As a result of their alliance, they must reach consensus on a plan to deal with Ashland's waste. This may mean that one or both groups in the alliance will compromise; it may also result in a multi-faceted waste solution. Let students know that they will need to articulate why the alliance was created; they must have a sound reason for doing so.
9. After groups have had enough time to form one or more alliances, ask each allied group to present its revised position. Each group should choose a representative to present its plan and to explain why they allied with the groups they did. Again, you will choose the plan proposed by the largest alliance.
10. As groups present, award points based on the number of valid alliances they were able to make. Give teams 1 point for each group they are able to include in an alliance. (So if one group can achieve consensus with two other groups, those three groups would each get 2 points for this step.)



11. Announce which plan you, as Mayor of Ashland, have decided to go forward with. (This is the plan with the largest alliance backing it. If there are two equal-sized alliances, choose the plan that was articulated the most clearly and persuasively.)

Discussion Questions

1. Was it difficult to achieve consensus? Why, or why not?
2. Who do you think should be responsible for disposing of hard-to-recycle products or those not designed to last long? Consumers? Manufacturers? Governments?
3. How could Ashland have prolonged the life of their current landfill? Are there additional possibilities not addressed by any of the six groups? (e.g., large-scale composting)
4. How could efficient waste management reduce the need for extracting natural resources to make new products?
5. Researchers have found that we often discard very different kinds and amounts of trash than we *think* we do.[1] Why might we have a distorted image of our trash? How could people become more aware about the trash they create?
6. Have you ever heard of the popular waste management strategy: "reduce, reuse, recycle"? Why do you think the words are listed in that order?

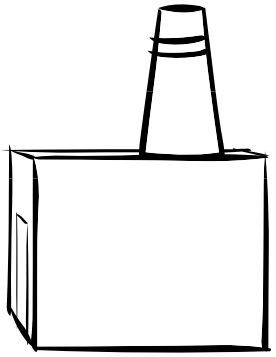
Geography Extension

Where does your trash go? Is there a landfill or incinerator in your community, or is the waste sent elsewhere? Locate the place where your community's trash ends up. Using data from the U.S. Census Bureau's "Population Finder" (www.census.gov), research the following characteristics of the zip code where your community's trash is taken:

- Largest population by race
- Percent of population with a bachelor's degree or higher
- Percent of population that speaks a language other than English at home
- Median household income

How does this compare to surrounding zip codes? To national averages? Ask students to answer this question: Why do you think the landfill or incinerator is located where it is, instead of in a neighboring zip code? If you are able, take a field trip to the site so that students can see where "away" is when they throw trash away.

1 William Rathje and Cullen Murphy, *Rubbish!* (Tucson: The University of Arizona Press, 2001), 67.



Additional Resources

- **Video:** "The Wasteland"
  This *60 Minutes* documentary tracks our recycled computers to China, where they are poisoning local people and environments. A companion online article, "Following the Trail of Toxic E-Waste," also chronicles this story. www.cbsnews.com/stories/2008/11/06/60minutes/main4579229.shtml (12 minutes, 58 seconds)
- **Website:** www.greenschools.net
  The Green Schools Initiative provides information and teaching ideas to "green" your school, including waste and recycling audits.
- **Website:** www.productpolicy.org
  The Product Policy Institute works with local government groups to make producers, rather than taxpaying citizens, responsible for collecting, recycling, and managing waste from their products. This approach to reducing waste is called Extended Producer Responsibility.
- **Video:** "Not in My Backyard: Coal Ash Landfill"
  This Planet Green video documents how a small town in Alabama is divided over whether a toxic coal ash landfill is a health risk or a financial asset. http://planetgreen.discovery.com/videos/focus-earth-not-in-my-backyard-coal-ash-landfill.html (2 minutes, 30 seconds)
- **Video:** "Zero Waste Systems"
  Eco-Cycle, a nonprofit recycling center operating in Boulder, Colorado, explains the concept of zero waste in this informative video. www.ecocycle.org/zerowastevideo/index.cfm (6 minutes, 55 seconds)

Action Project

Americans are piling up more and more e-waste (that is, discarded electronics). Often recycling for these products is not available or ends with the materials being shipped overseas where the toxic materials are dismantled in dangerous working conditions, sometimes even by children. Start by visiting the Basel Action Network (http://ban.org) to learn about responsible e-cycling. Next, research different options for repurposing, repairing, and/or recycling e-waste responsibly in your area. Then hold a community e-waste drive to collect the items and educate citizens about e-waste. Finally, deliver the items to a responsible recycler, a repair shop, or to people who can repurpose them. For example, computers might be useful at a job training center, or cell phones might be used as emergency phones for senior citizens.

Scenario:

You live in Ashland, a community of 325,000 residents. Ashland's current landfill has been filling very quickly, and the landfill manager estimates that in another two years it will be at maximum capacity. Now the community must decide what to do about waste disposal after the landfill is capped and sealed. Some say a new landfill should be built. Others are interested in building an incinerator to burn the trash. Some people think Ashland shouldn't spend much money on waste disposal but instead should invest in reducing waste in the first place.

You can already see this isn't going to be an easy decision. There are lots of things to consider—jobs, environmental health, and cost, just to name a few. The mayor has organized a meeting with various stakeholder groups with the hope that a good plan for dealing with future waste emerges from the meeting. Your stakeholder group must present a well-articulated, compelling plan for dealing with Ashland's waste. Your goal is for the mayor to choose and move forward with your plan.

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Name Date

Group 1: Landfill Workers United

By your calculations, a new landfill could be built for $210,000 per acre. Other people, though, have estimated that costs could run much higher.[1] You have determined that a new 1,000-acre landfill could accommodate your community's trash for the next 100 years. Building such a large landfill would allow you to take in trash from other communities for a fee. Other landfills are charging $14 a yard to take waste.[2] There are 4,840 yards in an acre, so that's a lot of money to help pay for the landfill.

It's really important to support a trash disposal industry in our community, since a lot of people are employed in trash collection and disposal. A larger landfill could employ even more people. Since factories in Ashland have been closing, there are a lot of residents looking for jobs.

One possible hurdle is getting a permit to build such a large landfill in town. The cheapest land is near the homes of Ashland's poorest people. If you have to locate the landfill in a more expensive part of town, the cost will increase significantly. Another option would be to locate the landfill outside the town's limits, but then costs from driving the trucks further will also raise your operating costs. You'd really prefer to locate it in the part of town where property costs are lowest.

The total cost to build this landfill would be $210 million. If you translate the cost to a per-capita figure, that's $646 per resident. While many residents couldn't afford to pay this, you're confident that there's a way to pass along the cost of the new landfill to taxpayers. A couple of years ago the people of Ashland managed to pay for a new bridge that cost $250 million.

You know a lot of people aren't crazy about building another landfill. Although landfills have a plastic liner to protect the surrounding soil and groundwater, it's public knowledge that they eventually break and can leak hazardous materials into the environment.[3]

D'ARCY NORMAN, http://www.flickr.com/photos/dnorman/3590939898/

A bulldozer moves trash at a landfill.

You're hoping to convince people that burying trash in a landfill would be cheaper and cleaner than an incinerator, which is a facility that burns trash. Incinerators pose a risk to public health. Burning trash produces a group of toxic chemicals, including dioxins which can cause cancer.[4]

Questions for Your Group

1. How should Ashland's waste be dealt with?
2. What will be the cost (monetary or otherwise) to taxpayers?
3. Will there be other sources of financial support?
4. Aside from the general public, who will benefit from this plan?
5. What do you think are the major merits of your plan?
6. What do you think critics will say in response to your plan?

1 Elizabeth Royte, *Garbage Land* (New York: Little, Brown and Company, 2005), 75.
2 Royte, 64.
3 Royte, 57.
4 World Health Organization, "Dioxins and Their Effects on Human Health," Fact Sheet No. 225, 2010, www.who.int/mediacentre/factsheets/fs225/en/index.html.

Name Date

Group 2: Waste-to-Energy Enthusiasts

There are 89 waste-to-energy plants in the U.S.; they burn 13% of the nation's garbage.[1] Waste-to-energy plants are incinerators that capture energy from burning trash. A waste-to-energy plant could generate electricity for homes in Ashland, resulting in cheaper electricity bills for Ashland residents. You want to bring this technology to Ashland, where people are looking for ways to lower their electricity bills.

Incinerators reduce the volume of garbage that has to be buried in a landfill. Burning trash can reduce its weight by 75%.[2] Because the ash that results from incineration must be buried in a landfill, you propose that the incinerator be built right next to the existing landfill. You will need to ensure that the landfill has adequate capacity for disposing of the ash over the coming years.

Convincing people to build a waste-to-energy plant won't be easy. No new waste-to-energy plant has been built in the U.S. since 1996. Incinerators face a lot of public opposition because burning trash releases chemicals such as lead, mercury, and dioxins. Lead and mercury can damage the nervous system,[3] and dioxins can cause cancer.[4]

Some people are afraid that building an incinerator will discourage recycling. After all, a waste-to-energy plant runs on trash. People also argue that the amount of energy saved through recycling is greater than the energy generated by burning trash.[5] In Denmark, local governments have created laws to make sure that recyclable materials do not end up in incinerators.[6] You might be in favor of doing something similar in Ashland.

The cost of building an incinerator could run more than $500 million,[7] higher than the cost of a landfill. If the waste-to-energy plant is a publicly owned utility, taxpayers will bear its cost. On the other hand, you could entice a private company to open the plant, lowering the initial costs to taxpayers.

©ISTOCKPHOTO/APHANIUS

Energy can be recovered from trash burned in an incinerator.

Questions for Your Group

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1 Elizabeth Royte, *Garbage Land* (New York: Little, Brown and Company, 2005), 77.
2 Royte, 79.
3 U.S. Department of Labor, Occupational Safety & Health Administration, "Safety and Health Topics: Toxic Metals," www.osha.gov/SLTC/metalsheavy/index.html (accessed May 24, 2010).
4 World Health Organization, "Dioxins and Their Effects on Human Health," Fact Sheet No. 225, 2010, www.who.int/mediacentre/factsheets/fs225/en/index.html.
5 Brenda Platt, Institute for Local Self Reliance, "Resources up in Flames: The Economic Pitfalls of Incineration versus a Zero Waste Approach in the Global South," 2004, p. 25. www.ilsr.org/recycling/upinflames.pdf
6 Elisabeth Rosenthal, "Europe Finds Clean Energy in Trash, but U.S. Lags," *The New York Times,* April 12, 2010.
7 Estimate based on Frederick County Government, "Frederick Regional WTE Facility Bond Size Estimate," www.frederickcountymd.gov/documents/Utilities & Solid Waste Management/Solid Waste Issues & Initiatives/Frederick-Carroll Cost Share Estimate.PDF (accessed May 11, 2010).

Name Date

Group 3: Citizens for Corporate Responsibility

Many of the items available at stores in your community are designed according to the principle of *planned obsolescence*, which means they are designed only to last for a certain amount of time before they break. That's how companies can get people to keep buying new products. In fact, manufactured products and packaging make up 72% of household waste in the U.S.[1] You want to hold companies accountable for the trash they create.

Some communities have already started doing this. For example, the state of Maine passed a law that requires electronics manufacturers to bear the cost of recycling or disposing of items at the end of their useful lives.[2] You propose Ashland should pass a similar law. You think that if enough cities and states adopted this type of law, manufacturers would start making more durable products that don't have to be replaced as often.

If electronics manufacturers alone were held accountable for disposing of electronics waste in Ashland, that could result in a significant reduction of waste. While only a small percentage of the current waste stream is electronic waste, "e-waste" is growing two to three times faster than any other type of waste.[3] Encouraging producer responsibility for other types of consumer goods would reduce waste even further.

Ashland probably still needs a waste disposal facility for some things. Landfill Workers United estimates that a new landfill would cost about $200,000 per acre to build. Your accountant has discovered that the real cost of a new landfill would be closer to $500,000 an acre if all permitting and construction costs are included. It looks like an incinerator would be even more expensive, especially since you still need a landfill for the ash resulting from incineration. According to Recycle Ashland, building a recycling facility would be cheaper than building a landfill or an incinerator.

Some people have expressed concern that companies forced to take back broken goods would simply make items more expensive, thus passing along the burden to consumers. You've thought about that possibility, but considering the average income in Ashland, you doubt that prices could be raised very much. Otherwise, no one would be able to buy luxuries like electronics.

©ISTOCKPHOTO/ILEXIMAGE

E-waste includes discarded computers and other electronics.

Questions for Your Group

1. How should Ashland's waste be dealt with?
2. What will be the cost (monetary or otherwise) to taxpayers?
3. Will there be other sources of financial support?
4. Aside from the general public, who will benefit from this plan?
5. What do you think are the major merits of your plan?
6. What do you think critics will say in response to your plan?

1 Franklin Associates, A Division of ERG, as cited in US EPA, "Municipal Solid Waste Generation, Recycling, and Disposal in the United States, Detailed Tables and Figures for 2008," 2009, Table 23, www.epa.gov/waste/nonhaz/municipal/pubs/msw2008data.pdf (accessed June 11, 2010).

2 National Center for Electronics Recycling, "Laws," www.electronicsrecycling.org/public/ContentPage.aspx?pageid=14 (accessed May 12, 2010).

3 US EPA, "Electronic Waste and eCycling," www.epa.gov/ne/solidwaste/electronic/index.html (accessed May 12, 2010).

Name Date

Group 4: Recycle Ashland

Your organization thinks it's high time to build a recycling facility in Ashland. Building a recycling plant would reduce the community's need for an expensive new landfill or incinerator. Plus, it would save natural resources, cut energy use, and reduce air pollution.[1]

A recycling facility in San Francisco cost $38 million,[2] and another in Indiana cost $8.2 million.[3] If these numbers are any indication, building a recycling plant will be much cheaper than paying for a new landfill or an incinerator, both of which would cost hundreds of millions of dollars. A recycling plant also could employ ten times more people than a landfill or incinerator.[4]

Experts estimate that over 60% of Ashland's waste could be recycled. If Ashland opened its own recycling plant, it could sell the reclaimed materials to help pay to keep the plant operating. One challenge may be finding markets to sell all of the recycled materials to. Items like aluminum and steel are big money makers, but you'll be lucky to break even on glass.[5]

While recycling could become a money-making venture for the city, that's beside the point. Because a recycling facility is much cheaper to build than a landfill or incinerator, it's by far more economical than building a landfill or incinerator.

You will need to educate people about what is recyclable and encourage them to recycle more, which will take money and time. One example of a program that encourages recycling is in the city of Seattle—people are required by law to recycle; those who put recyclables in their garbage may be fined.[6] To further encourage recycling, Seattle provides recycling services free of charge, while residents are charged money for throwing away garbage.[7]

Unfortunately, not all materials can be recycled at this time. That could mean that either a small new landfill will need to be built, or Ashland could pay another community to take its waste.

HDR ENGINEERING, INC. AND J.R. MILLER & ASSOCIATES

Materials are sorted and baled at a recycling facility.

Questions for Your Group

1. How should Ashland's waste be dealt with?
2. What will be the cost (monetary or otherwise) to taxpayers?
3. Will there be other sources of financial support?
4. Aside from the general public, who will benefit from this plan?
5. What do you think are the major merits of your plan?
6. What do you think critics will say in response to your plan?

1 Elizabeth Royte, *Garbage Land* (New York: Little, Brown and Company, 2005), 145.
2 Royte, 263.
3 DeKalb County, "News Release: Transfer Development Corp. to Start Recycling Operation in Waterloo," November 3, 2006, www.dekalbcountyedp.org/pdf_files/Transfer_Development_Corporation.pdf.
4 Royte, 284.
5 Royte, 278.
6 Seattle Public Utilities, "Ban on Recyclables in Garbage," www.seattle.gov/util/About_SPU/Recycling_System/History_&_Overview/Ban_on_Recyclables_in_Garbage/index.asp (accessed May 14, 2010).
7 Seattle Public Utilities, www.seattle.gov/util/ (accessed May 12, 2010).

Name Date

Group 5: Citizens for Environmental Justice

Did you know that the percentage of people of color who live within 3 kilometers of hazardous waste facilities is about two times higher than the percentage of people of color who live 5 kilometers or further away from them? Or that the poverty rate close to a hazardous waste facility is 20%, whereas it is 13% farther away from hazardous waste facilities.[1]

Ashland's current landfill is only a few miles away from a neighborhood where mostly immigrants live. The people who live in this neighborhood are considered "working poor." Most have low-paying jobs, many in factories. Because some of them do not speak English well, and others simply don't have any spare time, these residents have not organized a strong environmental justice campaign. Your group wants to ensure that Ashland's waste no longer ends up near their homes.

Modern landfills are lined with thick plastic so that waste can't contaminate the surrounding soil and groundwater. Unfortunately, these plastic liners don't last forever. Eventually they break and leak leachate (the liquid that comes from our garbage) into soil and groundwater.[2] Despite Ashland's best efforts, hazardous wastes like paint and batteries, as well as everyday items like bleach and nail polish remover, have ended up the landfill, making the leachate toxic. If the plastic liner breaks, you fear that people in the surrounding neighborhood will become ill.

You have similar concerns with building an incinerator. Burning trash in incinerators releases toxic chemicals such as dioxin and mercury. These are known to have serious effects on human health, including cancer.[3] Plus, the toxic ash left over from burning trash still must be taken to a landfill.

You think that if Ashland's leaders vote to build a new waste facility, they should locate it far away from the immigrant community. If that means that it will cost more because the land elsewhere is more expensive, then you think that people who live in wealthier neighborhoods should pay the extra cost through higher property taxes. However, since no one wants pollution in their backyard, you would be in favor of a solution that ensures everyone's safety.

PHOTO BY CRAIG MORSE, www.culturesubculture.com

Community members campaign against a new landfill.

Questions for Your Group

1. How should Ashland's waste be dealt with?
2. What will be the cost (monetary or otherwise) to taxpayers?
3. Will there be other sources of financial support?
4. Aside from the general public, who will benefit from this plan?
5. What do you think are the major merits of your plan?
6. What do you think critics will say in response to your plan?

1 Robert D. Bullard, Paul Mohai, Robin Saha, and Beverly Wright, "Toxic Wastes and Race at Twenty: 1987-2007," 2007, 43, www.snre.umich.edu/sites/webservices.itcs.umich.edu.drupal.snre/files/Toxic Wastes and Race at Twenty Rpt (2).pdf, (accessed June 1, 2010).

2 Elizabeth Royte, *Garbage Land* (New York: Little, Brown and Company, 2005), 57.

3 US EPA, "Taking Toxics out of the Air," 2000, 31 www.epa.gov/airquality/takingtoxics/index.html (accessed June 1, 2010).

Name Date

Group 6: People for Packaging Reform

Your group formed a few years ago when you learned that one-third of Ashland's trash is from packaging. Packaging waste takes the form of boxes, tissue paper, mailing envelopes, packing peanuts, plastic cushioning material, metal cans, and plastic and glass containers. Natural resources like trees, water, and oil are required to create these materials. Using these resources once, only to have them end up in a landfill, is not responsible.

One example of reduced packaging is flat pack furniture; it is designed to fit in the smallest box possible. If a company had to ship a fully assembled chair from Indonesia, where it was made, it would have to put the chair in a giant box. That would mean fewer chairs could fit on the cargo ship that traveled across the ocean to deliver it to the store where it is sold. And cargo ships don't run on air; they use natural resources, too (in this case, diesel fuel made from petroleum).

Reducing the amount of materials that we discard—a concept called *source reduction*—has benefits beyond saving natural resources. Source reduction reduces greenhouse gas emissions (that contribute to climate change) more than any other means of dealing with waste, including recycling.[1]

Also, source reduction would be much cheaper than alternative options. For example, it costs an average of $50 to incinerate a metric ton of garbage and between $10 and $40 to landfill a metric ton.[2] Although it's cheaper than a landfill or incinerator, processing recycled materials also costs money. Source reduction is free!

You propose that Ashland pass a law requiring all manufacturers to use minimal packaging. If a company does not use minimal packaging, it should not be allowed to sell products in Ashland, where residents have to pay to dispose of the packaging.

STILLFRAME.COM

More packaging waste is made from paper than from any other material.

Of course, this doesn't completely solve the problem of dwindling landfill space. Ashland will still need to find a solution for disposing of non-packaging wastes, which likely means investing in one of the following: a landfill, an incinerator, or a recycling facility.

Questions for Your Group

1. How should Ashland's waste be dealt with?
2. What will be the cost (monetary or otherwise) to taxpayers?
3. Will there be other sources of financial support?
4. Aside from the general public, who will benefit from this plan?
5. What do you think are the major merits of your plan?
6. What do you think critics will say in response to your plan?

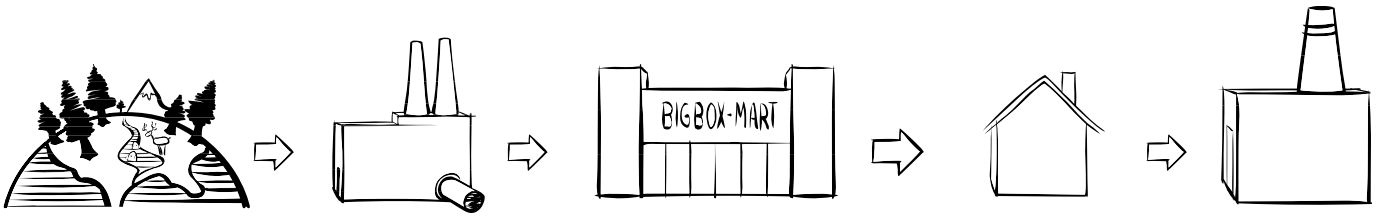
1 US EPA, "Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks," 2006, Executive Summary, 13 http://epa.gov/climatechange/wycd/waste/SWMGHGreport.html (accessed June 1, 2010).

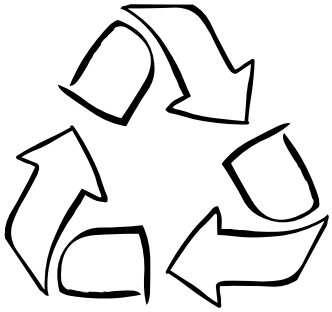
2 Brenda Platt, Institute for Local Self Reliance, "Resources up in Flames: The Economic Pitfalls of Incineration versus a Zero Waste Approach in the Global South," 2004, 11. www.ilsr.org/recycling/upinflames.pdf

Lesson 9

A System Redesign

Students recall the hidden impacts associated with various components of the materials economy (the system of producing and consuming goods). They then brainstorm points of intervention in order to redesign the system. Students work in pairs to determine ways to make the materials economy more sustainable.





Objectives

Students will:

- Critically analyze the sustainability of all major components of the materials economy
- Determine ways to make the materials economy more sustainable

Inquiry/Critical Thinking Questions

- How does the materials economy function as a system?
- What are hidden impacts of the materials economy?
- Where are points of intervention where the materials economy can be redesigned?
- How can we start to shift our worldview and underlying assumptions around consumption?

Subject Areas

- Social Studies (Global Studies, Contemporary World Problems, Economics, Civics)
- Science (Environmental, Biology, Physical, Earth)

Time Required

One 60-minute class period, plus optional time for outside research

Key Concepts

materials economy—the system of extracting raw materials, turning them into manufactured products, and selling them to consumers who use and dispose of them

system—a collection of many interconnected parts that work together; if you change one part, it affects other parts

structural solution—a way in which a component of a system can be changed in order to alleviate a problem

National Standards Addressed

National Council for the Social Studies

I (Culture)

III (People, Places, and Environments)

V (Individuals, Groups, and Institutions)

VI (Power, Authority, and Governance)

VII (Production, Distribution, and Consumption)

IX (Global Connections)

X (Civic Ideals and Practices)

National Science Education Standards

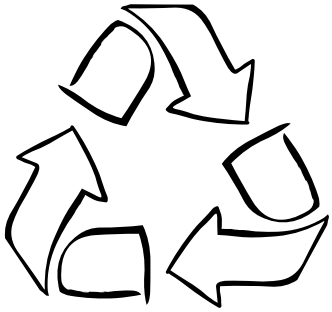
D (Earth and Space Science)

F (Science in Personal and Social Perspectives)

G (History and Nature of Science)

Optional Background Reading

- Leslie Kaufman, "Nudging Recycling from Less Waste to None," *The New York Times,* October 19, 2009, www.nytimes.com/2009/10/20/science/earth/20trash.html—The concept of "zero waste" is becoming more popular across the United States as a solution to reducing the amount of garbage Americans produce.



- Lester Brown, "Redesigning the Materials Economy," Good Planet.info, www.goodplanet.info/goodplanet/index.php/eng/Contenu/Points-de-vues/Redesigning-the-Materials-Economy (accessed March 23, 2010)—How can the materials economy be redesigned to be more compatible with nature? Brown argues that changes to product design, manufacturing processes, and government policies are a few ways of doing so.

Materials/Preparation

Five signs printed in large letters with the following titles and hung around the room: *extraction, production, distribution, consumption, disposal*

Blank index cards, 1 per student

Tape for hanging index cards

Handout: *A System Redesign,* 1 for each group of 2-3 students

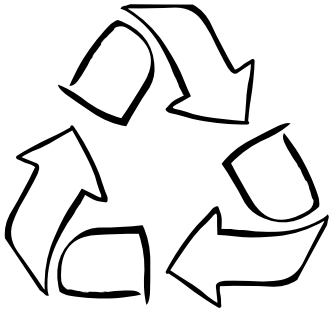
(Optional) Computer access for showing *Story of Stuff* segment

Note: If you are using this curriculum unit in its entirety, this lesson can be used as a summative assessment synthesizing students' knowledge of the materials economy as a system. If students need support in thinking of hidden impacts, brainstorm together as a class all the hidden impacts associated with consumption (from extraction through disposal) that they have learned about over the past 2 weeks.

Activity

Introduction

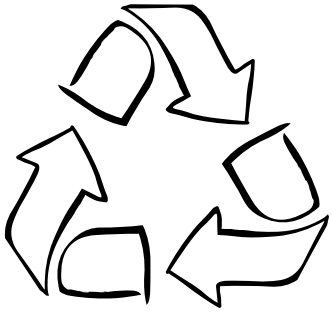
1. Ask students to recall the different components of the materials economy. (The "steps" of the materials economy studied in this unit include extraction, production, distribution, consumption, and disposal. Throughout the materials economy, other components such as individuals, corporations, and governments play a part.)
2. Pass out blank index cards to students.
3. Ask each student to write one negative result of the materials economy on his/her index card.
4. Point to where each of the five signs you prepared are located around the room. Ask each student to determine which of the steps of the materials economy is most directly related to the negative result they listed. Phrased another way, at what stage of the materials economy does this impact occur?
5. Ask students to tape their index cards beneath the signs you hung around the room. Each student should post his/her card where he/she thinks the negative impact occurs or results from.
6. When all index cards have been posted, read aloud the posted impacts for each of the five signs.



7. Ask students: Which part of the system appears to have the most hidden impacts? How might that influence thinking about sustainable changes to the system?
8. (Optional) ***Story of Stuff* link:** Show **Another Way**, the final segment of *The Story of Stuff* (19:00-20:40).
9. Have students briefly consider and discuss the following statement: "The materials economy is a linear system on a finite planet." (This statement is adapted from *The Story of Stuff.*) What is a linear system? In what ways is the planet finite?
   - **Note:** If students are not familiar with the term *system*, review the definition with them. (See Key Concepts section.)

Steps

1. Divide students into groups of 2-3. Pass out the handout, *A System Redesign*, to each group.
2. Give students 10-15 minutes to determine where negative impacts lie along the linear materials economy system and plot this information below the diagram on the handout. These impacts indicate that the system is not sustainable. Students can recall impacts from the introductory activity, or they might think of additional impacts that were not stated.
3. **Option:** Provide them the following impacts discussed in *The Story of Stuff* and in the previous lessons, which they can include in the appropriate place on the diagram:
   - incinerator emissions of toxins like dioxin
   - pollution and carbon dioxide emissions from transportation
   - increased ecological footprint
   - migration to urban slums
   - school dropouts
   - toxics in air and water
   - decreased natural resources
   - toxics in our products
   - accumulation of toxins in consumers
   - low wages and reduced health care benefits for retail workers
   - declining happiness of consumers
   - trash exported to poorer countries
   - credit card debt
   - loss of wildlife habitat
   - unsafe conditions for factory workers
   - more time spent working, less leisure time



4. Ask students to identify at least one thing that drives each step of the materials economy to produce the impacts identified. Have students write these above the diagram on the handout, *A System Redesign*. (As an example, planned obsolescence drives increased consumption.) Allow 5-10 minutes for this activity.
5. For the second part of the handout, students will consider points of intervention where the materials economy could be redesigned. They will read page 2 of the handout and determine how each solution could reduce specific negative impacts of the materials economy.
6. **Option:** Have students do additional research on one of the possible solutions that would make the entire system more sustainable for societies, economies, and environments. Use the sources listed in the Additional Resource section as a starting point for research. Have student groups present to the class their suggestion for one way to improve the sustainability of the materials economy, explaining how the change would affect the overall system.

Discussion Questions

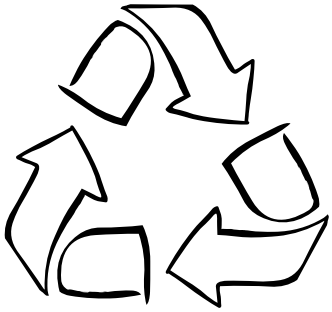
1. Why and how is it helpful to understand the parts of a system and how they interact?
2. Which impacts do you think will be the easiest to solve with available technology and solutions? Which do you think will be the most difficult to solve, and why?
3. Which possible solution do you think would be the most impactful? Which would be the easiest to implement?
4. What role could consumers have in transforming the materials economy?

Writing Extension

Have students create a Bill of Rights for the Materials Economy. They can create specific rights for consumers, workers, all living things, and all persons. To view an example, visit www.newdream.org/consumption/rights.php.

Media Extension

If students have watched *The Story of Stuff,* have them create their own segment for "Another Way" based on their systems redesign. The Story of Stuff website includes ideas for becoming more sustainable consumers (www.storyofstuff.org/anotherway.php). To share student-created video segments with the Story of Stuff Project, e-mail info@storyofstuff.org.



Science Extension

Have student groups design a sustainable product, along with a commercial advertisement showcasing its sustainable features. Students might draw their envisioned product, or they might create a model or prototype. The sustainable product could be a redesign of an existing product or an alternative to existing products. Have students investigate concepts such as cradle-to-cradle design, green chemistry, flat pack or other minimized packaging, and biomimicry to assist with re-envisioning the way things are made.

Action Project

Have students choose the system intervention they believe to be most important in redesigning the materials economy. Students can then create an action plan around this topic, implement it as a class project, and do a service learning project (e.g., a campaign for fair trade, persuasive letters to government officials about government accountability, a zero waste school policy). Increase the impact of your service learning project by involving community members and local media.

Additional Resources

1. **Biomimicry:** Biomimicry Institute, www.biomimicryinstitute.org
2. **Closed loop production:** Clean Production Action, www.cleanproduction.org
3. **Conscious consuming:** New American Dream, www.newdream.org
4. **Consumer labeling:** Forest Stewardship Council, www.fsc.org
5. **Corporate social responsibility:** Corporate Responsibility Coalition, http://corporate-responsibility.org
6. **Cradle to cradle design:** McDonough Braungart Design Chemistry (MBDC), www.mbdc.com
7. **Extended producer responsibility:** Institute for Local Self Reliance, www.ilsr.org/recycling/epr
8. **Fair trade:** The Fair Trade Federation, www.fairtradefederation.org
9. **Government accountability:** The Local Government Commission, www.lgc.org
10. **Green chemistry:** U.S. Environmental Protection Agency, www.epa.gov/greenchemistry
11. **Local living economies:** Business Alliance for Local Living Economies, www.livingeconomies.org
12. **Zero Waste:** "A Citizen's Guide to Zero Waste," www.zerowaste.co.nz/assets/Reports/CitizensGuide.pdf
13. **General solutions:** The Story of Stuff Project, www.storyofstuff.org/anotherway.php

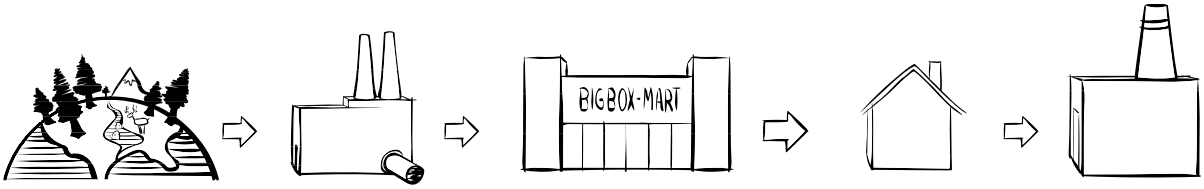
Name Date

A System Redesign, page 1

Below is a diagram of the materials economy, borrowed from *The Story of Stuff*.

Directions:

1. For each step of the materials economy, list any negative impacts *below* that step in the diagram.
2. For each step, identify at least one thing that drives that step to produce the impacts identified. Write this information *above* each step of the diagram.

Extraction	Production	Distribution	Consumption	Disposal
Identify drivers/causal factors:				
				
List negative impacts:				

Name Date

A System Redesign, page 2

What if the materials economy could be redesigned? Where are points of intervention where you would redesign this system?

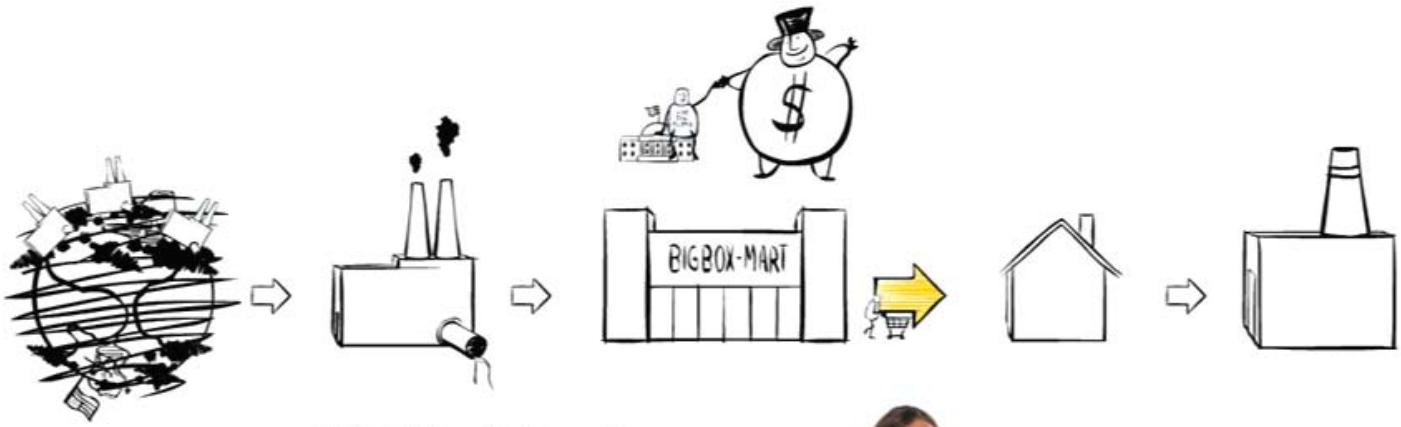
Directions: Review the following possibilities. For each possible solution, determine and list the effects it could have on the materials economy.

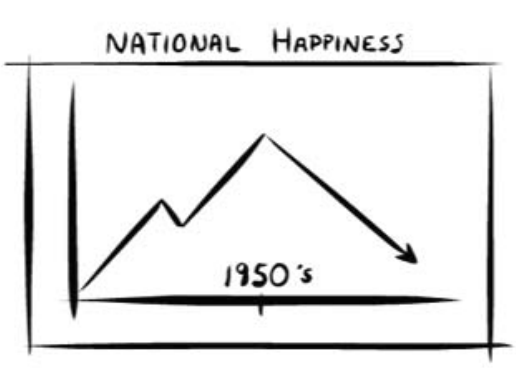
Possible Solution	Impacts
1. biomimicry—the use of models from nature to solve human problems; products are designed according to how things are designed in nature (e.g., energy efficient buildings inspired by termite mounds)	
2. closed loop production—a cyclical system of production in which waste products and energy used in manufacturing are reused, instead of disposed	
3. conscious consuming—an awareness among consumers of how their buying decisions impact the environment, their health, and the well-being of people who create products	
4. consumer labeling—designing product labels to include accurate and detailed information about where and how a product was made, providing consumers directly with information about a product	
5. corporate social responsibility—holding businesses accountable to adhere to ethical standards and international norms (for example, labor laws to protect workers) when creating products	
6. cradle to cradle design—a lifecycle design approach that tries to anticipate the environmental consequences throughout the entire life of a given product; everything in the chain of a product's development, use, and disposal is reused or recycled to create something new	
7. extended producer responsibility—a belief that producers are responsible for reducing waste and toxic materials associated with producing material goods and should therefore be responsible for product disposal and pollution clean-up	
8. fair trade—a system of partnerships between businesses and producers; the Fair Trade Federation ensures all of its members agree to conditions like fair wages, environmental sustainability, and respect for cultural identity	
9. government accountability—government can create incentives, often in the form of tax-based subsidies, for sustainable goods and services, including renewable energy and clean production; governments can also enact and enforce laws designed to protect environmental and human health	
10. green chemistry—the design of manufactured goods by inventing nontoxic chemicals and processes that do not pollute	
11. local living economies—systems that value human and community needs and provide local resources, fair wages, and low environmental impacts for a community; these systems are made of businesses that are owned by people who share in the direct impacts of production	
12. zero waste—the design and management of products and processes to decrease the amount of waste and the toxicity of materials, and to ensure materials are not burned or buried	

Lesson 10

Analyzing the Message

Students critically analyze *The Story of Stuff* by identifying the overall message of the film, persuasive techniques used, and bias. In an extension activity, students further examine data presented in the film, cross-checking references to analyze the accuracy and reliability of the film.





Objectives

Students will:

- Critically analyze a persuasive film
- Determine the accuracy and reliability of a media source
- Identify techniques that can be used to effectively deliver a convincing argument

Inquiry/Critical Thinking Questions

- What are ways to critically analyze media messages?
- How can critical thinking help us make sustainable choices?

Subject Areas

- Social Studies (Global Studies, Contemporary World Problems, Economics, Civics)
- Science (Environmental)
- Language Arts
- Communications
- Journalism

Time Required

45 minutes

Key Concept

media literacy—the ability to access, analyze, evaluate, and create messages in a variety of forms that communicate information

National Standards Addressed

National Council for the Social Studies

III (People, Places, and Environments)

IV (Individual Development and Identity)

V (Individuals, Groups, and Institutions)

VII (Production, Distribution, and Consumption)

VIII (Science, Technology, and Society)

National Science Education Standards

E (Science and Technology)

F (Science in Personal and Social Perspectives)

Additional Vocabulary

bias—a particular tendency, inclination, or prejudice

persuasive techniques—procedures and methods that influence or encourage a person to do something

credible—believable; trustworthy

Materials/Preparation

Computer access to show *The Story of Stuff* (www.storyofstuff.org)

Handout: *The Story of Stuff: A Critical Analysis,* 1 per student

Activity

Introduction

1. Share the following two statements with students and ask them to discuss how the statements differ. Does one sound more accurate than the other? Is one more impressive? Are the two statements mutually exclusive?
   - *"In the United States, we have less than 4% of our original forests left."*
   - *"Between 1920 to 2000, the number of forests in America have actually increased."*
2. Explain to them that the first statement is taken from *The Story of Stuff* and the second one comes from a critique of the film. If you look closely at the statements, they are not mutually exclusive. Both present information in a particular way for a purpose. The first statement refers to the amount of original forests—that is, forests that have never been logged. The second statement refers to total number of forests, including areas that have been logged and replanted.
3. Ask students why it might be important to differentiate between original forests and total number of forests. (*Some ecologists say that original forests perform different ecological services than replanted ones do. New forests have been planted throughout the country. These forests may differ significantly from original forests in terms of genetic and species diversity.*[1])
4. **Option:** Show students the graph from the United States Forestry Service[2] at www.fia.fs.fed.us/slides/major-trends.pdf (see page 2) that was used to support the second statement. Ask them what they can conclude from the graph and if they believe the second statement is an accurate interpretation of the data shown. (*The Forest Service indicates that total forest area has not changed significantly since 1900.*)
5. Ask students why two different people or groups would communicate different facts or statistics. What do you think Annie Leonard's goal was in using the first statement? What do you think the critic's goal was in using the second statement?
6. Explain that using different statistics and facts can represent a person or group's bias or point of view. Critically analyzing different forms of media can help students to determine the purpose of messages and if claims are valid.

1 Dirk Bryant, Daniel Nielsen, and Laura Tangley, "The Last Frontier Forests: Ecosystems and Economies on the Edge," World Resources Institute 1997, http://pdf.wri.org/last_frontier_forests.pdf (accessed April 1, 2010).

2 This summary of forest trends from the Forest Inventory and Analysis National Program is based on the report, "Forest Resources of the United States, 2002," www.ncrs.fs.fed.us/pubs/viewpub.asp?key=1987 (accessed April 1, 2010).

Steps

1. Distribute one copy of the handout, *The Story of Stuff: A Critical Analysis,* to each student. Explain that they will use this handout to critically analyze *The Story of Stuff.*
2. Read through the questions in the handout together as a class so that students know what questions they will need to answer after viewing the film. If students are unsure about the meaning of any questions, allow them to ask clarifying questions.
3. Show the video *The Story of Stuff* (www.storyofstuff.org) in its entirety. You may want to encourage students to take notes during the video as they hear possible answers to the questions on the handout.
   - **Option:** Provide students with the annotated script available at www.storyofstuff.org.
4. After watching *The Story of Stuff,* give students 10-15 minutes to work through the handout.
5. Review student answers together, pausing briefly to discuss any differences of opinion.
6. Conclude with a discussion using one or more of the following questions.

Discussion Questions

1. Why is it important to critically analyze any media, from newspaper articles to advertisements?
2. What sorts of criteria could you use to determine whether an author or media source is credible?
3. Overall, what are the strengths of Annie's argument? What are the weaknesses?
4. If you wanted to deliver a message similar to the one presented in *The Story of Stuff,* how would you do it? What form of media would you use, and why?
5. How might ethics (moral principles or culturally established rules of conduct) be related to creating and sharing messages with others?
6. What power and authority does (or should) government have over media?

Research Extension

Challenge the class to identify statements from the video that they are not sure about. Are there statements they do not understand? Are there some statements that sound unbelievable? Could there be multiple interpretations of the data used? Then have students research these statements further to determine whether they think the information Annie presented is credible.

Writing Extension

Have students write a response to a review of *The Story of Stuff* in the form of an editorial. In their editorials, students should explain whether they agree or not with a particular point of view and why.

To see reviews of *The Story of Stuff,* students can visit the Story of Stuff website (www.storyofstuff.org). They can go to the Press Room and the Blog to read praises and criticisms of the video, or start with any of the links provided below. It might be helpful for students to analyze the responses to the film according to the questions from the lesson handout, *The Story of Stuff: A Critical Analysis.*

- Glenn Beck (September 22, 2009)—www.glennbeck.com/content/articles/article/198/30932/
- Fox News (May 14, 2009)—www.foxnews.com/story/0,2933,520207,00.html
- *The New York Times* (May 10, 2009)—www.nytimes.com/2009/05/11/education/11stuff.html

Action Project

Have students create their own version of *The Story of Stuff* for younger audiences (or another audience that might not be reached by *The Story of Stuff*). Their version might be in the form of a video, a book, or a skit. Encourage them to think about key points to include for this audience, as well as what delivery style would most grab their attention. Partner with an elementary school or a community group to deliver students' message about consumption.

Additional Resources

- **Website:** http://listenup.org
  Listen Up! is a youth media network that connects young video producers and their allies to resources, support, and projects in order to develop the field and achieve an authentic youth voice in the mass media.
- **Magazine:** *The New York Times Upfront*
  Articles and opportunities are provided for students to analyze and debate current news items. http://teacher.scholastic.com/scholasticnews/indepth/upfront
- **Article:** "Teaching Media Literacy: Yo! Are You Hip to This?"
  In this article Renee Hobbs defines and explains four key concepts of media literacy. www.medialit.org/reading_room/article211.html
- **Website:** www.freechild.org
  The FreeChild Project website offers a number of resources for youth to become active participants in social change. A page on their website is dedicated to youth media resources.

Name Date

The Story of Stuff: A Critical Analysis

1. What is the overall message of *The Story of Stuff*?

2. What audience do you believe Annie Leonard is trying to reach?

3. What persuasive techniques does Annie use to convince people of this message?

4. Why do you think Annie uses the format of a 20-minute video rather than another format, such as a report, web blog, or poster?

5. What bias does Annie have?

6. Who might disagree with Annie's message? Why do you think they would disagree?

7. What is your analysis of *The Story of Stuff*—do you believe it makes a convincing argument? Explain why you think the video is convincing or not.

8. Has *The Story of Stuff* affected the way you think about consumption? If so, how?

Buy, Use, Toss?: A Closer Look at the Things We Buy, page 1

Student Pre- and Post-Assessment

Multiple Choice

Circle the letter of the correct answer.

1. Which of the following is not one of the three pillars of sustainability?

- **a.** environmental health
- **b.** economic prosperity
- **c.** social well-being
- **d.** emotional stability

2. Which of the following would not be considered an externalized (or "hidden") cost of a product?

- **a.** the reduction of a natural resource base
- **b.** increased asthma and cancer rates from pollution
- **c.** kids dropping out of school to work in factories
- **d.** factories providing fair wages and health care for their workers

3. Which of the following could best be described as a sustainable consumption choice?

- **a.** making and spending as much money as possible on goods and services
- **b.** researching the impacts on people and the environment when making a purchase
- **c.** buying products only if they are endorsed by famous people
- **d.** writing to a business convincing them to make more of your favorite product

4. Which of the following could be a barrier to improving quality of life?

- **a.** unsafe working conditions
- **b.** a democratic government
- **c.** good physical and mental health
- **d.** volunteering or helping others

5. Which one of the following is not a solution when considering a redesign of the materials economy?

- **a.** green chemistry
- **b.** closed loop production
- **c.** toxics in air and water
- **d.** extended producer responsibility

6. What role can a government play in creating a sustainable materials economy?

- **a.** enforcing corporate social responsibility
- **b.** convincing people to buy more products and services
- **c.** creating labor laws that pay workers low wages to attract foreign companies
- **d.** extracting unlimited natural resources

Buy, Use, Toss?: A Closer Look at the Things We Buy, page 2

Student Pre- and Post-Assessment

Vocabulary

7. Define each of the following steps of the materials economy.

a. extraction: _____

_____

_____

_____

b. production: _____

_____

_____

_____

c. distribution: _____

_____

_____

_____

d. consumption: _____

_____

_____

_____

e. disposal: _____

_____

_____

_____

Personal Attitudes and Beliefs

Directions for 8-10: Below each question, circle a number to indicate your response. 1 means never and 10 means all the time.

1 = never 10 = all the time

8. When making consumption choices, how much do you consider impacts on the environment?

1 2 3 4 5 6 7 8 9 10

9. When making consumption choices, how much do you consider impacts on the economy?

1 2 3 4 5 6 7 8 9 10

10. When making consumption choices, how much do you consider impacts on society and people?

1 2 3 4 5 6 7 8 9 10

11. Complete the following sentence:
Two ways I can be a more thoughtful consumer are…

_____

_____

_____

_____

Buy, Use, Toss?: A Closer Look at the Things We Buy

Student Pre- and Post-Assessment

Teacher Master

1. **d**
2. **d**
3. **b**
4. **a**
5. **c**
6. **a**
7. **extraction**—the process of deriving or obtaining natural resources from the land

   production—the process of manufacturing or creating material goods and products

   distribution—the shipment, delivery, promotion, and sale of an item or line of merchandise to individual customers in a region or area

   consumption—the purchase of goods and services for direct use or ownership

   disposal—the process of getting rid of or discarding something

Buy, Use, Toss?

A Closer Look at the Things We Buy