



OVERVIEW

In this lesson students will learn about the process of recycling through modeling and class discussion. Students will then go on to classify items as recyclable, compostable, reusable or as trash, as well as identify plastics by their identification code. Finally, students will develop an informational flier of recycling opportunities in their area.

Learning Targets

- Students will explain three elements of recycling: collecting recyclable materials, taking old material and making it into new products and buying products made from recycled materials.
- Students will identify and categorize plastic products that are recyclable according to the identifying symbol and number on the product.
- Students will distinguish between multiple ways to recycle by creating an information flier of recycling opportunities in their community.
- Recycling helps to reduce the amount of trash that ends up in the landfill, and it is important for young people to help keep trash from ending up in landfills by finding out whether their city or town offers recycling opportunities.

GLEs

See attachment

Materials Needed

- A variety of plastic containers with recycling symbols
- Glass bottles
- Plastic water bottles
- Detergent bottles
- Cereal boxes
- Newspapers
- Magazines
- Plastic yogurt cups
- Plastic wrap/film
- Banana peel
- Disposable diaper
- Modeling clay (to represent aluminum soda cans)

Background Information

Recycling is the process of collecting used materials and turning them into new products that can be purchased. The three phases of recycling are represented in the recycling symbol that many people equate with recycling. Recycling prevents potentially useful materials from being wasted, as well as reducing energy use and pollution. There are many materials that can be recycled, including paper, plastic, glass, metal, textiles and even electronic equipment. The idea of recycling is not new; history shows that humans have been recycling various materials for thousands of years. The first recorded use of using old paper pulp to make new paper is from Japan in 1031, while evidence exists man's prehistoric ancestors used broken tools and pottery to make new utensils.

Background Information (continued)

There are different ways to collect waste for recycling. These include drop off centers (where waste materials are dropped off at a specified location), buy-back centers (where certain materials are exchanged for money), and curbside collection (where materials intended for recycling are set out and subsequently picked up along streets).

Recycling programs may be single stream or dual stream. A single stream recycling system lets people put all recyclable material into a single container. The advantage of single stream recycling is that it is easy, and therefore has high participation rates. The disadvantage is that it costs more to recycle items using the single stream method. In a dual stream recycling system, materials must be sorted into separate containers before they are recycled (often paper in one, and plastic, metal and glass containers in the other). The advantage of dual stream recycling is that it usually produces better quality products at a lower cost. The disadvantage of dual stream recycling is that many people choose not to recycle when they have to sort materials. In either case, it is important to make sure items are clean and free of debris.

In a single stream recycling system, materials are sorted using machinery and workers. View the following video for an overview of how this works <https://www.youtube.com/watch?v=5YaTpl8nl7c>. Paper is first removed using star disks, followed by big powerful magnets that are used to sort through different types of metals (think about the end of the Toy Story 3 Movie). Glass is removed and crushed into a sand to be sent to glass manufacturers.

Recycling plastic can be more difficult than other materials. This is because each plastic has a different chemical formula. Different types of plastics are labeled by numbers (plastic identification codes), for example polyethylene (PET) is number 1 and polyvinyl chloride (PVC) is number 3. To learn more about recycling symbols, go to <http://www.alliedwastedalycity.com/kids/symbols.cfm>. It is important to buy items that can be recycled, and understanding the plastic identification codes can help consumers do this. If a plastic item does not have one of these codes, it's probably not easily recycled!

Plastic bags are NOT recyclable at curbside pickup. This is because plastic bags easily get caught in the sorting machines at recycling facilities. Many grocery stores have drop offs for plastic bag recycling. To find recycle locations for plastic bags, go to www.plasticbagrecycling.org.

After materials have been collected and turned into new products, it is important to close the recycle loop by buying products made from recycled materials. Products that give a percentage of "post-consumer content" have been made out of recycled materials. Not all goods made out of recycled materials are labeled, however, so it is important to check!

Plastic Identification Codes



PET or PETE: Polyethylene Terephthalate

PET is commonly used for soft drink and water bottles, cooking oil bottles, peanut butter containers. It is the most widely recycled plastic.



HDPE: High-Density Polyethylene

Identifies milk, cider and water jugs, detergent, fabric softener and bleach bottles. HDPE is slightly waxy and semi-rigid. It does not crack. It floats in water.



PVC: Polyvinyl Chloride

Also abbreviated V, PVC is used in salad dressing bottles, vegetable oil bottles and mouthwash bottles. PVC is smooth, scratches easily and sinks in water.



LDPE: Low-Density Polyethylene

LDPE is used in flexible bags for dry cleaning, trash, produce, bread and shrink wrap. Recycled LDPE is often used to make grocery bags.



PP: Polypropylene

PP is usually is found in drinking straws, battery cases, some dairy tubs, bottle labels and caps, and rope. PP stretches into filaments and emits a chemical smell when burned.



PS: Polystyrene

PS and Expanded Polystyrene (EPS) are both number 6 plastics. PS and EPS are commonly used in packaging peanuts and other packaging materials and in plastic utensils and egg trays. PS sinks in water; EPS floats.



Other

Other plastics often are made of multiple resins or layers of different types of plastics. These may include microwave packaging, snack bags and industrial plastics.

ACTIVITY

Note: Send a note home with students a few days before the activity asking them to collect cleaned plastic containers from their homes. Have students bring these containers in on the day of the activity.

Part I (Suggested for grades 1 to 4)

1. Introduce students to the recycling symbol by drawing one on the board. Ask students if they know what the symbol represents. Explain that this is a symbol that represents recycling, and that recycling occurs in three main steps, just like the three arrows on the symbol.
2. Show your class the chunk of modeling clay. Explain that this represents all the aluminum available to make soda cans, aluminum foil, airplanes, etc. Aluminum is a very durable material that can be used over and over again.
3. Ask students if they would like a soda (organic and sugar free of course!). Give each student who raised their hand a piece of the clay. Have students observe how much "aluminum" is left. What will happen as students continue to drink more soda? Continue until all the clay is gone.
4. Ask students to brainstorm how they are going to get more aluminum to make more soda cans. An appropriate student response would be to give their soda cans back to the factory. This is the first step of recycling! Label the first recycling symbol arrow "Collect recyclable materials." (There are several different ways to collect recyclable materials, and this will be covered later). Collect the used "soda cans" from the students.
5. Ask students what the factory should do with all these cans? They should turn them into new ones! This is the second step of recycling, and you can now label the second arrow on the symbol, "Turn used materials into new products." Mash the "soda cans" into a solid clay ball, and divide them out into individual cans.
6. Finally, ask students what they think the last arrow will represent. Thirsty students will want to get a new can of soda — this is the last step of recycling. Label the last arrow of the symbol "Purchase products made from recycled materials." Ask students what happens to the aluminum used to make the cans if any part of the recycle symbol is broken. It winds up in the landfill, and now we have less aluminum!

Part II (Suggested for grades 1 to 4)

1. Now that students are familiar with recycling, it is time to learn about which materials can be recycled.
2. Present students with the items you brought to class and ask them which ones can be recycled, and which ones cannot. The only ones that cannot be recycled are the plastic film, disposable diaper and banana peel.
3. Have students look at how much material could be kept out of the landfill by recycling. Older students can calculate percentages or fractions based on the amount of material that cannot be recycled compared to the total amount of material.
4. What should students do with items that can't be recycled? Have students discuss what can be done about these items, such as composting the banana peel, reducing or not using plastic wrap for food, and using washable diapers.

Part III (Suggested for grades 1 to 4)

1. How can students easily tell if something can be recycled? Most items that can be recycled will have the recycling symbol on it, or will ask them to recycle. However, not all cities are able to recycle the same kinds of materials and students must check with their waste officials to learn what can be recycled where they live. Have students look at the plastic containers they brought to class for the recycling symbol. Many will notice that these symbols have a number included with them.
2. One item that can be confusing to recycle is plastic because not all plastics are made the same way. Plastic codes were developed to make recycling plastics easier. Share the plastic codes provided with this lesson with your class.
3. Have students sort their plastic containers by their code numbers. Of all the plastic codes the students looked at, which one was the most common?
4. The last step of recycling is to purchase items made out of recycled materials. Have students look at their items again, this time looking for the phrase "post-consumer content." Explain that this number can tell students what percentage of the object was made out of recycled materials. Unfortunately, not all manufacturers label their products with post-consumer content, so it is up to students to research what items are commonly made out of recycled materials!
5. Visit these websites to learn more:
<http://www.maine.gov/dep/waste/recycle/whatrecyclablesbecome.html>
http://www.recycleforyourcommunity.com/about_recycling/what_does_it_get_turned_into/
<http://www.recycleeverywhere.ca/what-they-become/>

Part IV (Suggested for grades 2 to 4)

1. Have students explore recycling options in your area.
2. Students should identify if the recycling options are single or dual stream, and who offers them. They may check with local retail or grocery stores, or the online resources provided below.
3. If your city offers recycling services, find out what plastic numbers are recyclable in your area and have the kids sort the plastic items into those that can be recycled and those that can be reused. To find out the services in your area go to <http://search.earth911.com/>
4. Direct students to make an informational flier that can educate their parents and/or other community members about recycling opportunities in the community. Encourage students to share their fliers with friends and family to help others learn about recycling opportunities.

CALL TO ACTION

1. Ask the students if they could imagine only having one trash bag of trash at their house for one entire year? Show the students the video: <https://www.youtube.com/watch?v=yNloyhhHyYA> which features an ABC News story on a family household that works on recycling and reducing in their own home every day.
2. Challenge the class to see if they can reduce the classroom waste for one month. Weigh your classroom waste each week to see whether there is a reduction.
3. Older students can assess what items at school can be recycled and use this information to develop a proposal for a school-wide recycling program. The school may choose to participate in America Recycles Day as part of its efforts.
4. In communities that offer curbside recycling, create a classroom goal to have a 100 percent recycling participation rate from students.

OTHER RESOURCES

- **Keep Louisiana Beautiful** <http://keeplouisianabeautiful.org/>
- **Keep America Beautiful** <https://www.kab.org/>
- **Recycle Bank – an online tool that rewards recycling and learning about recycling** <https://www.recyclebank.com/>
- **Terracycle – online recycling options** <https://www.terracecycle.com/en-US/>
- **Keep America Beautiful's America Recycles Day:** <http://americarecyclesday.org/>
- **"How this Japanese town is working to produce no trash"** <http://thekidshouldseethis.com/post/how-this-japanese-town-works-to-produce-no-trash>
- **Top 10 Recycling Websites for Kids** <http://www.more4kids.info/704/top-10-recycling-websites-for-kids/>
- **Recycling Computer Game** <http://fergusonfoundation.org/hbf-kids-zone/take-out-the-trash/>
- **Show them the Reading Rainbow Video, The Lifecycle of Recyclables.** <http://thekidshouldseethis.com/post/84528738617>