



Title: Be a Recycling Superhero

Grades: Pre K-K

Subjects: Science, Language Arts

Objectives:

- Explain the need to reduce the amount of trash they generate, and describe ways in which they can make changes in their actions to support waste reduction.
- Listen to gain knowledge and share information, perform a task, and converse with an adult or peer.

Standards:

Technology Standard 3: Understand the relationship among science, technology, society and the individual.

- Benchmark # 3: Know that man-made materials, products and systems can affect the environment adversely, yet there are things that can be done to circumvent this process (e.g., disposing of waste properly, reusing objects, recycling, reducing the amount of trash created, composting, shopping green, buying in bulk).

Science Standard 14: Understands how human actions modify the physical environment

- Benchmark #1: Knows how people affect the environment in negative (e.g., litter, pollution) and positive (e.g., recycling, picking up litter) ways.

Language Arts Standard 8: Use listening and speaking strategies for different purposes.

- Benchmark # 1: Make contributions in class and group discussions.
- Benchmark # 2: Ask and respond to questions.
- Benchmark # 5: Use grade level appropriate vocabulary in speech (e.g., terms related to waste reduction and recycling).

Language Arts Standard 6: Uses reading skills and strategies to understand and interpret a variety of literary texts.

- Benchmark #5: Relates stories to his/her own personal experiences (e.g., events, characters, conflicts, themes)

Materials:

- A copy of “Michael Recycle” book by Ellie Bethel
- A sign for each category: Paper, Plastics, Metals, Glass
- Provided worksheet of recycling symbol for teacher to display and students to complete
- Pictures of hard to recycle items (Examples of hard to recycle items include: appliances, batteries, building materials, cell phones, clothing, fluorescent light bulbs, computers, electronics, furniture, ink toner and cartridges, Styrofoam packing, paint, and tires)
- Items for children to classify and sort: aluminum can, aluminum foil, brown paper bag, cereal box, junk mail, white paper, pie tin, newspaper, telephone book, plastic milk jug, plastic soda bottle, various plastic containers, drinking glass, glass bottle, glass jars, corrugated cardboard

Overview: The average US citizen generates approximately one ton of trash annually, but seldom gives it any thought once they throw it away. So what happens to it all? Well, it goes into the waste stream where it is collected and hopefully, disposed of in a manner that least impacts the environment. This process is known as solid waste management.

The Environmental Protection Agency has designed a plan for this process, which they refer to as “integrated solid waste management”, and has identified five ways to properly handle waste materials: a) source reduction and reusing, b) recycling, c) composting, d) converting to energy, and e) burying it in a



sanitary, engineered site. The EPA emphasizes that there is no definitive approach to waste management and encourages communities to combine these five methods to effectively address the issue.

Most recyclable materials are sent to a single stream materials recovery facility. (The term “single stream” refers to the fact that the recyclables are not pre-sorted by the consumer.) Trucks transport the recyclables to the facility, where they are unloaded onto the “tipping floor”. From there they are placed on a conveyor belt and sorted by hand and by machine into the four main recycling categories: a) plastics, b) paper, c) metals, and d) glass. Once sorted plastics are further sorted by color and type. Some facilities use air to separate lighter plastics from heavier ones, while others use optical scanners, or both methods, to separate by type (e.g., PET, HSPE, etc). After sorting, the plastics are baled and sent off to manufacturing plants where they are ground up, washed, melted, and reformed into plastic pellets. These plastic pellets are what is used to make other consumer goods.

Paper recyclables are sorted into four categories: a) corrugated boxes, b) newspaper, c) mixed paper, and d) office mix. These are each baled and sent off to paper mills. Used newsprint, for example, is washed and rinsed and simultaneously has the long and short fibers separated from it. The long fibers are then mixed with wood scraps from lumber mills and together combine to make up pulp. The pulp is then poured onto large rollers, drained, and run through heated rollers. The paper that results is trimmed, rolled onto tubes and sent to printing plants.

Glass recyclables are sorted by color. This may take place before or after crushing the glass, depending on the facility, and sometimes it is shipped without sorting. Once glass is crushed it is cleaned of any debris and contaminants. Then the crushed glass, or “cullet”, is loaded onto trucks and transported to manufacturers. Crushed glass is used for a variety of purposes, including the production of new containers, kitchen counter-tops, and in the construction of roadways. To make new glass containers the recycled, crushed glass is mixed with sand, soda ash, limestone and feldspar. This mixture is then melted down in large furnaces and reformed into new containers. Recycling one ton of glass saves 1330 pounds of sand, 433 pounds of both soda ash and limestone, and 151 pounds of feldspar that would otherwise be used to produce new glass.

Magnets are used to separate steel from other recyclables, and aluminum is separated mechanically using an eddy current. Once separated the steel and aluminum are crushed, baled and sent to processing mills. Aluminum is melted down, and either poured into molds or rolled into sheets, to await use by manufacturers to make new products. Tin and steel require the process of electrolysis to be recovered. Following the recovery they are purified, melted and poured into molds. When it is time to make them into new products, the steel is melted down, poured onto sheets and then coated by the tin before forming. Once these and the other recyclables mentioned above have been processed and transformed into useful items, they are placed back on the shelves for consumers to purchase, and the cycle starts once again.

Recycling guidelines vary by locales and will need to be considered when talking to students about sorting trash.

Kid's Speak: Recycling is the process of reprocessing materials into new items. For example, a plastic bottle can be recycled and emerge as a fleece jacket. If trash is not recycled, it is taken to landfills which are rapidly filling. Eventually more land will be needed for landfills so that land will be unavailable for environmentally friendly use by people, plants, or animals. Items made from glass, paper, aluminum, and plastics can be recycled. Recycling prevents valuable resources from being wasted. These items are sorted and separated into material types. If you are unsure if an item or its packaging material can be recycled, check for the recycling symbol.

Eco-Fact: Water pollution is reduced by 76% and air pollution by 85% when steel is recycled.



Procedure:

Before Recycling Activity:

- Introduce the lesson by asking the question while holding the recycling symbol on provided worksheet, “What this symbol means?” Take answers from students and accept recycling as correct answer. Unfold the sign and show the word recycle to the class. Review or explain what recycling means.
- Show the symbol on several products. Teacher then asks, “What should I do when I see this symbol on a product?” Then answer your own question. “I could throw it in the trash basket, or maybe I could recycle it. What would be the best thing to do?” Answer your own question, giving a few reasons why people should recycle: it reduces waste, saves energy, uses less space in the landfill, reduces pollution, it’s good for the environment, etc.
- Teacher will tell students that she has a book called “Michael Recycle.” This book will help us discover why recycling is a good choice.
- Introduce book and read story.
- Discuss the book.
 - Do you think Michael Recycle was a Superhero? Why? What did Michael Recycle do to help make less trash?
 - What would happen if everyone threw away all of their trash? What kind of problems could this cause?
 - What type of items can we reuse? How can we reuse them?
 - What type of items can we recycle? How do we recycle them?
 - What type of items can’t we reuse or recycle at school? Why?
- Ask students, “Do you think you could be a superhero like “Michael Recycle?” Next explain to students that today we are going to do an activity to get them started.

Recycling Activity:

- Teacher asks, “What types of items can we recycle?” The teacher answers her own question by saying, “Recycling superheroes need to know what materials our items are made of. We will do any activity to sort items that are alike. I have brought some items from my trash for us to sort.” (Note: Teacher may wish to save and reuse these trash items for future lessons.)
- We can recycle many things. However, some items are hard to recycle. Show the students pictures of various items cannot be easily recycled. Examples of hard to recycle items include: appliances, batteries, building materials, cell phones, clothing, fluorescent light bulbs, computers, electronics, furniture, ink toner and cartridges, Styrofoam packing, paint, and tires. Most of these items cannot be cycled at curbside and must be brought to special recycling drop-off centers.
- Explain that the types of materials we will classify or sort fall into these categories: Paper, metals, glass, and plastic.
- Make and display a sign for each category so children can place each item in the proper place.
- Spread out the following items for class classify and sort: aluminum can, aluminum foil, brown paper bag, cereal box, junk mail, white paper, pie tin, newspaper, telephone book, plastic milk jug, plastic soda bottle, various plastic containers, drinking glass, glass bottle, glass jars, corrugated cardboard.
- Guide the class through the classification process giving explanations as needed. Each item will be placed by students near the appropriate category sign.



- Tell students when in doubt look for the recycle symbol. Display the provided sign with the symbol and the word Recycle. Teacher will ask for volunteers to find the recycling symbol on our previously classified items. Point out that plastic items have a number inside the symbol and that number determines how the plastic is sorted in their area. Briefly explain to students the sorting guidelines in their locale and school.

After Learning about Recycling:

- Review why recycling is important and stress that each student can help make a difference. After the activity ask the students the following questions:
- Why is it important to recycle? (items that are not recycled but could be end up in a landfill.)
- How does recycling reduce the amount of garbage that is thrown away?
- Why is it important to stop throwing away so much garbage?
- Do you need to be a superhero to recycle and make good choices? How can you make a difference?
- Explain to students that they are going to make a recycling reminder for their home. Perhaps it could be displayed to remind or encourage family members to start or continue to recycle. Using the provided worksheet, students will color the recycling symbol green. They will trace the word recycle in green crayon or marker. In the center of the symbol students can add their own art to present their own ideas about recycling and to personalize the sign.

After Recycling Activity:

- Color in the recycling symbol and add your own artwork. You could draw a picture of yourself recycling. You can be a superhero if you wish!
- Hang on the refrigerator at home to remind your family to recycle.

Adaptations:

- To hasten lesson pace classifying activity can be done as a demonstration by teacher with students provided verbal responses to which category the item belongs.

Extensions:

- Visit this link on this GEF site for more details about composting.
- For lessons about composting, visit these links on this GEF site:
- Sort the Compost Bin
- Build an Indoor Compost Bin
- Build an Outdoor Compost Heap