

Waste Education Recycling Program

Grade Level: 1st-4th

Length of Lessons: 1 hour

Objectives:

SWBAT properly identify items that are recyclable in Rice County.

SWBAT properly identify items that are not recyclable in Rice County.

SWBAT describe the different parts of the recycling process.

Minnesota Academic Science Standards

5.3.4.1.3 – Compare the impact of individual decisions on natural systems.

5.4.4.1.1 – Give examples of beneficial and harmful human interaction with natural systems.

AAAS Project 2061 Benchmarks

4B/M10c* – Recycling materials and the development of substitutes for those materials can reduce the rate of depletion of resources but may also be costly. Some materials are not easily recycled.

8B/E3b – Sometimes it is possible to use the materials from discarded products to make new products, but materials differ widely in the ease with which they can be recycled.

Core Knowledge Sequence for Science

Grade 3 Science V – Man-made threats to the environment: Air pollution: emissions, smog; Water pollution: industrial waste, run-off from farming

Grade 3 Science V – Measures we can take to protect the environment (for example, conservation, recycling)

Materials

You'll need the two green bins and the black garbage bag that has the posters in it. The red cart is in the storage closet. Make sure you have all of the following things and you'll be ready to go!

General info:

- Directions to the school
- Contact info for the school
- Notes on class times and teacher names
- Teacher evaluation
- Enough recycling brochures for the day (1 per student)
- Enough station worksheets for the day (1 per group of 3-4 students)
- Program notes if you want them
- Blue folder that contains all this info

Papermaking supplies:

- Enough pre-cut wax paper (1 per student)
- Sharpies to write names on wax paper
- Enough pre-made slurry (one bucket per class)
- Towels (at least 4 per lesson and a few extras in case of spills)
- 2 water pitchers
- 1 blenders

- Extension cord
- At least 4 slurry trays
- At least 4 undamaged screens
- Extra paper for making more slurry
- Extra roll of wax paper

Other activities:

- Green timeline bag
- Mystery bag of trash
- Landfill poster
- 5 station posters (in black bag)
- At least 5 plastic sleeves with garbage bar graph
- Plastic bag with station items (two toy trucks, maze, 4 green strips, dry erase markers, washcloth, and laminated photos)

Location

Classrooms at Rice County schools

Background Information

Trash (or waste) is becoming a bigger deal as time goes on. People have always made trash, of course, but with a growing number of people on this planet using a larger number of products, concern over our garbage continues to grow.

In the last 40 years, the global population has doubled. The US accounts for about 5% of that population, and 30% of the world's waste. The average American produces between 3-5 pounds of trash per day.

There are different methods for dealing with waste, but Rice County currently uses the landfill method, burying trash in the ground and putting it out of sight. When it comes down to it, there is no way around waste and the production of waste, but what needs to be done is to find ways to produce less waste. We need to look at the decisions that we make when it comes to the use of our goods.

We live in a society that uses a tremendous amount of natural resources, and up until the last few years, we extracted those resources from the earth without much worry. While we were pulling out these vanishing resources, we were also filling in a good portion of the earth with our trash. By putting the waste in the ground, we lived as if it was gone, with no worry for us in the future. But just as the earth's resources are limited, so is space for our waste. Recycling is the process we use to divert waste away from the landfill and reuse items that would have used other natural resources.

We recycle in Rice County because the current landfill is reaching capacity, and recycling allows that site to stay open longer since there is less waste flowing into it. All of the people living in Rice County produce over 150 tons of waste in one day. Think about how much space that takes up in one landfill.

Recycling has many benefits including reduced pollution and increased health. Also, recycling lessens the amount of waste that actually goes into the landfill. No one wants to have the next landfill in their own backyard. In fact, all of Rice County is our own backyard!

In Rice County we have a single-sort recycling system. This means all recyclable material can be placed in the same container (blue bins) on the curb for pickup. Single-sort recycling is also called commingled recycling. For the system to work well, items should be loosely placed in the bins and not crammed together in separate bags. This new system was put in place in 2008. Before 2008, individual households

and businesses sorted their own recyclable materials and placed them in separate bins and bags before placing them on the curb for pickup. Garbage removal companies are under contract with Rice County to provide recycling pickup services for individual households, usually every other week.

To make the process simpler and to make space for more materials, Rice County purchased large, 65-gallon blue bins for everyone to hold their recyclables. The bins have large wheels and can be easily rolled to the curb on pickup days.

This program is funded by Rice County and designed and delivered by the staff at River Bend Nature Center. The basis is to introduce what recycling is and what it means to students at schools in Rice County. These students will then be educated on how to recycle in Rice County and will be able to educate their family on how to do it as well.

Set-up & Prep

This program involves a fair amount of set-up and preparation. The day before the program you should make one gallon of paper slurry per class you will be teaching. We just do not have time to make slurry for each group during the actual program. Also, do not make it more than one day in advance as the slurry has a tendency to get moldy fast. After you are finished making the slurry the ice cream buckets can go into the green bins for the program and all the equipment should be thoroughly cleaned before getting put back into the green bins.

Before the program in the classroom begins, you should have the recycling stations set out around the classroom. You should also have the paper-making station completely setup and ready to go. When going to another classroom immediately following the current program you should allow fifteen minutes to take it all down and set it back up again.

Prior to Visit (for teachers)

- Classroom setup:
 - Nametags
 - Have class divided into 6 groups (for papermaking and stations)
 - Table for papermaking
 - Counter space for drying the paper
 - Enough torn paper to fill an ice cream bucket (1 inch chunks – NOT thin strips from a shredder)
- Tell them about pre-visit materials on our website that they can look at if they're interested:
 - <http://www.rbnc.org/wasteed.htm>
 - From homepage (www.rbnc.org): Programs → Waste Education
 - Review sheet, PDF on website

Introduction

- Introduce leaders
- Ask if anyone has been to River Bend before.
- Do you know why we're here today? (*to talk about recycling*)
- What is recycling? (*the process of turning something old/used into something new*)
- If we don't recycle something and it goes into the trash, where does it end up? (*a landfill – hold up photos of what a landfill looks like*)
 - It takes things in a landfill a really, really long time to decompose. How many of you have heard the word decompose before? (*many haven't so I usually say that I'm excited to teach them a new word*) Decomposition is the natural process of breaking down material and returning it to the soil. Give them an example like an apple in the forest getting eaten by worms and other bugs. Do you think those bugs can live very well in a landfill? (*No*)

- Since decomposers can't survive in a landfill, our garbage takes a long time to break down. This means that it will stay in the landfill for many years.

Waste Decomposition Timeline

- For our first activity we're going to learn about how long it actually takes different items to decompose in a landfill.
- Is everyone sitting with their groups? *(if they aren't, give them a minute to get in their groups – you can also do this before the intro depending on how much you still have to set up and if they're waiting for you)*
- I'll need two volunteers to come up and help me. *(have them unroll the timeline)*
- In just a minute I am going to pass out some items to your groups. As a group, you must decide how long it will take for your item to decompose. When you've made your decision, send ONE person from your group up to the front and stand behind the timeline at the number of years you think it will take to decompose. It's okay for more than one item to be at each time marker, and some years might not even have any items.
- Now go through the timeline and have the kids switch around as needed. For the newspaper and paper napkin I like to have the kids imagine the things getting really wet and they all realize that it falls apart. This helps them understand that it breaks down differently than a plastic bottle. If you tell them about rust it helps them understand how a metal can will break down faster than plastic. Also emphasize that nobody has been alive long enough to see a plastic bottle decompose entirely, so scientists just make their best guess.
- Finally, go through and have them decide what items on this timeline are recyclable, and point out that if people recycled those items, none of them would have to sit in the landfill forever, and we could even reuse the materials to make new products. It also means that we would have more space in our landfills.

Paper napkins	1 year (only 30-45 days in a compost pile!)
Newspaper	5 years
Plastic bags	20 years (at least)
Tin can	100 years
Aluminum soda can	300 years
Plastic bottles	500 years (to never)
Glass bottles	1,000,000 years (basically never)
Plastic Styrofoam cups	1,000,000 years (basically never)

Blue Bin

- Explain that we have a single sort system, which means that all of our recyclables can be mixed together in the blue bin. (hold up the blue bin poster for this)
- Mention that plastics #1-7 can be recycled (new as of Jan 1, 2012)
- Mystery bag of trash – I am going to pull out different items and if it is recyclable give me a thumbs up. If it's not, thumbs down, and if you don't know, thumbs sideways.
- As you pull out items, mention ways you can reuse some of them (like that socks make good rags). You can also collect bottle tops to be recycled separately since they are made of out a different kind of plastic (this is especially nice for the people in Northfield to know because the coffee shop Goodbye Blue Monday collects these).
- This activity is a good place to watch the time and adjust so you will have enough time for papermaking/stations.

Recycling Stations

- Explain that in their groups they'll be doing some activities at stations around the room. All of the stations are related to the different things that happen to our recyclables after we put them in the blue bin. I would hold up the posters around the room so they would know where to find each station.
- Things to emphasize:
 - Follow the directions on the poster and their worksheet!
 - The title of the poster corresponds with a title on their worksheet
 - Reset the station before their group leaves
 - When they finish a station, move to an empty one – the order does not matter
 - We will call up each group for the paper making (it's not a rotating station)

Papermaking Station

- Give a brief demo to the entire class so they all understand the process and you don't have to explain as much when they come up in their groups. Depending on the classroom setup, I liked having the students gather around the papermaking table to see better.
- The process we're doing here is the same as what the big recycling companies do, but it's just a much smaller scale. (*do you think they use a little tiny blender like this one?!*)
- Hold up a torn piece of paper and ask if they can see the little fibers on the edge. Explain that paper is made of these fibers (which come from trees) and the fibers are all being held together to form one sheet. To make a new piece of recycled paper, we want to separate all of these fibers and put them back together in a new way to form a new piece of paper.
 - First, we have to rip the paper up into smaller pieces.
 - Next, it must be blended with water because that helps break down the paper better. Recycling paper is a process that does use a lot of water.
 - When it gets to be the right texture, the mixture (called slurry) is poured out into trays where the fibers can float around. (show the blender of slurry to everyone)
 - We'll take a small screen and slide it under the slurry in the tray, and cover the screen as evenly as possible. Then lift it up and let the water drip out.
 - Recycling companies have really big special dryers they use, but today we're going to use towels. Then you'll set your paper out to air dry, which takes a day or two.
- Remember that you really need to keep this station moving in order to get all of the kids through!!!

Conclusion

- Quickly go over the **order** of what happens to our recyclables so they understand the whole process (on the back of the poster with the blue bin).
- Encourage them to share what they learned today with their friends and families because they are now recycling experts and they know a lot more about it than most adults.
- Pass out the brochure (or mention that they'll get it in their mailbox at the end of the day) and tell them they can share this with their families to show them what they learned today.
- Thank them and invite them to come out to River Bend.

Assessment

Recycle Review Handout

Extensions/Resources (for teachers)

<http://rbnc.org/wasteed/index.htm>

<http://rbnc.org/wasteed/recycling.htm>

<http://www.co.rice.mn.us/departments/recycling-solid-waste>

<http://americarecyclesday.org/>

References

N/A