

Talking Trash in Tucson

City of Tucson
Recycling Education Program



City of Tucson Environmental Services
Recycling Info Line: 791-5000 Customer Service: 791-3171

**A Middle School Curriculum
on Recycling**

Talking Trash in Tucson

A Middle School Curriculum on Recycling

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- Students discuss and develop a role-play skit for a hypothetical recycling decision-making scenario to present to their classmates.

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Teacher Background Information

A World of Waste

What is solid waste? Also referred to as trash, rubbish, refuse, or garbage, solid waste means waste material that is not liquid or gas. These lessons focus on municipal solid waste (MSW), which includes household, commercial and institutional waste, but not wastes from mining, agriculture, silviculture, demolition debris, and a variety of sludges. The term “waste” has interesting connotations. It can refer to something leftover or something not used wisely. Much that is considered waste could actually be used wisely.

Solid waste is a serious issue in the United States. The U.S. leads the world in the production of municipal solid waste. Even compared to other wealthy industrialized nations such as Japan or countries in Europe, we generate twice as much solid waste per capita. The average American produces about 4.4 pounds of garbage each day! In 1960, that figure was 2.6 pounds. This is expected to increase to 4.8 pounds per person per day by the year 2010.

Recycling has been growing steadily for over 20 years. From 1980 to 1990, the U.S. almost doubled its recycling rate from 9 percent to 17 percent. In 1995, our country’s average recycling rate was over 25 percent, and by 2000, it was 30 percent. Tucson is way below average. At Tucson’s Los Reales landfill, more than 1,500 tons of garbage arrive every day, much of it recyclable. The City of Tucson spends money to bury material it could be selling to recycling companies. The good news is that the *Tucson Recycles* program (once-a-week trash and recycling collection) diverts more of our waste from the landfill. Eligible households have a 60 or 90 gallon blue barrel for recycling, the types of recyclables accepted has increased,

and all recyclables are collected together, then sorted at a local facility. Tucson’s recycling rate has increased from 9% to 23% since the *Tucson Recycles* program was implemented in 2002. Recycling is much more than an alternate means of waste disposal. Recycling is about conserving natural resources, reducing our use of energy and materials, minimizing pollution, and more.

What are the “Three Rs”?

In a waste reduction context, the “Three Rs” refer to reduce, reuse, and recycle. These are the three most basic, important ways to reduce waste, conserve natural resources, and decrease our impacts on the natural world. Reducing, reusing, and recycling often save money, too.

It is important to recognize that the order cited—reduce, reuse, recycle—is *not* arbitrary. Some people tend to think of recycling as a central focus and of reducing and reusing as less important, but this is not a correct understanding. Reducing is actually the most efficient way to conserve resources. Reusing is second in efficiency. Recycling is important, but is not as efficient as reducing and reusing. Recycling of course involves a cycle. For recycling to be successful, we need to complete the cycle, or “close the loop,” by buying recycled goods. Although confusing, it’s important to learn to distinguish between the “made from recycled” symbol, which is a trio of light chasing arrows on a dark circle background, from the “recyclable” symbol, which is a simple trio of chasing arrows, with no dark background. A “made from recycled” product is actually made from materials that have been used before.



REDUCE

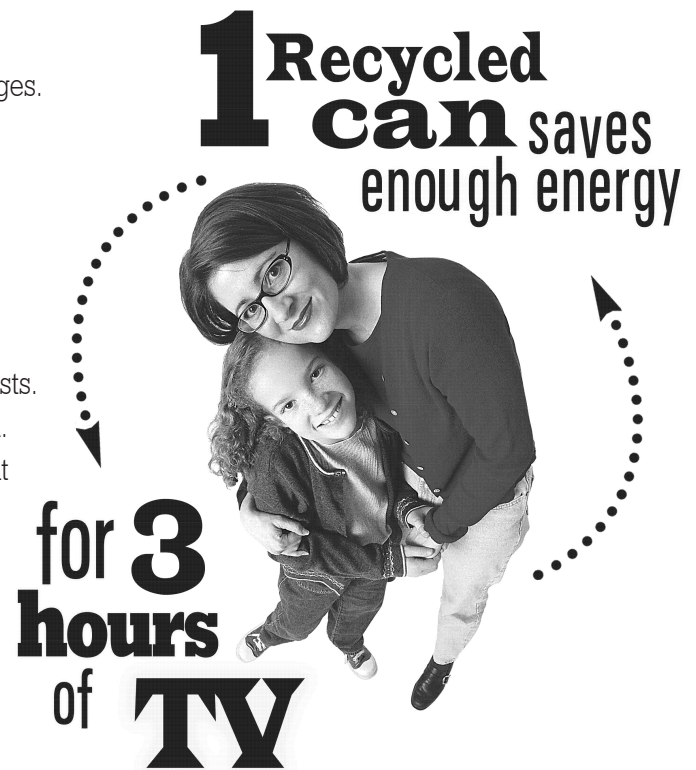
- Prevent waste; buy only what you really need.
- Purchase products you use regularly in large packages.
- Purchase products in less packaging.
- Purchase concentrates and bulk goods.
- Buy products in refillable packaging.
- Borrow, loan, rent, lease, or share when possible (books, tools, etc.).
- Use both sides of paper.
- Take action to get your name deleted from mailing lists.
- Repair instead of replace something broken or worn.
- Buy good quality, durable products fabricated so that they can be repaired.
- Take good care of your things so that they last.

REUSE

- Choose reusable rather than disposable goods (napkins, mugs, razors, sponges, etc.).
- Purchase used goods (furniture, books, music, toys, clothes, etc.).
- Sell or give away goods you no longer want or need.
- Use the back of old paper as scratch paper.
- Use glass jars, plastic tubs, water bottles, lunch bags, etc. again and again.
- Use leftover materials to make something different (scrap lumber to build a bat house or doll house).

RECYCLE

- Recycle as much as possible through community collection programs, either curbside or at drop-off locations.
- Adjust your purchasing habits to buy items in packages that are recyclable in your area.
- Keep an eye out for other special recycling programs, such as opportunities to recycle copier or computer printer cartridges through an office supply, Christmas tree collection programs, and so on.
- Remember to buy recycled! Look for products and packaging with recycled content.
- Help "nature's recycling" by composting kitchen and yard waste.

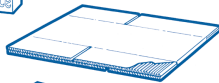
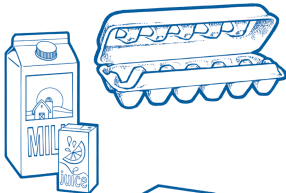
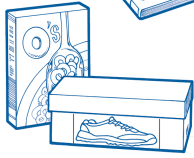
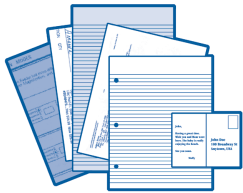


What Can We Recycle?

The *Tucson Recycles* program means that we can recycle a lot in Tucson!
See the list below.

Detailed Blue Barrel Recyclables List:

All these items also accepted at City's 16 neighborhood recycling centers.



- **Paper:** (no need to remove staples or labels)
 - White and colored, coated and non-coated paper
 - Open mail (with non-paper items removed; window envelopes and labels OK)
 - Adding machine tape, accounting ledgers, tabulating and time cards
 - Pamphlets, brochures, advertising flyers, posters
 - Booklets and magazines and catalogs (less than 1/2" thick)
 - Carbonless multi-forms (i.e., NCR paper)
 - Paper from legal, steno, note and message pads; sticky (Post-It) notes
 - Fax and telex sheets, computer and copy paper
 - Manila or pastel file folders (no brown, dark green or neon)
 - Shredded paper in a secured, clear plastic bag (please put white paper in a separate bag if possible; this is the only time plastic bags should go in the recycling container).
- **Paperboard/chipboard**
(like cereal or stationery boxes. Exception: no paperboard with metallic and wax coating)
- **Phonebooks**
- **Fiberboard**
(like paper egg cartons and some packing material)
- **Milk and juice cartons and drink boxes**
(coating is OK because these are very high quality paper)
- **Newspaper and brown bags**
- **Corrugated cardboard**
(flatten and cut as needed to fit in container)
- **#1 and #2 plastic bottles & jugs**
with necks or screw-on lids (no tubs, pails or other plastics)
- **Steel and tin cans**
(including non-hazardous product aerosol cans)
- **Aluminum cans**
- **Glass food and beverage containers**

Reminder:

If it is **not on the list**, or if it takes **too much water to clean**, it goes in the garbage!

The success of *Tucson Recycles* depends on two factors:

- Quality of the recycled materials, and
- Efficiency of the collection.

It is the responsibility of each homeowner to follow these recommendations which allow for the best separation and eventual use of the recycled materials.

Tips:

- Make sure materials are clean, empty and dry and have no food or beverage residue.
- Lightly rinse—throw very dirty items in the garbage.
- All recycling goes into container together—no sorting.
- Do not flatten cans, jugs or bottles; leave labels on.
- Bottle caps can be recycled on or off.
- Put items in container individually, not inside of boxes, plastic bags, etc.
- Please do not overfill container (there is no charge for a second blue recycling barrel).
- Set out the Blue Barrel for collection when it is more than half full. Having the truck stop for nearly-empty containers increases fuel consumption and air pollution.

Do NOT Recycle:

- tissue paper; paper towels; carbon paper; photographic paper; paper plates and cups; paper ream wrappers; blueprints; glued binders
- plastic bags or packaging; plastic chairs, blinds, gutters, toys, etc.
- newspapers with twine, straps or rubber bands
- electronics, computers, rechargeable batteries
- auto parts
- light bulbs, window glass, mirrors, ceramics or crystal
- medical supplies or containers
- construction and finishing materials and products
- herbicide, pesticide, automotive, chemical or other hazardous product containers
- green (yard) waste
- food waste
- pet food bags with plastic lining



Arizona Department of Education Academic Standards

Talking Trash in Tucson addresses the following Academic Standards.

(Complete versions of the Academic Standards are available at <http://www.ade.state.az.us>.)

SCIENCE STANDARDS	ACTIVITY #1	ACTIVITY #2	ACTIVITY #3	ACTIVITY #4
SC06-S1C1-02, SC07-S1C1-01, SC08-S1C1-01 Formulate questions based on observations that lead to the development of a hypothesis.		✓		
SC06-S3C2-01, SC07-S3C2-01, SC08-S3C2-01 Propose viable methods of responding to an identified need or problem.	✓			✓
SC06-S3C2-02, SC07-S3C2-02, SC08-S3C2-02 Compare possible solutions to best address an identified need or problem.	✓			✓
SOCIAL STUDIES STANDARDS				
SS06-S3C4-01 Describe ways an individual can contribute to a school or community.	✓	✓	✓	✓
SS06-S4C5-02 Describe the intended and unintended consequences of human modification (e.g., irrigation, aqueducts, canals) on the environment.	✓			
SS06-S4C5-03 Explain how changes in the natural environment (e.g., flooding of the Nile) can increase or diminish its capacity to support human activities.	✓			
SS06-S5C1-01 Identify how limited resources and unlimited human wants cause people to choose some things and give up others.	✓			✓
SS07-S4C5-03 Describe how humans modify environments (e.g., conservation, deforestation, dams) and adapt to the environment.	✓			
SS07-S4C5-04 Describe the positive and negative outcomes of human modification on the environment.	✓			
SS07-S4C5-07 Compare different points of view and research on environmental issues (e.g., land use, natural resources, wildlife, biomes).	✓		✓	✓
SS07-S5C1-01 Identify how limited resources and unlimited human wants cause people to choose some things and give up others.	✓			✓

SOCIAL STUDIES STANDARDS CONT	ACTIVITY #1	ACTIVITY #2	ACTIVITY #3	ACTIVITY #4
SS08-S4C5-03 Explain how changes in the natural environment can increase or diminish its capacity to support human activities.	✓			
SS08-S4C5-03 Explain how technology positively and negatively affects the environment.			✓	
SS08-S4C5-05 Analyze changing ideas and viewpoints on the best use of natural resources (e.g., value of oil, water use, forest management).	✓			
SS08-S5C1-01 Explain how limited resources and unlimited human wants cause people to choose some things and give up others.	✓			✓
SS08-S5C1-05 Describe the impact of the availability and distribution of natural resources on an economy.			✓	
WRITING STANDARDS				
A variety of standards from Strand 1 (writing process), Strand 2 (writing elements) and Strand 3 (writing applications) may be addressed, based on how the activity is assigned by the teacher.	✓			
W06-S3C6-02, W07-S3C6-02, W08-S3C6-02 Write an informational report that includes: a. a focused topic; b. appropriate facts and relevant details; c. a logical sequence; d. a concluding statement; e. a list of sources used.			✓	
READING STANDARDS				
R06-S3C1-06, R07-S3C1-06, R08-S3C1-06 Locate appropriate print and electronic reference sources (e.g., encyclopedia, atlas, almanac, dictionary, thesaurus, periodical, CD-ROM, website) for a specific purpose.			✓	
LANGUAGE ARTS STANDARDS				
LS-E2 Prepare and deliver an oral report in a content area and effectively convey the information through verbal and nonverbal communication with a specific audience.			✓	

WORKPLACE SKILLS STANDARDS				
3WP-R2 Identify changing aspects of the school and community and describe the effects they have on personal decisions.				✓
4WP-R1 Interact positively with other students and work cooperatively as a team member on class projects.				✓

Teacher Note: Pursuing the suggested Extension Activities will allow you to address additional ADE standards in a variety of subject areas.

Lesson 1: **Trash: It Lasts a Long Time!**

At a Glance:

Students complete a worksheet while participating in a class discussion about Tucson's Los Reales landfill and the practices of municipal solid waste management utilized in town. In the activity section of this lesson, students work in small groups to estimate and come to consensus agreement on the length of time it takes specific materials to decompose in a landfill. After considering the alternatives to current waste disposal methods such as reducing, reusing and recycling, students describe their concluding thoughts about waste management practices in our community.

Arizona Department of Education Academic Standards:

Please refer to the Arizona Department of Education Academic Standards section for the ADE standards addressed by this lesson.

Learning Objectives:

Students will be able to:

- ☛ understand the limitations of sending municipal waste to a landfill
- ☛ formulate their best estimate of how long some trash items might last in a landfill
- ☛ work together in a group to come to consensus
- ☛ understand some of the processes and environmental consequences of waste disposal
- ☛ draw conclusions that will direct their personal choices about consumption and waste disposal
- ☛ develop and express an opinion on solid waste management

Trash Talk: Key Words

solid waste management, landfill, decomposition, biodegrade, longevity, trash, garbage, compost, reduce, reuse, recycle

Materials:

- Student Worksheet: *How Long Does Trash Last?* – photocopy one per student
- Overhead Transparency: *Los Reales Landfill, Tucson, Arizona*
- Overhead Transparency: *Trash Decomposition Times*
- Overhead Transparency: *Garbage Longevity*
- Display Materials (Prior to class, collect the items listed below which are sometimes thrown away. The boot and sock can be still 'useful' items from your home. Write this list of items on the board or chart paper.)

<ul style="list-style-type: none"> ■ aluminum can (soda pop can) ■ banana ■ cigarette butt ■ cotton rag ■ glass bottle 	<ul style="list-style-type: none"> ■ leather boot ■ paper bag ■ plastic 6-pack rings ■ plastic jug ■ rubber sole of a leather boot 	<ul style="list-style-type: none"> ■ Styrofoam cup ■ steel-tin can (soup or vegetable can) ■ wool sock
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Lesson 1: Trash: It Lasts a Long Time! (continued)

Procedure:

Part 1: Landfills as a Solid Waste Management Option

1. Direct the students' attention to the display of "trash" items, as noted in the Display Materials list.
Tell students that these items are examples of what is termed "solid waste". Explain that every town or city must have procedures to handle solid waste. In Tucson, solid waste is managed by the City of Tucson's Environmental Services. Ask students to name other items from home or school that may "flow" into the Tucson "solid waste stream". Their suggestions may include any item that is thrown away or recycled.
2. Hand out the student worksheet, *How Long Does Trash Last?* Have students complete the student and class information at the top of the page and write responses for question 1: *List some procedures that your community uses for management of solid waste.* When this has been completed, ask students to share some of their comments. Lead the students to understand that the City of Tucson Environmental Services provides city-wide recycling collection and operates the Los Reales Landfill.
3. Display the overhead transparency, *Los Reales Landfill, Tucson, AZ*, a page of images and information about the Los Reales Landfill site in the southern part of Tucson. Ask students if any of them have ever been to this landfill. Read aloud the text shown on the overhead. Encourage students to express their opinions about landfills, trash and waste management by responding to question 2 on their worksheet: *Describe your impressions of a landfill site.* Ask and discuss the question, *How can we help make landfill space last longer?*
4. Tell students that the materials you have collected are samples of items which are sometimes tossed away and end up in a landfill such as Los Reales. Have students respond to the worksheet questions numbers 3-7:
 3. *What do all the items in the class "trash" collection have in common?*
 4. *What will happen to these items if they end up in the landfill?*
 5. *Which item do you think will take the shortest time to decompose?*
 6. *Will all the items disappear/disintegrate/degrade immediately or will they continue to take up space in the landfill?*
 7. *Which items, if any, will never decompose?*
5. You may wish to let students quietly discuss those questions with each other. After students have all completed their responses to the questions, discuss them as a class.
6. Next, draw students' attention to question 8 on their worksheet, a table including the list of "trash" items in the collection of materials. Instruct students to:
 - Think *on their own* about how long each of the items on the list might last when buried in a landfill.
 - Write in the first column their own "best guess", as a range, for how long each item might take to completely decompose.
7. Point out to students that there is not necessarily a "right answer" because various conditions could result in some items degrading more or less quickly. If time permits, ask students to name some things that could effect decomposition time, such as weather or the amount of moisture or heat inside the landfill.

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Lesson 1: Trash: It Lasts a Long Time! (continued)

Procedure: (continued)

8. When all students have recorded their own "best guesses", arrange students into small groups of 3 to 4 students. Display the overhead transparency, Trash Decomposition Times. Tell each group to use the times displayed on the overhead and come to a consensus agreement about their "best guess" of the decomposition time of each of the items. Students should record these times in column 3. In the fourth column, have students record the numbers 1-13 to correctly sequence the list in order from shortest to longest decomposition time. As groups finish this task, have them talk among themselves about the process of consensus and how best to present their group's list.
9. Ask the groups to share their lists in the sequence they agreed upon. Call on a member of the group to provide the item and the decomposition sequential number. Record this number next to the appropriate word on the board or chart in front of the class. For example, if they call out "sheet of paper -- number 1," write the number "1" after that phrase. Do the same for the other groups. When that activity is completed, draw students' attention to the discrepancies in the list. For example, Why did some groups choose to list the sheet of paper before the banana? At the conclusion of the discussion, reveal to students the best estimates of scientists, who say the following is the most probable sequence:

- | | |
|--------------------------|------------------------------------|
| 1. banana | 8. tin can (soup or vegetable can) |
| 2. paper bag | 9. aluminum can (soda pop can) |
| 3. cotton rag | 10. plastic 6-pack rings |
| 4. wool sock | 11. plastic jug |
| 5. cigarette butt | 12. Styrofoam cup |
| 6. leather boot | 13. glass bottle |
| 7. rubber sole of a boot | |

10. Next, display the overhead of the scientists' approximations listed below:

- banana -- 3 to 4 weeks
- paper bag -- 1 month
- cotton rag -- 5 months
- wool sock -- 1 year
- cigarette butt -- 2 to 5 years
- leather boot -- 40 to 50 years
- rubber sole (of a boot) -- 50 to 80 years
- tin can (soup or vegetable can) -- 80 to 100 years
- aluminum can (soda pop can) -- 200 to 500 years
- plastic 6-pack rings -- 450 years
- plastic jug -- 1 million years
- Styrofoam cup -- unknown? forever?
- glass bottle -- unknown? forever?

Sources: <http://www.blm.gov/education/int/background/packing.htm>
and <http://www.deq.state.or.us/wmc/solwaste/rethinkrecyc/K-3/RRK-308.pdf>

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Lesson 1: Trash: It Lasts a Long Time! (continued)

Procedure: (continued)

11. After you have provided students with data about the longevity of the “trash” items on display, refer students to the last column of the chart for question 8 on their worksheet. Instruct students to record the scientists' estimations in this column.
12. Ask students to share their thoughts as to why they feel their sequence may not agree with the scientists' list. Point out that it is acceptable for scientists to have different conclusions if these are supported by good evidence. Read aloud from the overhead transparency, *Garbage Longevity*, the short summary regarding the research of William Rathje.

Part 2: Options for Waste Management – Reduce, Reuse, Recycle

1. Review the ideas generated in the previous activity regarding trash decomposition time.

Discuss the following questions:

- What does the data (the scientists' approximations of decomposition time) tell you about landfills?
 - Do items continue to degrade and make room for new garbage or will landfills eventually fill up?
 - Do the trash “life spans” say anything to you about the importance of limiting the production of solid waste by a community?
 - What do you know about the solid waste management practices of reducing, reusing and recycling?
 - How are these practices used in your family or community?
2. Refer to the list of “trash” items in Part One of this activity. Ask students to share ideas of how they could use the practices of reducing, reusing or recycling to keep each item from going into a landfill.
 3. Ask students to take out their worksheets from part one of this activity. Have the students record responses to question number 9 on the worksheet:
How would you apply each of these practices in reference to solid waste management?
Give an example of each application.
 - *Reduce:*
 - *Reuse:*
 - *Recycle:*
 4. Instruct students to continue onto number 10 on the worksheet, the “Opinion Essay about a Problem Situation”. Instruct them to describe, in a “letter to the editor”, their opinion about community waste management. Have them use as many facts as they know to support their statements. Students should include the “Trash Talk” key words. If time permits, students could read aloud their essays when completed or during the following class period.

Extension Activities:

- Have students create graphs illustrating the life span of trash items discussed in the activity, either by hand or using a graphing software program.
- Have students create posters to encourage reducing, reusing or recycling. Display those posters where students in the school will see them or in prominent public places, such as the library or a grocery store.

Student Worksheet: *How Long Does Trash Last?*

Name: _____ Class/Period _____ Date _____

Instructions: Read and record a response for each question below as directed by your teacher.

1. List some procedures that your community uses for managing its solid waste.

2. Describe your impressions of a landfill site.

3. What do all the items in the class "trash" collection have in common?

4. What will happen to these items if they end up in the landfill?

5. Which item do you think will take the shortest time to decompose?

6. Will all the items disappear/disintegrate/degrade immediately or will they continue to take up space in the landfill?

7. Which items, if any, may never decompose?

Student Worksheet: *How Long Does Trash Last?* (continued)

8. Complete this chart. In the first column, list your estimate for the time that each item of trash might take to break down in a landfill. Use a range, for example, 3-5 weeks. Then work with your group to agree upon an estimate of time based on time ranges provided by your teacher. Next, number the items in order as agreed upon. Complete the final column at the direction of your teacher.

Your Own "Best Guess" Decomposition Times	Item of Trash	Group Consensus Decomposition Times	Decomposition Order (Shortest to Longest, 1-13)	Decomposition Times as Estimated by "Garbologists"
	aluminum can			
	banana			
	cigarette butt			
	cotton rag			
	glass bottle			
	leather boot			
	paper bag			
	plastic 6-pack rings			
	plastic jug			
	rubber sole of boot			
	Styrofoam cup			
	tin can			
	wool sock			

9. *How would you apply each of these practices in reference to solid waste management? Give an example of each application?*

a. Reduce:

b. Reuse:

c. Recycle:

10. Opinion Essay about a Problem Situation:

Your community will soon fill up the current landfill. Community leaders are searching for another site to develop as a sanitary landfill. The local newspaper is encouraging readers to write a letter to the editor with thoughts and facts about this issue. Describe, in an essay, your opinion about community solid waste management. Use as many facts as you know to support your statements. Include the following "Trash Talk" vocabulary words.

Trash Talk: Key Words

solid waste management, landfill, decomposition, biodegrade, longevity, trash, garbage, compost, reduce, reuse, recycle

Overhead Transparency: *Los Reales Landfill, Tucson, AZ*

Landfills are one option for solid waste management.



The Los Reales Landfill in Tucson, Arizona covers approximately 370 acres. It is located south of Los Reales Road between Craycroft and Swan Roads. This landfill has been managed by the City of Tucson since 1967. About 2000 tons of refuse per day are dumped, compacted and buried in the landfill. It is expected to remain open for at least another 20 years.

A growing city does need a place to dispose of its trash. When the Los Reales landfill is full the city of Tucson will either need to locate another site for waste disposal or pay to have the garbage transported somewhere else. Both of these are expensive options. How can we help make landfill space last longer?

Overhead Transparency: *Trash Decomposition Times*

Instructions: Certain items on your list will take longer to decompose than others. Use times from the following list and write them after the items where your group has decided they fit best.

- **3 to 4 weeks**
- **1 month**
- **5 months**
- **1 year**
- **2 to 5 years**
- **40 to 50 years**
- **50 to 80 years**
- **80 to 100 years**
- **200 to 500 years**
- **450 years**
- **1 million years**
- **unknown? forever?**
- **unknown? forever?**

Overhead Transparency: *Garbage Longevity*

How long will trash last?

Scientists' approximations of how long certain items remain in a recognizable condition in a landfill: (These times will vary depending on soil and moisture conditions.)

- **banana – 3 to 4 weeks**
- **paper bag – 1 month**
- **cotton rag – 5 months**
- **wool sock – 1 year**
- **cigarette butt – 2 to 5 years**
- **leather boot – 40 to 50 years**
- **rubber sole** (of a boot) – **50 to 80 years**
- **tin can** (soup or vegetable can) – **80 to 100 years**
- **aluminum can** (soda pop can) – **200 to 500 years**
- **plastic 6-pack rings – 450 years**
- **plastic jug – 1 million years**
- **Styrofoam cup – unknown? forever?**
- **glass bottle – unknown? forever?**

Sources: <http://www.blm.gov/education/lnt/background/packing.htm>
and <http://www.deq.state.or.us/wmc/solwaste/rethinkrecyc/K-3/RRK-308.pdf>

Read what another researcher discovered:

William Rathje is a "garbologist". He is the founder and Director of the Garbage Project, which conducts archaeological studies of modern trash. This University of Arizona professor and his students have been collecting data about solid waste since 1973. Rathje and his team found newspapers from the late 1970s that were still readable. Rathje's research also shows that for some kinds of organic garbage biodegradation (the rotting process) works for a while and then slows down or stops. For other kinds, it never starts to break down at all. Rathje and his team of garbologists plan to conduct more digs to find out why paper and other organic waste degrade slowly in landfills. "It's not a pleasant task," Rathje says, "but someone has to do it."

Source: <http://www.eia.doe.gov/kids/energyfacts/saving/recycling/solidwaste/landfiller.html>

Lesson 2: Blue Barrel Basics

At a Glance:

In this lesson students review methods of source reduction: reducing, reusing, and recycling. They work together to identify ways to apply these methods to a variety of consumable products. Students gain a better understanding of how the City of Tucson Recycling Program, Tucson Recycles, works by reviewing which recyclables should go into a “Blue Barrel” or be taken to a recycling drop-off location. As a homework assignment, students conduct an “icebox inventory” of recyclables found in a home refrigerator. They present their findings to the class.

Arizona Department of Education Academic Standards:

Please refer to the Arizona Department of Education Academic Standards section for the ADE standards addressed by this lesson.

Learning Objectives:

Students will be able to:

- ☛ identify ways recyclable and non-recyclable materials can be reduced or reused
- ☛ determine items in their home that are accepted recyclables in Tucson
- ☛ conduct an inventory as a research project

Materials:

- ☐ Overhead Transparency: *Tucson Recycles*
- ☐ Student Survey: *Doing the Blue Barrel Role* – photocopy one per student
- ☐ Student Handout: *Recycling Guidelines* – photocopy one per student
- ☐ Student Data Sheet: *Icebox Inventory: Recyclables in the Refrigerator* – photocopy one per student

Procedure:

Part One: What Goes Where?

1. Explain to the students that during this lesson they will be learning how the City of Tucson Recycling Program, *Tucson Recycles*, works and about other methods of source reduction. Explain that their homework will consist of sharing their knowledge of recycling in Tucson via a type of research project called an inventory which they may complete with their family at home.
2. Write the words: “Reduce, Reuse, Recycle” on the board. Review these topics with the class to introduce the concepts of “Reduce” and “Reuse” which should be the first choices used before considering recycling or disposing of an item.
3. Using a paper bag as an example, ask students to name several ways to reduce the need for using the bag (buy less, carry items by hand if not too many, use a cloth bag). Have students also name various methods of reusing the paper bag (bring it back to the store on their next shopping trip, make a mask, use it to hold loose things at home). List their suggestions on the board.

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Lesson 2: Blue Barrel Basics (continued)

Procedure: (continued)

4. Ask, "What would you do with a paper bag that had holes in it or was ripped apart?" Display the overhead transparency, *Tucson Recycles*. Point out that, in Tucson, brown and white paper are both recyclable. When sorted from other recyclables, these are shipped to the same place to be remanufactured and made into cardboard.
5. Ask students if they use a "Blue Barrel" for recycling at home or take recyclables to a neighborhood drop-off location. Point out on the overhead the contact information to obtain a "Blue Barrel" for their home.
6. Tell students that, next, they will have a chance to show what they already know about recycling in Tucson by taking a survey. (Emphasize that this is not a test.) Distribute the student survey, *Doing the Blue Barrel Role*. Discuss the directions with the students, then have them complete the activity. When done, students should check their responses with information listed on the student handout, *Recycling Guidelines*. When all students have completed the survey and checked their answers, spend a few minutes discussing and sharing their responses. Remind students that they cannot recycle hazardous materials in their "Blue Barrels", but they can safely dispose of them through the City/County Household Hazardous Waste program. Instruct students to take the guidelines handout home with them to share with their family.
7. Encourage students to explain what they learned when they were able to check and change their responses. Ask them how this type of learning practice helps them remember information better.

Part Two: Conducting an "Icebox Inventory" as a Research Project

1. Introduce the research method called an inventory - a procedure whereby a person can keep track of specific items for a purpose. Provide examples of who might do this, such as a grocery store clerk who must inventory supplies by writing down the items as they are unloaded from a delivery truck or a biologist who lists the type and number of birds that come to a bird-feeder. Ask students to suggest other examples of things that can be inventoried.

Ask students to think about what type of inventory a recycling researcher might do. Encourage them to explain the purpose of their suggested responses. Lead students to realize that they could investigate the types and quantity of the recyclables in their own home. Ask students to recall the names of some items in their home refrigerator that might be recyclable or non-recyclable. Explain that limiting the inventory to the items only in the refrigerator is one way of controlling the size of the data for an inventory. Review the procedures for conducting a true research project, including the development of a question and hypothesis, data collection procedures, analysis and conclusion.

2. Tell students that this will be the assignment for homework – to take an inventory of containers and packaging items inside their home refrigerator. Differentiate between an old style ice chest or icebox and a refrigerator. Students today will of course have a refrigerator at home. Explain that over 100 years ago, the predecessor to the refrigerator was actually called an "icebox" which contained large blocks of ice which were delivered every few days.

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Lesson 2: Blue Barrel Basics (continued)

Procedure: (continued)

3. Hand out the Student Data Sheet, *Icebox Inventory: Recyclables in the Refrigerator*. Read and discuss the directions so that all students understand the assignment. Be sure students take their Blue Barrel Recycling Guidelines handout home to help complete the investigation successfully.
4. When students return with the previous assignment completed, discuss some of the challenges that they may have faced during their inventory process. Ask for suggestions as to how these might be avoided in the future. Have students share if or how family members may have been involved in their "icebox inventory".
5. Have students present their findings by stating their own conclusions and explaining how their results support their conclusion. Include a discussion of how students can reduce and reuse items so that even less trash needs to be recycled or thrown away. This can be done as a written assignment in class or as an oral presentation to the class.
6. Conclude the discussion by asking students to share their own impressions about reducing, reusing or recycling more. You may also wish to have students review the initial survey, *Doing the Blue Barrel Role*, and discuss and indicate which items they actually do (or will) recycle at home. Emphasize that they do not need to have a Blue Barrel to recycle.

Extension Activities

- Have students create a bar graph using their inventory data and use their graphs to support their conclusions.
- Select common data from the students' investigations for comparison, such as the number of recyclable plastic items or the number/types of non-recyclable items in their home refrigerators. Create a table of this data on the board or overhead transparency. Have students develop a graph of the data. Analyze the results as part of a class discussion or additional assignment.
- Use the Internet to locate the Tucson Recycles website (<http://www.tucsonrecycles.org>) for a list of neighborhood recycling drop-off locations.

Overhead Transparency: *Tucson Recycles*



Recycling & Waste Reduction



Weekly curbside recycling collection is offered to single family homes, duplexes, triplexes, fourplexes, and small businesses with plastic container garbage service. To order a free blue barrel recycling container and find out the recycling schedule for your neighborhood, call 791-3171.

There are also 16 neighborhood drop-off sites, convenient for households without curbside service and small businesses.

Guidelines for blue barrel recycling:

- **Please make sure materials are clean, empty and dry.**
- **Set out your blue barrel for collection when it is more than half full. Having the truck stop for nearly-empty containers increases fuel consumption and air pollution.**
- **Have the barrel out at the curb by 6 a.m. to ensure pick up.**
- **All recyclables go into the blue barrel together – no sorting! Please put them in individually, not inside a box or especially not in a plastic bag.**

Student Survey: *Doing the "Blue Barrel Role"*

Name: _____ Class/Period _____ Date _____

Do you know how to do the "Blue Barrel Role"?

Here's your chance to find out for yourself what you know about using the Blue Barrel recycling program in Tucson.

Instructions:

- a. Place a "Y", for yes, in front of items that you think you can recycle by placing them in a "Blue Barrel".
- b. Place an "N" in front of those items that should not be put in a "Blue Barrel".
- c. When you have finished, use the Recycling Guidelines handout and check your guesses and correct any that need to be changed.

- | | |
|---------------------------------------------|-----------------------------------------------------------------------------|
| ___ 1. white paper | ___ 27. milk and juice cartons |
| ___ 2. regular colored paper | ___ 28. #6 polystyrene (Styrofoam) |
| ___ 3. envelopes | ___ 29. plastic toys |
| ___ 4. neon bright colored paper | ___ 30. foam packing "peanuts" |
| ___ 5. paper towels | ___ 31. brown bags |
| ___ 6. brochures | ___ 32. newspaper |
| ___ 7. advertising flyers | ___ 33. hard foam packing blocks |
| ___ 8. posters | ___ 34. plastic pails |
| ___ 9. neon and dark colored file folders | ___ 35. plastic bags |
| ___ 10. rubber bands | ___ 36. corrugated cardboard |
| ___ 11. magazines | ___ 37. #1 plastic bottles and jugs with necks
or screw-on lids |
| ___ 12. catalogs (less than 1/2" thick) | ___ 38. medical supplies |
| ___ 13. sticky (Post-It) notes | ___ 39. window glass |
| ___ 14. paper plates and cups | ___ 40. yard waste |
| ___ 15. plastic-coated boxes | ___ 41. steel and tin cans |
| ___ 16. fax paper sheets, | ___ 42. non-hazardous product aerosol cans |
| ___ 17. manila file folders | ___ 43. aluminum cans |
| ___ 18. pastel file folders | ___ 44. #2 plastic bottles and jugs with necks
or screw-on lids used oil |
| ___ 19. #2 plastic tubs | ___ 45. used oil |
| ___ 20. foods | ___ 46. aluminum foil |
| ___ 21. shredded paper | ___ 47. foil baking pans |
| ___ 22. uncoated cereal or stationery boxes | ___ 48. glass food and beverage containers |
| ___ 23. phonebooks | ___ 49. construction materials |
| ___ 24. hazardous product containers | ___ 50. auto parts |
| ___ 25. plastic margarine containers | |
| ___ 26. paper egg cartons | |

Answer Sheet for Student Survey: *Doing the "Blue Barrel Role"*

Name: _____ Class/Period _____ Date _____

Do you know how to do the "Blue Barrel Role"?

Here's your chance to find out for yourself what you know about using the Blue Barrel recycling program in Tucson.

Instructions:

- Place a "Y", for yes, in front of items that you think you can recycle by placing them in a "Blue Barrel".
- Place an "N" in front of those items that should not be put in a "Blue Barrel".
- When you have finished, use the Recycling Guidelines handout and check your guesses and correct any that need to be changed.



Items in bold cannot be recycled in Tucson.

- | | |
|--------------------------------------------------|-----------------------------------------------------------------------------|
| ___ 1. white paper | ___ 27. milk and juice cartons |
| ___ 2. regular colored paper | ___ 28. #6 polystyrene (Styrofoam) |
| ___ 3. envelopes | ___ 29. plastic toys |
| ___ 4. neon bright colored paper | ___ 30. foam packing "peanuts" |
| ___ 5. paper towels | ___ 31. brown bags |
| ___ 6. brochures | ___ 32. newspaper |
| ___ 7. advertising flyers | ___ 33. hard foam packing blocks |
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| ___ 15. plastic-coated boxes | ___ 41. steel and tin cans |
| ___ 16. fax paper sheets, | ___ 42. non-hazardous product aerosol cans |
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| ___ 18. pastel file folders | ___ 44. #2 plastic bottles and jugs with necks
or screw-on lids used oil |
| ___ 19. #2 plastic tubs | ___ 45. used oil |
| ___ 20. foods | ___ 46. aluminum foil |
| ___ 21. shredded paper | ___ 47. foil baking pans |
| ___ 22. uncoated cereal or stationery boxes | ___ 48. glass food and beverage containers |
| ___ 23. phonebooks | ___ 49. construction materials |
| ___ 24. hazardous product containers | ___ 50. auto parts |
| ___ 25. plastic margarine containers | |
| ___ 26. paper egg cartons | |



Recycling Guidelines



Only These Items Can Be Recycled:

- **Newspapers** (Newspaper inserts are OK. Please do not leave or place in plastic bags)
- **Brown Paper Bags**
- **Corrugated Cardboard** (Flatten and cut to fit in container. Remove plastic wrappers)
- **Paperboard** (Like cereal and shoe boxes. No metallic or wax coated paperboard)
- **Milk Cartons and Drink Boxes**
- **Fiberboard** (Like paper egg cartons)
- **Magazines and Catalogs** (Less than 1/2 inch thick)
- **Phonebooks**
- **Printing and Writing Paper** (No bright, neon or dark colored paper)
- **Mail** (Envelope windows and labels are OK, remove other non-paper items)
- **Other Paper** (Pamphlets, brochures, Post-It™ notes, file folders, card stock, etc. Shredded paper should be placed in a sealed clear plastic bag* No gift wrap or tissue)
-  **Plastic (PETE) Bottles** (With screw-on lids: soda, water, etc., caps on or off. No trays or baskets)
-  **Plastic (HDPE) Bottles and Jugs** (With necks or screw-on lids: milk, water, juice, liquid detergent, softener, etc., caps on or off. No hazardous materials containers** No tubs, pails, buckets or any other plastics.)
- **Aluminum Cans** (No foil, pie plates/trays or other aluminum)
- **Steel / Tin Cans** (Non-hazardous** aerosol cans are OK. Please no other steel)
- **Glass Food and Beverages Bottles and Jars** (No other glass)

Recycling Guidelines:

NO GARBAGE • NO FOOD LEFTOVERS • NO DIRT • NO YARD TRIMMINGS

CLEAN MATERIAL ONLY • NO HAZARDOUS MATERIALS**

ONLY  &  **PLASTIC BOTTLES & JUGS CAN BE RECYCLED, NO OTHER PLASTICS**

- Please make sure items are clean and empty with no food residue.
- Place items in the recycling container individually, not inside of boxes.
- Remove plastic liners from paperboard boxes.
- No need to flatten bottles and cans or remove labels.

* Clear plastic bags are only to be used for shredded paper.



Please Do Not Recycle:

- Plastic bags or plastic film packaging • Margarine or yogurt tubs • Tarps, toys, garden hoses, clothes hangers
- Hair brushes • Any foam, such as "Styrofoam" or foam rubber • Pet food bags with plastic film lining • Packing peanuts • Food waste • Food service items, such as cups, plates, clamshells • Napkins, paper towel, tissue or diapers • Carbon paper, ream wrappers, photographic paper or blueprints • Books • Newspapers in plastic bags or wrapped in twine • Kitchen utensils • Appliances • Furniture • Auto parts • Tools • Electronics, computers or batteries • Light bulbs, window glass, mirrors or ceramics • Medical supplies, needles, syringes, lancets or other sharp objects • Clothing • Shoes • Yard trimmings • Lumber

** Hazardous materials (pesticides, herbicides, automotive fluids, pool chemicals, etc.) and their containers may be safely disposed of through the City/County Household Hazardous Waste program.

Call 888-6947 for more information.

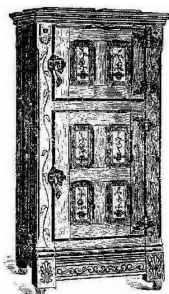
Customer Service 791-3171
Recycling Info 791-5000

Printed on recycled paper.



Student Data Sheet: Icebox Inventory: Recyclables in the Refrigerator

Name: _____ Class/Period _____ Date _____



Two Door Icebox
Sears and Roebuck - 1897

The "icebox" was the name given over 100 years ago to a food cooling unit which held a large block of ice in its upper cabinet. Today we call it the refrigerator and it's usually an electric-powered appliance. Inside are some of the same foods but with a lot more packaging.



As a recycling researcher, you are to take an inventory of all of the container and packaging items in your home "icebox" that may or may not be recyclable. Do not count food items.

Instructions: Use the information below as a guide for designing your investigation. Record the data for each item in the proper columns in the data table below.

Question: (Example: Which type of recyclable is most often found in my home refrigerator?)

Hypothesis: (Example: I think there are more paper products than anything else in my "icebox".)

Type of Material	Tally of Recyclable Items	Total Recyclable Items	Tally of Non-Recyclable Items	Total Non-Recyclable Items
Paper				
Cardboard				
#1 Plastic				
#2 Plastic				
#6 Polystyrene				
Other plastic				
Steel/tin				
Aluminum				
Glass				
Other:				

Conclusion: (Example: My hypothesis was incorrect. There were mostly #1 plastic items.)

On the back of this sheet, list an example of each type of recyclable and non-recyclable item and a way to reduce or reuse it.

Lesson 3: Researching Recyclables

At a Glance:

This lesson provides students the opportunity to follow the pathway of a recyclable material from the gathering and sorting stage through its production and marketing as a re-manufactured product. Following a set of guiding questions, students work individually or in small teams to research and take notes on specific stages of the process. They use only their notes to present their findings to the class. (Internet access recommended.)

Arizona Department of Education Academic Standards:

Please refer to the Arizona Department of Education Academic Standards section for the ADE standards addressed by this lesson.

Learning Objectives:

Students will be able to:

- ☛ explain the importance of producing and purchasing 'made from recycled' products in "closing the loop" in the resource use cycle
- ☛ research, list, define, and explain the steps used in creating a product of their choice from a specific recyclable material

Materials:

- Overhead Transparency: *Tucson Recycles*
- Student Handout: *Tucson, Where Does Your Recycling Go?* – photocopy one per student
- Overhead Transparency: *Environmental Benefits of Recycling*
- Student Worksheet: *Guided Questions for Researching Recyclables* – photocopy one per student
- Books and Internet availability for research on the recycling process
- Several items made from recycled materials (e.g., cardboard, polyester fabric, paper)

Procedure:

Part One: Research Preparation

1. Begin the lesson by writing the following words on the board or chart paper: Collection – Processing – Purchasing. Next, display the overhead transparency, *Tucson Recycles*, and point out the three "chasing arrows" on the Blue Barrel image at the top of the page. Explain that these arrows symbolize "closing the loop" in the sequence of materials use. Emphasize that a successful recycling program needs to include support from producers to use recyclables as resources and from consumers to purchase "made from recycled" products.
2. To further illustrate this process, brainstorm with the students a list of the basic natural resources and the recyclable products that are manufactured using them. List their responses on the board or chart paper. These may include resources such as bauxite (becomes aluminum for soda cans), trees (become paper), oil (becomes plastic), etc.

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Lesson 3: Researching Recyclables (continued)

Procedure: (continued)

3. Next, display a few items that are made from recycled materials such as those listed in the center column on the Student Handout, *Tucson, Where Does Your Recycling Go?*. Ask students to hypothesize which recyclable material was the main resource used to make the display item. Have them explain why they made the choice.
4. Ask students to name some of the potential benefits for using recycled materials to manufacture another product instead of using raw materials. These may include raw materials are saved for future generations, less energy is used to produce from recycled materials or it costs less to manufacture using recyclables.
5. Display the overhead transparency, *Environmental Benefits of Recycling*. Have several students read the text aloud and discuss some of the facts as stated. Ask students if they were a manufacturer, would they buy recycled materials as their primary resource for making their product. Encourage them to express their reasons why or why not.
6. Explain that during the remainder of this lesson the students will be conducting a brief online and/or literature research project focused on the manufacture of a product using a recyclable resource material. Provide note cards for their use. Pass out the Student Worksheet, *Guided Questions for Researching Recyclables* for the students to use while collecting information. Go over these questions aloud with the class to be sure they understand what they will need to do.
7. Have the students work independently or in pairs to research an object or material of their choice. They should gather information on the process of "closing the loop" for their chosen product including how the recyclable resource was collected, processed and re-manufactured. Cost and environmental benefits of the process should also be included.

Part Two: Presentation of Research

1. Provide a limited amount of time for the students to present their research findings to the rest of the class. You may also require them to have at least one illustration or diagram showing the pathway from sorting to processing to the manufacture of the product.
2. During the presentations you may choose to have the students in the audience take notes on specific aspects of each presentation. Students in the audience should use the guiding questions as a reference for these notes.

Extension Activities

- Have students complete a short written report using the note cards that they developed.
- Assign students to create a PowerPoint presentation of the recyclables' path to becoming a new product.

Overhead Transparency: *Tucson Recycles*



Recycling & Waste Reduction



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- **Set out your blue barrel for collection when it is more than half full. Having the truck stop for nearly-empty containers increases fuel consumption and air pollution.**
- **Have the barrel out at the curb by 6 a.m. to ensure pick up.**
- **All recyclables go into the blue barrel together – no sorting! Please put them in individually, not inside a box or especially not in a plastic bag.**

Student Handout: *Tucson, Where Does Your Recycling Go?*

Where Does Your Recycling Go?

Tucson Recycles features an expanded list of recyclable materials, which the City collects from the blue recycling barrels and neighborhood recycling centers each week. These commodities are delivered to Waste Management Recycle America, a local materials recovery facility. There, the materials are sorted, baled and shipped to the manufacturers listed below to be made into new products. From their sale, the City of Tucson's share is approximately \$1,000,000, in addition to the saving of expensive landfill capacity.

Information provided by Recycle America

Commodity	End Product	Company
Cardboard, newspaper, magazines	Cardboard, box board, blank newsprint	Abitibi Consolidated PO. Box 128 Snowflake, AZ 85937
Cardboard	Packaging boxes, box liners, shoe paper (inserted inside new shoes)	McKinley Paper Co. 10501 Montgomery, Ste. 300 Albuquerque, NM 87111
Office paper, white ledger paper, colored paper	Tissue paper, white coating on cardboard	Weyerhaeuser 301 N. 30th St. Phoenix, AZ 85034
Phone books	Building/construction insulation	Green Fiber 601 S. 55th Ave. Phoenix, AZ 85043
Aluminum cans	Can sheet used to make new cans	Anheuser Busch Recycling 3636 S. Geyer Rd. St. Louis, MO 63127
Glass food & beverage containers	Glassphalt	Tucson Ready Mix I-10 at Orange Grove 744-3222
Tin cans	90% made into new steel; 10% sold to copper industry	AMG 1622 22nd Ave. Seattle, WA 98112
#1 PETE plastic bottles & jars	Polyester fiber to make comforters, pillows, clothing or carpet	Wellman Hwy. 41/51N Johnsonville, SC
#2 HDPE plastic bottles & jars	Drainage pipes, flower pots, other plastic items	USA Polymer Corp. 9295 Baythorne Houston, TX
Milk cartons, drink boxes	Writing paper	America Chung Nam 1206 Lexington Ave. Pomona, CA 91766
Chipboard/paperboard (like cereal boxes)	Filler medium for cardboard	America Chung Nam (same as above)

Overhead Transparency: *Environmental Benefits of Recycling*

Environmental Effects of Recycling

Material	Energy Savings with Recycled vs. Raw Material	Environmental Impact with Recycled vs. Raw Material	Natural Resource Savings with Recycled vs. Raw Material	Additional Information
Aluminum	95% energy savings; recycling of one aluminum can saves enough energy to run a TV for 3 hours	Reduces pollution by 95%	4 lbs. of bauxite saved, therefore, less mining, for every pound of aluminum recycled	Enough aluminum is thrown away to rebuild our commercial air fleet 4 times every year
Glass	50% energy savings; recycling of one glass container saves enough energy to light a 100-watt bulb for 4 hours	20% less air pollution; 50% less water pollution	1 ton of glass made from 50% recycled materials saves 250 lbs. of mining waste	Glass can be reused an infinite number of times; over 41 billion glass containers are made each year
Paper	60% energy savings	95% less air pollution; each ton prevents 60 lbs. of air pollution	Recycling of each ton of paper saves 17 trees and 7000 gallons of water	Every year enough paper is thrown away to make a 12' wall from New York to California
Plastic	Producing new plastic from recycled material uses 2/3 of the energy for making them from raw materials	Recycling a ton of plastic saves about as much energy as is stored in 197 gallons of gasoline	If we recycled every plastic bottle we used, we would keep 2 billion tons of plastic out of landfills	We use enough plastic wrap to wrap all of Texas every year
Steel	74% energy savings; every pound of steel being recycled saves enough energy to light a 60-watt bulb for 24 hours	Every year we create 11.5 million tons of ferrous wastes	One ton of recycled steel saves 2,500 lbs. of ore, 1000 lbs. of coal, and 40 lbs. of limestone	Enough iron & steel is discarded in the US to continually supply the nation's automakers

Sources: http://www.umass.edu/recycle/environmental_benefits.html and <http://www.dnr.state.oh.us/recycling/plastics/vsdisposal.htm> and http://www.cce.cornell.edu/~schuyler/recycle/fast_facts.htm

Student Worksheet:

Guided Questions for Researching Recyclables

Name: _____ Class/Period _____ Date _____

Instructions: Refer to the following questions to help guide your research on your chosen recyclable material or object. Develop a set of note cards to record your responses and organize your information. Sources should be cited on the last note card. Number the note cards to match the question that you researched. You will use only these cards when presenting your information in an oral report to the class.

There should be at least one note card for each question. If you are working with a group, the questions should be divided fairly among group members. The group is to decide the order of presentation.

Collection:

1. What are the main raw materials used in making this recyclable item?
2. How much of this item is produced and/or used in any given period of time?
3. How is this item typically disposed?
4. Where should the items go to be recycled?

Processing:

5. What products are made with your material or how is this object used?
6. What are the steps involved in recycling the object/material into the new product?
7. How does using the recyclable material in re-manufacturing benefit the environment?

Marketing:

8. Where is this product usually sold?
9. Who might buy this re-manufactured product?
10. Name and describe a unique invention or common item that is not currently known to you that might be made from recycled content in the future.

Research:

11. Cite the resources used in gathering the above information.

Lesson 4: Recycling – Roles and Responsibility

At a Glance:

In this lesson students are presented with a hypothetical recycling decision-making scenario. Working in cooperative groups of three, each group strives to reach a consensus decision. Each group devises a skit in which members role-play the hypothetical scenario according to their agreement. Summary questions are provided for further group discussion and completion as an assigned writing exercise.

Arizona Department of Education Academic Standards:

Please refer to the Arizona Department of Education Academic Standards section for the ADE standards addressed by this lesson.

Learning Objectives:

Students will be able to:

- ☛ understand how to better negotiate through the process of group consensus
- ☛ clearly state their position on recycling as a personal choice
- ☛ determine when it is appropriate for them to take responsibility for the behavior of others

Materials:

- ☐ Overhead Transparency: *Recycling Scenario* – optional to photocopy one per group
- ☐ Student Worksheet: *Group Planning Sheet* – photocopy one per student
- ☐ Student Worksheet: *Summary Questions* – photocopy one per student

Procedure:

1. Display the overhead transparency, *Recycling Scenario*, and pass out the student worksheet, *Group Planning Sheet*, to each student. Read aloud this hypothetical scenario, along with the two group discussion questions. Explain to students that they will be meeting in groups of three to come to a decision on how to address this personal choice issue.
2. Divide the class into groups of three students. Instruct the groups to come to consensus on the two questions and complete the written responses to them. When this is done, have each group select one of the decisions and create a short skit in which members role-play the individuals described in the scenario.
3. Allow all groups time to complete the planning for the role-play. If time and space is available, encourage them to practice their skits. When all groups are ready, select one group at a time to present their skits to the rest of the class.

Hypothetical Scenario:

A student has just completed a short unit of study on recycling in a school class. As a part of this unit, the student receives a copy of the official city policy on recycling, which recommends the placement of certain items such as newspapers, scrap paper, and metallic and plastic objects in an official city container that is placed curbside each week. The student has become convinced of the importance of and need for recycling as an alternative to discarding items and having them go to the community landfill. This student and the student's family are friendly with their next-door neighbor. The student has
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Lesson 4: Recycling – Roles and Responsibility (continued)

done some minor chores and run errands for this neighbor. While walking to school, the student has observed her neighbor setting out trash containers and notices that they never contain any recyclables. The neighbor’s recycling container is always full. The student is careful at home to recycle all acceptable materials, but the student’s parents only recycle a few items, occasionally, or sometimes not at all.

Questions for Group Discussion and Formation of a Consensus Decision:

1. Should the student approach her parents about recycling? If so, why?
How should she approach them? If not, why not?
2. Should the student approach her neighbor about recycling? If so, why?
How should she approach her neighbor? If not, why not?

Role-Playing:

- Each group member should record the role he/she will assume when role-playing the scenario, as well as notes or comments to be used during the role-play.
- Each group should prepare a skit using role-play to act out the chosen scenario. The presentation should be limited to 3 minutes.

Group member	Role	Group Notes (ideas, words, phrases and points to mention)

4. When groups have all completed their presentations, hand out the student worksheet, *Summary Questions*, for further group discussion and completion for homework if needed. This assignment can be for each student to prepare alone, or each group can be asked to prepare a consensus statement that represents decisions and responses arrived at by all members.

Summary Questions (to be completed after group discussion and presentation):

1. What reasons might the parents have for not recycling? Are these reasons good reasons? Explain.
2. What reasons might the student have for not approaching her parents or neighbor?
Are these reasons good reasons? Explain.
3. What skills and qualities of character are most important in trying to persuade someone to take recycling more seriously? Explain.
4. What are the most important facts and information that the student should have when talking to someone about recycling and waste management?
5. If the city policy requires recycling, rather than merely recommending it, does this change what the student should do? Explain.
6. What other resources might the student have at her disposal in discussions with her parents or neighbor?

(continued on next page)

Lesson 4: Recycling – Roles and Responsibility (continued)

Teacher Background:

This lesson requires students to engage in shared reflection on their convictions concerning a significant issue in society today--recycling. It also requires them to connect what they learn in a school classroom with their daily affairs. In the hypothetical scenario it is clear that the student believes that recycling is important, and she incorporates this in her own treatment of recyclable materials. However, the scenario raises another kind of question - one of responsibility. What responsibility, if any, does one have to attempt to persuade others to share, and act on, that same belief?

An interesting feature of the lesson is that students work together in small groups and are expected to try to reach consensus within their group. This is a valuable activity in its own right, since such cooperative practices are typical of much of what we must do in our everyday and work worlds. Striving for consensus requires listening carefully to others and trying to negotiate differences in ways to respect those whose views may be different. This often results in genuine changes in our thought. Others may bring up important matters that we would not think of on our own. They may challenge one's own conceptions. But this process also exemplifies some of the features of democratic life, especially those that require cooperative action even when there is not full agreement among those who must act together.

At the same time, insisting on consensus, particularly in controversial areas, is not always desirable. A consensus view is not necessarily more likely to be more adequate than a dissenting view. So, students should not be encouraged to think that consensus necessarily determines what is best.

As described in the procedures, this lesson requires groups to role-play attempting to persuade others to recycle. It is quite possible, however, that some groups will reach a consensus that, while the student should try to approach a parent, she should not (or need not) approach the neighbor. Alternately, a group might conclude that the neighbor should be approached, but not a parent. Also, a group might conclude that neither should be, nor need be, approached. For these groups, role-playing the student approaching a neighbor or parent might be difficult (although still worth trying). A possible variation on the lesson would be to allow groups simply to role-play whatever consensus they obtain. For example, the student could be portrayed as discussing with her friends why she is reluctant to approach either a parent or the neighbor. Or, the friends can be portrayed as trying to convince her that she should. And so on.

The final assignment, writing responses to the summary questions, is important because it requires students to put their thoughts on paper--after there has been much exchanging of ideas with others. This will encourage further reflection, and it will encourage students to refine their thoughts even further. This can be a group assignment, requiring an effort to formulate a group consensus statement (although it would be good to allow individual differences to be expressed as well). Alternately, each student could be required individually to write responses to the question.

Extension Activities

- Have students design a brochure which encourages recycling in the school or at home.
- Work in groups to conduct a survey of community members about their values and opinions on alternatives to landfills as a method of municipal waste management.

Source: Adapted from a lesson plan developed by Harvey R. Rabinowitz, Oceanside High School, Oceanside, Long Island, NY., 2000.

Overhead Transparency: *Recycling Scenario*

Hypothetical Scenario:

A student has just completed a short unit of study on recycling in a science class. As a part of this unit, the student receives a copy of the official city policy on recycling, which recommends the placement of certain items such as newspapers, scrap paper, and metallic and plastic objects in an official city container that is placed curbside each week. The student has become convinced of the importance of and need for recycling as an alternative to discarding items and having them go to the community landfill. This student and the student's family are friendly with their next-door neighbor. The student has done some minor chores and has run errands for this neighbor. While walking to school, the student has observed the neighbor setting out trash containers and notices that they never contain any recyclables. The neighbor's recycling container is always full. The student is careful at home to recycle all acceptable materials, but the student's parents only recycle a few items, occasionally, or sometimes not at all.

Student Worksheet: *Group Planning Sheet*

Name: _____ Class/Period _____ Date _____

Instructions: Use the following information as a guide to complete this lesson. Write your responses in the space provided or on additional paper if needed.

Questions for Group Discussion and Formation of a Consensus Decision:

1. Should the student approach her parents about recycling? If so, why? How should he/she approach them? If not, why not?

2. Should the student approach the neighbor about recycling? If so, why? How should he/she approach the neighbor? If not, why not?

Role-play:

- As a group, select one of the above scenarios to role-play.
- In the table below, list each group member and the role he/she will assume when role-playing the scenario; record notes or comments to be used during the role-play.
- Prepare a skit using role-play to act out the chosen scenario. The presentation should be limited to 3 minutes.

Group member	Role	Group Notes <small>(ideas, words, phrases and points to mention)</small>

Student Worksheet: *Summary Questions*

Name: _____ Class/Period _____ Date _____

Instructions: Write your responses to these questions after completing the study group discussion and presentation. Use a separate sheet of paper if necessary.

1. What reasons might the parents have for not recycling? Are these reasons good reasons? Explain.

2. What reasons might the student have for not approaching her parents or neighbor? Are these reasons good reasons? Explain.

3. What skills and qualities of character are most important in trying to persuade someone to take recycling more seriously? Explain.

4. What are the most important facts and information that the student should have when talking to someone about recycling and waste management?

5. If the city policy requires recycling, rather than merely recommending it, does this change what the student should do? Explain.

6. What other resources might the student have at his/her disposal in discussions with parents or neighbor?



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