Reduce, Reuse, Recycle Activity Kit



Designed to meet these objectives:

Science

- Students will understand that many materials are nonrenewable.
- Students will recognize the importance of conserving natural resources.
- Students will follow written directions.

The Reduce, Reuse, Recycle Activity Kit is a great way to introduce students to the importance of conserving and protecting our environment. The kit includes materials and instructions for 6 hands-on experiments and activities, plus an informative classroom poster. We've also included handy reproducibles and extension activities inside this guide. Students will enjoy the hands-on experiences—and are sure to remember the valuable lessons about the world around us!

What's Included

- 6 activity cards
- Plastic papermaking tray
- Wooden frame and screen (deckle)
- II" x I7" poster
- 2 biodegradability containers with labels
- Interactive double-sided tent board

- 30 sorting cards
- Sorting center
- 30 vocabulary tiles
- Drawstring bag
- Plastic experiment tray with labels

Getting Started: Explaining the 3 Rs

Teaching students about environmental conservation can be a daunting task—there's a huge amount of information available, and sometimes the statistics can be a bit overwhelming or frightening. To help students gain an understanding of what it means to conserve our natural resources and protect our environment—and to show that every person can make a difference—it can be helpful to focus on the 3 Rs: reduce, reuse, and recycle.

Reduce

To reduce means to cut down on the amount of disposable products and energy that you use each day. The idea is to create as little waste as possible. The following are some simple things you can do to reduce:

- Switch from disposable to reusable products, such as food and beverage containers, utensils, cups, plates, and shopping bags.
- Use cloth napkins instead of paper napkins.
- Use cloth towels that you can wash and reuse instead of paper towels that you have to throw away after one use.
- Use bleach-free toilet tissue that is made from at least 80% postconsumer waste.
- Print things from your computer on bleach-free, recycled paper made from postconsumer waste.
- Use a dry-erase message board to write notes for family members instead of paper or sticky notes.
- Buy products in bulk rather than in smaller amounts to cut down on the amount of packaging you throw away. Transfer these products to your own reusable containers.
- Buy products that will last a long time, such as long-life lightbulbs.
- Turn off the water while you are brushing your teeth or putting soap on your face.
- Buy products printed with soy-based ink. Soy-based ink takes less energy to make than standard petroleum-based ink, is better for the environment, and makes it easier to recycle the paper it's used on. (This guide is printed with soy-based ink that has a VOC—volatile organic compound level close to 0%, making it some of the lowest VOC-level ink available.)



To reuse simply means to use again. There are many things we own that can be used more than once...or given to someone else to use. Reusing cuts down on future waste. The following are some simple things you can do to reuse:

- Hold garage or yard sales to allow others to reuse items you no longer want or need. Shop at other people's garage sales to find items you need before buying them new.
- Donate your old clothes to charity organizations.
- Send your family's used cell phones, ink cartridges, and eyeglasses to organizations that reuse these items and donate their profits to charity.
- Use both sides of every piece of paper, if possible, for writing and printing documents from a computer at home or at school.
- Reuse plastic and paper bags.
- Use rechargeable batteries.
- Wash and reuse aluminum foil.

Recycle

To recycle means to make new items out of used or waste materials. It takes a lot less energy to make things out of used materials than it does to start with raw materials taken from the Earth. The following are some simple things you can do to recycle:

- Check your local phone directory to find the location of recycling centers in your community. Once a month, take items that can be recycled to these centers. Check for special collection centers for household hazardous waste products, such as batteries, oil, and paint. Never throw these things in the garbage!
- Set out containers in your home or garage for different types of recyclable products—paper, plastic, and glass. If your community does not provide a weekly collection service for these items, take them to local recycling centers when your containers are full.
- Purchase products that are made from recycled materials whenever possible to support and encourage recycling efforts.
- Start your own compost pile in your yard with food scraps and yard trimmings.

Facts About the 3 Rs

To inspire students to practice the 3 Rs, you may want to share some of the following facts with them:

- The amount of energy saved by recycling just one aluminum can will power a lightbulb for one hour!
- In the United States, we throw away 44 million newspapers a day. That works out to 500,000 trees' worth of paper thrown out every week!
- The average person in the U.S. uses about 70 gallons of water every day.
- A two-minute shower uses about 24 gallons of water.
- One out of every ten lakes, streams, and rivers in the United States is polluted with toxic chemicals and metals.
- 11 million gallons of oil are dumped onto land every three weeks by people changing their own motor oil. This oil seeps into the ground and can find its way into the water supply.
- The average person in the U.S. throws away 3 to 4 pounds of garbage every day.
- Over 60 million tons of paper and cardboard are thrown away every year.
- More than 16 billion disposable diapers are thrown away each year.

Introductory Activity: KWL Chart

As an introduction to the concept of the 3 Rs, create a KWL chart with your class. Divide the class into small groups of 4 or 5 students. Give each group a copy of the KWL reproducible on page 10 of this guide. Ask each group to fill in the "K" and "W" sections on the reproducibles, listing what they already know (K) about the 3 Rs and what they want to find out (W). Bring the whole class back together and ask each group to share their ideas. Record students' ideas on a large class KWL chart that you can keep and add to as you work through the unit. As students learn new things about the 3 Rs, add them to the "L" section on the chart ("What we learned").

Activities Included in the Kit

1. Where Does It Go?

Materials Needed:

- "Reduce, Reuse, Recycle" sorting center
- 30 sorting cards
- "Doing Our Part" reproducible
- Pencil & writing paper

Sorting Card Answers

		9		
I. Recycle	7. Reduce	13. Reduce	19. Recycle	25. Reduce
2. Reuse	8. Recycle	14. Reuse	20. Reuse	26. Reuse
3. Reduce	9. Reduce	Reduce	21. Recycle	27. Reduce
4. Recycle	Reuse	Reuse	22. Reduce	28. Reuse
5. Reuse	II. Reuse	17. Reduce	23. Recycle	29. Recycle
6. Recycle	Recycle	18. Reuse	24. Reuse	30. Reuse
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Place the "Reduce, Reuse, Recycle" sorting center and cards in your science center, along with the activity card and pencils. Have students visit the center with a partner or small group and read the directions on the activity card. Students will then read the information on each sorting card and decide if the action on the card is an example of reducing, reusing, or recycling. They will then place the card in the correct place on the sorting center to reflect their choice.

- Give each student a copy of the reproducible on page II of this guide ("Reduce, Reuse, Recycle: Doing Our Part"). After sorting the cards, have students work together to fill in the three columns on the reproducible with their observations. Send the worksheets home with students and encourage them to share the information with their families. How many of the suggestions from the worksheet can be put into action in their homes?
- You can also complete this activity with the whole class. Have a volunteer choose a card from the pile and read it aloud to the class. Then, ask the class to decide which category on the sorting center the card should be placed on.

2. Paper Trail

Materials Needed:

- "Life Cycle of Paper" tent board
- Venn diagram reproducible
- Pencil

This activity helps students explore what goes into making a sheet of paper—the wheel depicts the process from beginning to end. Students can then see the similarities and differences involved in making new and recycled paper...and understand how recycling can help save both trees and energy.

Place the "Life Cycle of Paper" tent board in your science center, along with the activity card, Venn diagram reproducible, and pencils. Have students visit the center and turn the wheel to discover the process of turning trees into paper. They can then check the wheel on the other side to learn about the life cycle of recycled paper. Students can then read the information on the back side of the activity card to find out why it is important to recycle paper.

• The activity card asks students to create a Venn diagram that compares and contrasts the life cycles of new and recycled paper. On page 12, we have provided a Venn diagram reproducible that you can copy and place in your science center for students to use.

3. What's in Our Trash?

Materials Needed:

- 2 clear plastic containers with lids and labels
- "What's in Our Trash?" reproducible
- Biodegradable trash
- Nonbiodegradable trash
- Soil
- Large spoon
- Newspaper (optional)
- Pencil

NOTE: So that students can easily see the results of the experiment, you may want to take pictures of the containers before and after the experiment.

In this activity, students discover what biodegradable items are and how they break down when disposed of. This is contrasted with what happens to nonbiodegradable items. Students will place trash in clear plastic containers and then observe the changes that occur when they are placed in the sun.

Start by putting the labels on the two plastic containers. Then, help students follow the directions on the activity card to fill up the containers. Pour a thin layer of soil into each container, and then add alternating layers of trash and soil. Make a copy of the reproducible on page 9 of this guide, and write down what you are putting into each jar. That way, you will be able to identify which items broke down and which items did not.

After adding a top layer of soil, add water to make the contents moist. Screw the lids onto the containers and set them in a location that gets plenty of sunlight. Add additional water if necessary to keep the contents moist. Leave the containers in place for four weeks, and then check to see what's happened. Dump the contents out onto newspaper to examine them. (We suggest wearing rubber gloves when doing this—it might get messy!) On the reproducible, have students answer the questions at the bottom of the activity card.

4. Vocabulary Match-Up Game

Materials Needed:

- 15 vocabulary tiles and 15 definition tiles
- "The 3 Rs Crossword" reproducible
- Pencil and writing paper

This activity helps students master 15 different conservation terms. It is a simple Concentration-style memory game in which students match up terms with their definitions. Place the vocabulary and definition tiles at your science center, and ask students to visit in groups of two or three. Have them play the matching game together.

- Make copies of the crossword puzzle on page I4 of this guide and place them in your science center.
 After students have visited the center and played the Vocabulary Match-Up Game, have them take a copy of the crossword back to their desks and complete it.
- After playing, ask students to choose two or three of the terms and write a sentence using each one. Have them draw illustrations to go with each one.
- Use the vocabulary and definition cards with small groups of students. Give students index cards, and have them make flash cards for each conservation term. Place the flash cards on a ring for students to take home or keep at their desks to use as a study and reference tool.

5. Making an Eco-Friendly Cleaner

Materials Needed:

- Plastic experiment tray with labels
- "Science Log Sheet" reproducible
- Grass seeds
- 4 spray bottles
- 2 commercial liquid cleansers

- Vinegar
- Water
- Soil
- Pencil and writing paper

In this activity, students will make a simple, eco-friendly (nontoxic) cleaning solution. They will then compare its effects on nature with those of more toxic cleaners by spraying two different kinds of cleaners—as well as their own eco-friendly one—onto patches of grass and watching the results.

Begin by explaining that some household cleaning products contain chemicals that are harmful to the environment. Discuss the fact that, for hundreds of years, before the introduction of modern soaps and cleansers, people managed to clean things by using natural products that are easy to find.

You may choose to do this activity as a whole class so that everyone can observe the results when the cleaner is put on the grass. Follow the recipe on the activity card to make the cleaner, and then pour it into a spray bottle. Next, find two commercial liquid cleansers and put them in two spray bottles. Finally, put water in a fourth spray bottle. Prepare the grass samples as directed on the activity card. Over the course of two weeks, "water" the seeds with your solution, the other cleansers, and water. Have students record their observations of what happened to each patch. How did the grass react to each solution?

- As an extension activity, ask students to look at the labels of cleaning products sold at a local grocery store. Do any of them say that they're "nontoxic" or "safe for the environment"? Have students write down the names or brands of any nontoxic cleaning products they find and report back to the class.
- Have students write letters to local grocery stores, asking the managers to stock more nontoxic cleaning products. Make sure they include information about why this is so important. Send the letters home with students and encourage them to mail the letters to the store manager.

6. Making Paper

Materials Needed:

- Wooden frame and screen (deckle)
- Papermaking tray
- Venn diagram reproducible
- Scrap paper
- Iron (optional)

- Sponge (optional)
- Bowl
- Blender
- Lightweight absorbent cloth (such as felt cloth or kitchen wipes)
- Pencil and writing paper

Students discover how to make their own recycled paper! Using scrap paper that would otherwise be thrown away, students create new sheets of paper that can be used for notes, cards, and more.

This activity can be completed as a whole class or with small groups. Collect pieces of scrap paper over the course of a week or so—**photocopy paper or white tissue paper works best**. Follow the instructions on the activity card to create new paper. Soak the paper, and then place it in a blender with water. Once the paper has been turned into pulp, you can use the plastic tray and wooden deckle to make your new paper.

Helpful Tips:

- I. When pouring the pulp onto the deckle, be sure to cover the screen completely. For best results, make the layer of pulp on the screen as thin as possible.
- 2. In steps 6 and 7, once the pulp stops dripping, hold two pieces of felt firmly over the edges of the pulp side of the screen and hold it tightly. Turn the deckle over carefully so that the pulp stays on the screen. This is the easiest way to place the screen pulp-side down.
- 3. Use pieces of felt to remove excess water and allow the pulp to dry.

Once the paper has been completed, have students compare it to other paper they have. How is it the same? How is it different? What do students think is the reason for the differences?

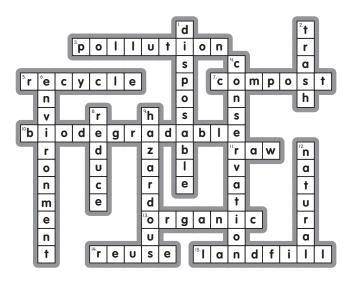
NOTE: This experiment requires the use of an electric blender and the optional use of iron. An adult should closely supervise and help with these steps.

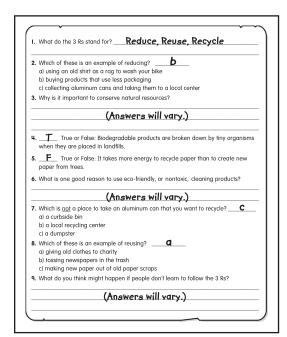
Assessment

The last page of this guide is a reproducible assessment. After completing the unit, you can hand out copies of the assessment to students to assess their understanding of the lesson.

Answer Keys

You will find a reproducible crossword puzzle on page 14 of this guide. Here are answer keys for the reproducibles:





Additional Activities

Recycled Art

Ask students to bring in one clean, dry trash item from home, such as an old glass jar, milk jug, egg or strawberry carton, paper towel roll, etc. Explain that students will be making something new and useful out of their objects. Give students some time to brainstorm new uses for their objects, and then provide them with markers, paint, stamps, and other art materials to decorate the objects. When they're done, invite each student to present her item to the class and explain how it's used and how she thought of the idea.

Breaking the Code

Help students learn to interpret the symbols and codes found on various recyclable items. Make copies of the reproducible on page 13 of this guide. Hand them out to students, and discuss what each symbol means and examples of that kind of product. Which kinds of recycling does your local program accept? Which ones aren't accepted? Let students take the sheets home to share with their families. Encourage students to post the sheets in prominent places that will help remind family members to recycle properly.

NOTE: Some of the recyclable materials listed can be dangerous to handle once they have started to break down. These are 3, 6, and 7. You may want to mention this to children so that they don't try to conduct their own recycling "experiments" with objects made from these materials.

Packing a Waste-Free Lunch

Choose a day to have every student bring his lunch to school. Before lunch, have students take out their lunches and look at the different kinds of packaging materials they find inside. On the board or chart paper, make a class list of items from students' lunches that can or can't be recycled or reused. Discuss ways that lunches can be packed to reduce waste, such as using cloth napkins, reusable containers, lunch boxes instead of bags, etc. Challenge students to bring in waste-free lunches. Create a chart to track how many days students can bring in waste-free lunches over the course of two weeks. Each day, have students open their lunches to check for wasteful items. If there are none, the students can place a mark or sticker on the chart. The students who bring in the most waste-free lunches can get a prize!

Be a Green Shopper

Explain that plastic bags from stores create waste each time we go shopping. Brainstorm ways to reduce this waste and be more of a "green shopper." Discuss that a very effective way to do this is by refusing to use plastic bags. Buy your own reusable shopping bags and bring them with you to the store. Keep them clean and store them in the car so that they're always handy. That way, you can bring them with you into any store—so you won't have to use plastic bags at all!

As an art project, ask students to bring in a large, plain fabric tote bag (sturdy canvas is best). Provide fabric markers or paint for students to decorate their bags. Let them take the bags home and encourage them to take the bags with them when they go shopping.

How Much Water Do We Waste?

Explain that many gallons of water are wasted by letting water run when it's not necessary, such as while you're brushing your teeth, washing your hands, or washing dishes. As a demonstration, plug the drain in your classroom sink. Have a volunteer pretend to wash her hands with the water running the entire time. Ask another student to use a 1-cup measuring cup to collect the water in the sink and pour it into a large container. Ask the class to help keep track of how many cups of water are collected. Write the total amount on the board or chart paper. Instead of dumping out the water, use it to water classroom plants!

Now, have another volunteer pretend to wash her hands in the sink, this time turning off the water whenever possible. Ask a different student to use the measuring cup to measure the amount of water used this time. Compare the amounts of water used when the faucet was left on and turned off. Ask students to think of other ways they can conserve water throughout the day and how dirty water can be reused. Have them write their ideas in a science journal and then share them with the class.

What a Lot of Rubbish!

Find out how much trash students produce in a week. Have students save and bring into class any non-food trash items. Collect all the trash in one place in the room. Count the pieces of trash and weigh it each day, making a bar graph showing the results. When you have completed the graph for one week, help students use that amount to estimate how much trash they create in one month and then one year. Discuss different ways to use the 3 Rs to cut down on the amount of trash they make.

Junk the Junk Mail

Discover how much "junk mail" comes to our homes each week. Near your classroom door, place a few junk mail collection boxes. Send a letter home asking parents to send any appropriate junk mail to school with their child every day for one week. Have students drop the mail in the collection boxes as they arrive each morning. At the end of the week, weigh the mail. Calculate how much junk mail we get in a month and a year. Brainstorm solutions for eliminating junk mail, such as calling the companies and asking to be removed from their mailing list. Think of ways to use the junk mail we do receive, such as using blank sides as scratch paper, recycling it, making it into paper, etc. Try some of the ideas with the mail you collected.

Recycling Relay

Bring in (or ask students to bring in) non-food trash items, such as plastic containers, newspapers and magazines, food wrappers and packaging, etc. (For this activity, it is best to avoid glass containers, as they may break.) Mix up all the trash items and place them in three large boxes. Next, get three more large containers and label them "Waste," "Reuse," and "Recycle."

Divide the class into three teams, and have each team form a single-file line behind one box of trash. (This activity is easier to play outside on the playground or in an area where there is plenty of open space.) Place the "Waste" box far away from the starting point (to represent a landfill), the "Recycle" box a little closer (to represent a recycling center), and the "Reuse" box close to the starting point. Give each team a different-colored marker and have them mark each item in their trash box with an "X."

Explain that when the race begins, the first person in line will choose an item from the trash box. The team will then decide whether this item should be placed in the "Reuse," "Recycle," or "Waste" box. The first student then races to the appropriate box, drops the item inside, and then returns to the line. Then, the next student may go. The first team to empty their box of trash wins! Afterwards, collect the boxes and check to see that each item is appropriate. If a team placed an item in the wrong box, return it to the team and discuss which box it should have gone into.

Erosion Experiment

Help students visualize the process of erosion by completing the following experiment with the whole class or in small groups.

You will need:

• 2 trays

- Grass seeds
- Potting soil
- Watering can

In advance, fill both trays with potting soil and plant the grass seeds in one tray. Then, water the tray with the grass seeds. Prop one end of each tray on a small stack of books or a shoe box so that the trays slope downward. Wait a few days until the grass is a couple of inches tall.

Simulate rain by holding a watering can above each tray and letting water fall onto the soil. Ask students to observe what happens in each tray. In the tray with only soil, the topsoil should be carried by the water and collect at the bottom of the tray. In the other tray, the topsoil should stay in place because of the grass and its roots.

Discuss the results with students. Explain that trees do the same thing for soil that the grass did. When too many trees are cut down, wind and water are more likely to erode, or wear away, the soil. Help students understand the importance of protecting trees, and talk about ways that we can reduce the number of trees that are cut down.

Reduce, Reuse, Recycle: Doing Our Part

Clakeshore Recycle Reuse Reduce

Name:

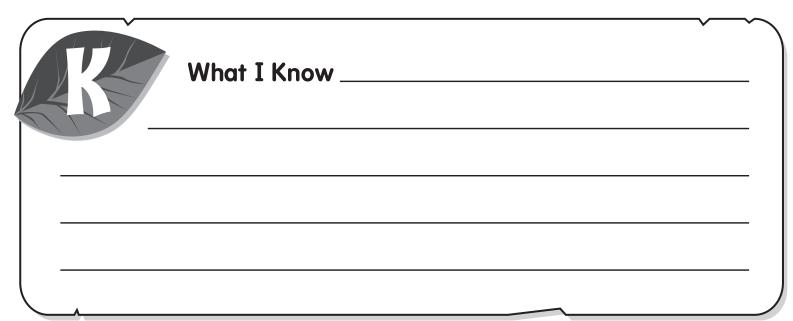
What's in Our Trash?

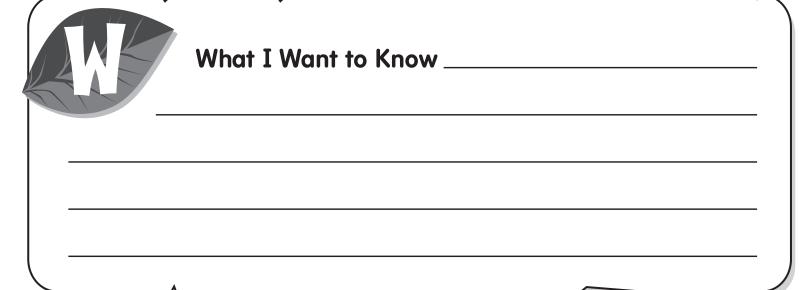


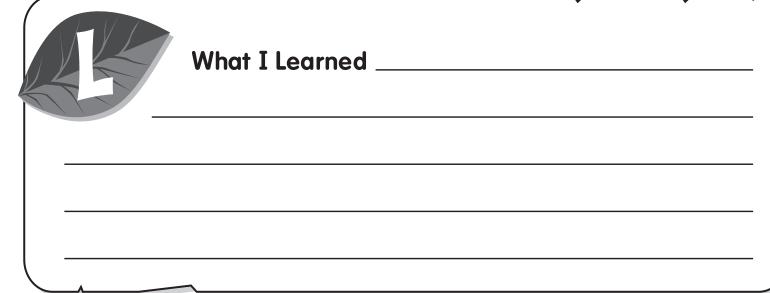
Name:	Do	ate:	
Capsule #1		Capsulo	e #2
Draw your trash in the	containers a	nd list the contents	s below.
What do you think will happen to th			
After four weeks, check the content	s of the cont	ainers. Describe wh	nat has happened.

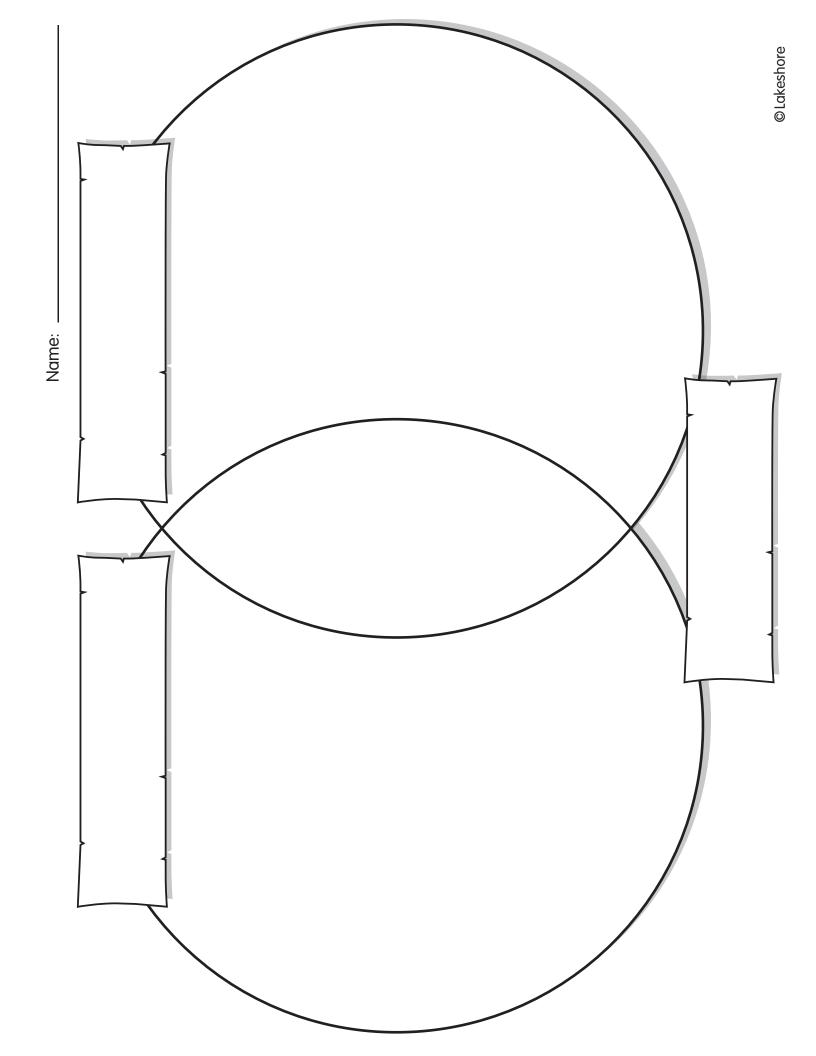
KWL Chart

Name:









Recycling-Breaking the Code!

Below are the 7 symbols found on recyclable plastic products. These codes let you know what materials the products are made of and can help you decide where to take them to be recycled.



PET or PETE (polyethylene or terephthalate)

Found in: soft drink or water bottles, peanut butter containers, salad dressing and vegetable oil bottles, food trays that can be used in the oven

To recycle: place in a curbside recycling bin

Can be recycled into: polar fleece, fiber, tote bags, furniture, carpet, paneling,

straps, new containers



HDPE (high-density polyethylene)

Found in: milk jugs, juice bottles, household cleaning bottles, shampoo bottles, some

trash and shopping bags, motor oil bottles, cereal box liners

To recycle: place in a curbside recycling bin

Can be recycled into: laundry detergent bottles, oil bottles, pens, recycling containers,

floor tiles, benches, doghouses, picnic tables, fences



PVC (vinyl or polyvinyl chloride)

Found in: window cleaner and detergent bottles, shampoo bottles, cooking oil

bottles, clear food packaging, medical equipment, pipes, windows

To recycle: usually not recyclable

Can be recycled into: flooring, speed bumps, mud flaps, mats, cables, roadway

gutters, decks, paneling



LDPE (low-density polyethylene)

Found in: squeezable bottles, bread bags, dry-cleaning bags, frozen food bags,

shopping bags, tote bags, furniture, clothing, carpets

To recycle: some curbside bins; plastic bags can be returned to many stores

Can be recycled into: trash can liners and cans, compost bins, shipping envelopes,

paneling, lumber, landscaping ties, floor tiles



PP (polypropylene)

Found in: some yogurt containers, syrup bottles, ketchup bottles, caps, straws,

medicine bottles

To recycle: place in a curbside recycling bin

Can be recycled into: signal lights, battery cables, brooms, brushes, auto battery cases, ice scrapers, landscape borders, bicycle racks, rakes, bins, pallets, trays



PS (polystyrene)

Found in: disposable plates and cups, meat trays, egg cartons, carryout containers, aspirin bottles, CD cases

To recycle: place in a curbside recycling bin

Can be recycled into: insulation, light switch plates, egg cartons, vents, rulers,

foam packing, carryout containers



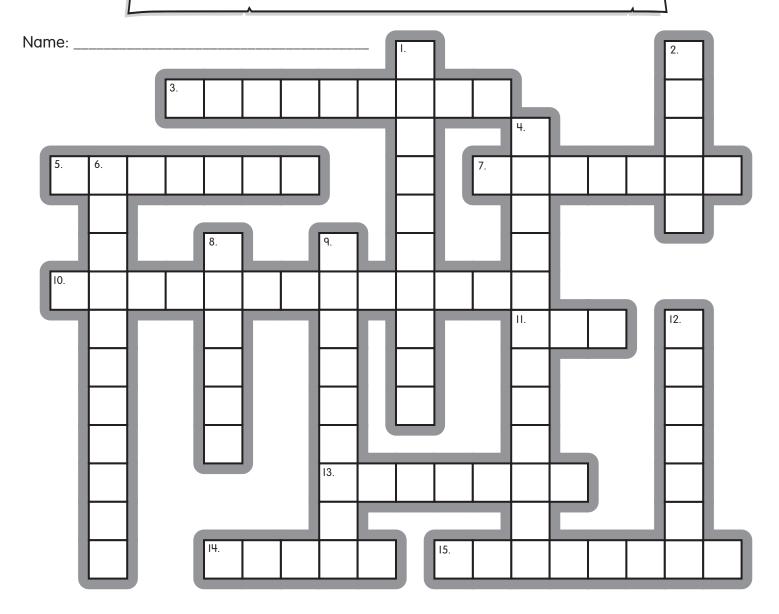
OTHER (miscellaneous materials)

Found in: three- and five-gallon water bottles, bulletproof materials, sunglasses, DVDs, iPod and computer cases, signs and displays, nylon, food containers

To recycle: some curbside bins; usually not recyclable

Can be recycled into: plastic lumber, custom-made products

The 3 Rs Crossword



ACROSS

- **3.** the introduction of harmful materials into our soil, air, or water
- 5. to make new things from old materials
- a soil-like mixture made from rotting plant and animal matter
- 10. able to be broken down by tiny organisms
- II. ____ materials: things in nature that people use to make things
- 13. grown with only natural fertilizers
- 14. to use again
- **15.** an area where garbage is dumped and covered with dirt

DOWN

- I. meant to be thrown away after one use
- 2. things that are thrown away
- **4.** the wise use of water, land, and other resources to minimize waste or loss
- **6.** the surroundings in which a person, animal, or plant lives
- 8. to use less or make less waste
- **9.** _____ waste: toxic things that are thrown away that harm the Earth and living things
- **12.** _____ resource: something in nature that helps support life or meets people's needs

Science Log Sheet

Name:	Date:
Experiment:	
Procedure:	
Observations/Results:	
	4
Conclusions:	

No —	me: Date:
١.	What do the 3 Rs stand for?
2.	Which of these is an example of reducing? a) using an old shirt as a rag to wash your bike b) buying products that use less packaging c) collecting aluminum cans and taking them to a local center
3.	Why is it important to conserve natural resources?
_	True or False: Biodegradable products are broken down by tiny organisms when they are placed in landfills.
•	True or False: It takes more energy to recycle paper than to create new paper from trees.
	What is one good reason to use eco-friendly, or nontoxic, cleaning products?
•	Which is <u>not</u> a place to take an aluminum can that you want to recycle?a) a curbside bin b) a local recycling center c) a dumpster
3.	Which of these is an example of reusing? a) giving old clothes to charity b) tossing newspapers in the trash c) making new paper out of old paper scraps
	What do you think might happen if people don't learn to follow the 3 Rs?