

Re-Imagine it! Reduce, Reuse, Recycle Curriculum



A Joint Project of the Jackson Hole Children's Museum,
Teton County and Teton County Integrated Solid Waste
Management and Recycling
2012



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(Note: These units and lessons can be taught in any order appropriate to the educational purposes of the programming. Many of the lessons are designed for 3-4 hour blocks of time, so there may be the need for lessons to be broken up into smaller segments depending on the educational setting.)

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Part One: Rethink It and Reduce It!

Unit Topic: Reducing Waste by teaching students how to re-think parties by teaching them to throw a waste free party.

Rationale: Young students often spend a lot of time celebrating birthday and holiday parties both at school and at home. These parties often can fill several garbage bags full of waste, which will eventually end up in a landfill. Teaching students how to reduce waste while still being able to celebrate birthday and holiday parties, will not only bring awareness to how much waste is being created by these parties, but also give them the tools to throw a virtually waste-free party.

Objectives:

1. Students will understand and build an awareness that trash that is thrown in garbage cans will end up in a landfill or littering communities and wild spaces.
2. Students will understand how little decomposition occurs in landfills.
3. Students will become aware of how much waste is often generated from birthday and holiday parties at school and at home.
4. Students will re-think how to throw a party that is virtually waste-free.
5. Students will design and implement a waste-free celebration.

Recommended ages: This unit was designed for elementary students entering 1st-5th grades, but can be adapted to fit any age level.

Subjects: Science, literacy, art, textiles

Duration: 9-12 hours total: For the JHCM camp, the unit will be divided into four days: Each day needs to include a 3-4 hour block of time. The days do not need to be consecutive. This lesson can be divided into any timeframes that work for the educational setting.

Lesson 1: Create a Mini-landfill: Students will construct a small scale replica of a landfill. (This lesson is adapted from an educational unit from MassDEP. www.mass.gov/dep/recycle/reduce/k6build.htm)

**This first lesson will set the stage for students for why we need to create waste-free parties, before the how to create waste-free parties lessons begin.

Time: 1 hour on the first day, 10-15 minutes each day thereafter for 3 weeks

Materials: Two identical samples of food scraps, newspaper, cardboard, glass, cloth, aluminum foil, plastics, copper wire, etc.; several small plastic bags; a small aquarium or clear plastic box; clear plastic bags to line the tank or box; soil (not potting soil); masking tape; index cards or small cardboard squares; water; magnifying glass; If possible, example of a garbage bag of waste from a typical birthday party.

Procedure: Guiding Questions: What kind of decomposition happens to food in landfills? How do other types of material decompose in landfills?

Engage: If you have a bag of trash from a recent party, show the students the amount of trash that can be accumulated from a typical birthday party from disposable dishware, napkins, tablecloths, wrapping paper, plastic bags from grocery shopping... Explain that most of the trash will end up in a landfill. Today we are going to create examples of mini landfills to watch over the next few weeks to see what happens to trash when put in a landfill.

1. Explain to the students the purpose of a landfill and how they are constructed.
2. Have the students, individually or in small groups, construct their own mini-landfill. Line a small aquarium or clear plastic box with a plastic bag and fill it half full of earth.
3. Have each student prepare two identical groups of trash. Place the trash from the first group in one of the small plastic bags and seal it, simulating what they do with their household waste. Do not place the second batch of trash in a bag. Bury the two groups of trash in adjacent rows, marking the location of each item with a cardboard label.
4. Have them add water to moisten the soil and place the mini-landfill in a sunny spot. The landfills should be watered regularly, keeping the soil moist but not wet, to simulate rain.
5. After 7 to 10 days, have the students carefully remove some of the waste items from each of the rows of trash and examine them. (A magnifying glass may be helpful at this point.)
6. Wait another 7 to 10 days and repeat the procedure for the remaining trash in each row.
7. Use the students' observations to discuss the results, comparing the condition of

waste in the plastic bag with that which was buried directly in the soil. Address questions such as: Which items in the landfill decomposed the most? Were the decomposed items natural or manmade? Did the type of decomposition in the bag differ from the type that occurred in the soil? What characteristics are shared by the items that decomposed the quickest? Some items showed no signs of decomposition: Will they remain unchanged for a long time? Why?

Extensions:

1. If you have the students for a longer period of time such as a classroom setting, have students replace the items removed in step 6 and cover the box or aquarium. Let it sit for at least 2 months to allow for leachate formation. (Leachate will collect in the bottom of the liner plastic bag.) Have students empty the contents of the landfill to determine which items decomposed and which did not. Also have them collect a sample of the leachate and test its acidity. (Note, the mini-landfill does not contain the kind of toxic materials that exist in real landfills. These toxics would have an effect on the acidity of the leachate, were they present.)
2. Have the students research why leachate needs to be controlled at landfills, addressing what kinds of materials are commonly found in leachate and whether or not they are harmful.
3. Items such as disposal diapers and plastic trash bags are being advertised as biodegradable. Discuss with the class the meaning of biodegradable and whether these products are indeed biodegradable and why.

Lesson 2: Green Party: Gathering and decorating supplies for the party: Re-usable plates, cups, silverware; Decorating re-usable supplies with dishwasher safe materials: making cloth napkins, a re-usable tablecloth and washable mosaic place mats.

Time: 2 hours

Materials: Re-usable cups and plates that can be decorated, paint and brushes that are non-toxic and dishwasher safe to decorate plates and cups, re-usable silverware, cloth, sewing supplies, fabric pens to make cloth napkins and tablecloths, cut up pieces of magazines and recycled color paper, a piece of colored or white paper as the background to the mosaic, laminating sheets and access to a laminator.

Procedure:

1. Explain to the students that as a group we are going to challenge ourselves to create a waste-free party. Brainstorm all of the ways that the students feel they could reduce waste. As a group start to generate a list that you chart on chart paper. Help facilitate that re-usable supplies such as plates, cups, silverware, cloth napkins and cloth tablecloths are all essential in a waste-free party.
2. Show the students all of the supplies that they have to work with for the party. Ask kids to each decorate two plates and two cups with the paint or other supplies that work for decoration. Chalkboard paint on the outside of cups or mugs is a great interactive way to decorate.
3. Once all of the plates and cups are decorated, set them aside to let them dry so they are ready for the party. For JHCM purposes, students can take one set of their decorated pieces home and keep one at the museum for the final celebration and upcoming birthday parties.
4. The next step in getting ready for the green party is to create cloth napkins and a tablecloth that are easily washable and re-usable for future parties. If you are sewing napkins from large pieces of cloth, then you need to have the sewing machines and sewing supplies ready. Another option is to have pieces of cloth already made into napkins that the students can hand sew various ribbons and decorations on and use fabric pens for further decoration. This would require sewing materials, but not the sewing machines. The tablecloth as well can either be made from scratch from using sewing machines or a pre-made one can be decorated with fabric pieces, ribbons and fabric pens. For the JHCM camp a seamstress is coming in to lead this activity.
5. Students will then create a placemat for the party that can be re-used. Students will create a mosaic out of recycled paper and magazine scraps that they glue to a plain piece of colored or white paper. Once their recycled art piece is created,

lamine the pieces with durable pieces of lamination sheets that can washed and be re-used.

6. Brainstorm next steps for the creating the green party to work on during the next day. Facilitate students to think about re-usable gift ideas, sustainable ways to shop and organic treats to make, and creating a re-usable gift bag to put their gift in that the recipient can then re-use for future gift-giving.

Extensions:

1. Brainstorm with the students outdoor games that are fun to play at parties that don't require making waste. Some ideas might include blob tag, capture the flag, soccer, kickball, duck, duck goose... Play some of these games with the students.
2. If you have the materials to incorporate clay, have students make plates and cups for the party from clay, ideally using a pottery wheel and firing their creations before decoration.

Lesson 3: Making jewelry as gifts from recycled materials (paper beads)

Time: 1-2 hours

Materials: Old magazines, pencils or dowels, glue or glue stick, string for beading, key chain rings

Procedure:

1. Ask students about the types of gifts they usually see given at birthday parties. What kind of waste is generated from these gifts? Brainstorm and chart ideas of gifts the kids could make that are waste-free or from recycled materials.
2. Explain that today we are going to learn how to make paper beads from recycled magazines as a way to create waste free birthday gifts. With the paper beads, students can make necklaces, bracelets or key chains.
3. Have examples prepared of necklaces, bracelets and keychain rings made of paper beads. Have the students decide what they want to make and have materials ready for them to begin their gift making.
4. Instructions for paper bead making: 1.) Cut long triangles out of magazines. The base of the triangles will be the width of the bead. The longer the bead, the fatter the triangle will become. 2.) Turn the triangle design side down and apply a bit of glue to the pointy end. A glue stick or tiny bit of liquid will do. 3.) Starting at the wide end, roll the triangle around itself using a dowel or pencil. Keep the triangle centered as you roll. Roll tightly. 4.) As you roll, add dabs of glue to be sure the bead is secure and make sure the tip is glued down securely. 5.) Extend the life of the bead by glazing it with Mod Podge or a clear, water solution. 6.) Slide the bead off the dowel and use beads for necklaces, bracelets or key chains!
5. Come back together as a group and brainstorm other waste-free recycled gifts that they could make for birthday parties.

Extensions:

1. Use the idea board that the students generated of the types of waste-free gifts they could make and try to create some of them.

Lesson 4: Making Gift Bags out of old(recycled) t-shirts.

Time: 45 minutes to 1 hour

Materials: "George Saves the World by Lunchtime" by Jo Redman, One old t-shirt for every student, sharp scissors for each student, permanent markers, pattern for the t-shirt bags, one completed bag to use as an example.

Procedure:

1. Read "George Saves the World by lunchtime." Talk with the students about what happens to old items that we throw away. Most of them end up in a dumpster, then landfill. Discuss how George re-thinks what he is going to do with used items instead of throwing them away.
2. Explain to the students that today, we are going to reduce waste for our green party, by using recycled t-shirts as gift bags for the gifts we made to pass along.
3. Show the kids the pre-made bag. (See attached instructions to make an old t-shirt into a bag with no sewing!)
4. Give each student a t-shirt (at JHCM we have old "Old Bill's" t-shirts left over from the race that never got used). Pass out sharp scissors. And depending on age of the students, either show them the pattern and give them a pen to draw the pattern on their shirts or have the patterns pre-drawn on the t-shirts for students to cut along the lines.
5. Once the t-shirts are made, place the recycled gift they made for the party in the bag to pass along.

Extensions:

1. Decorate the t-shirts with fabric pens or by tie-dying.

Directions for no-sew recycled t-shirt bags from:

www.lookslikehomemade.com/10-no-sew-t-shirt-upcycle-projects

Lesson 5: Making organic no-bake cookie treats or rice crispy treats

(From reducing waste while shopping to storing in reusable containers.)

Time: 1 hour

Materials: All of the ingredients for the no-bake cookies or rice crispy treats (See end of lesson plan for the recipes), glass containers or plastic bins to have all of the ingredients available in the Museum grocery store. Re-usable grocery bags ready to go shopping at the museum market, a cook top and an oven.

Procedure:

1. Discuss with the students how much waste can be created in food preparation for a typical birthday party. Chart with the students all of the waste from the plastic grocery bags to the packaging of the ingredients.
2. Brainstorm and continue to chart ways that we can reduce that waste in food preparation for our green party.
3. Introduce the recipe that you are going to make for the day. Session one will make no-bake chocolate chip cookies and session two will make rice Crispy treats. Explain that today we are going to make our treats using no-waste.
4. The students will shop at our Museum grocery store using canvas bags and bringing their own sacks to get the food from glass containers or plastic bins. They will measure how much of each ingredient they will need so that they don't end up with excessive leftover ingredients. All of the ingredients will be organic.
5. Then students will bring their food back to the JHCM kitchen to prepare. The students will make either no-bake chocolate chip cookies or rice crispy treats.

Extensions:

1. Students can plan and make any menu they want for the party within the limits of making their meals with minimal or no waste. This would be a good opportunity for students to research recipes they like.
2. Students can create a cookbook of fun green party recipes and how to make them from beginning to end with little or no waste.

Recipes:

3 Minute No Bake Organic Cookies (Use all organic ingredients)

- * 2 cups granulated sugar
- * 8 tablespoons margarine or butter
- * 1/2 cup low-fat milk
- * 1/3 cup baking cocoa
- * 3 cups oats (quick or old fashioned*, uncooked)

In large saucepan, combine sugar, margarine, milk and cocoa. Bring to boil over medium heat, stirring frequently. Continue boiling 3 minutes, stirring frequently. Remove from heat. Stir in oats. Drop by tablespoonfuls onto waxed paper. Let stand until firm. Store tightly covered.*

**If using old fashioned oats, cool mixture in saucepan 5 minutes.*

Organic Rice Krispy Treats

- * Butter
- * marshmallows
- * Organic rice crispy cereal

1. In large saucepan melt butter over low heat. Add marshmallows and stir until completely melted. Remove from heat.
2. Add Rice Krispy cereal. Stir until well coated.
3. Using buttered spatula or wax paper evenly press mixture into 13 x 9 x 2-inch pan coated with cooking spray. Cool. Cut into 2-inch squares. Best if served the same day.

MICROWAVE DIRECTIONS:

In microwave-safe bowl heat butter and marshmallows on HIGH for 3 minutes, stirring after 2 minutes. Stir until smooth. Follow steps 2 and 3 above. Microwave cooking times may vary.

- For best results, use fresh marshmallows.
- 1 jar (7 oz.) marshmallow crème can be substituted for marshmallows.
- Diet, reduced calorie or tub margarine is not recommended.
- Store no more than two days at room temperature in airtight container.
- To freeze, place in layers separated by wax paper in airtight container. Freeze for up to 6 weeks. Let stand at room temperature for 15 minutes before serving.

Lesson 6: Planting herbs or flowers in ceramic pots to send home as party favors.

Time: 45 minutes

Materials: Small ceramic pots, potting soil, variety of herbs and/ or flower seeds or small plants already started, water, paintbrushes, paint appropriate for ceramic pots.

Procedure:

1. As a group, talk about the typical party favors that are sent home from birthday parties... Candy each individually wrapped, plastic games and toys... Explain that for a green party, you want your party favors to be sustainable and waste-free.
2. Brainstorm ideas that the group has for examples of "green" party favors.
3. Explain that today, we are going to make party favors that the guests can take home and continue to use and enjoy. Show them all of the materials available to pot herbs or flowers that the guests can take home, grow and either use for teas or cooking or re-plant in a garden.
4. Give the children instructions on how to plant their herbs or flowers by packing their ceramic pot with potting soil, planting their seeds or starter plant, watering and placing in an area with sunlight. If you are going to also paint the pots, then complete this step first, let the paint dry, then begin the planting.
5. Then their party favors are ready for the party. For the purposes of our party, they can each exchange the party favor they made with another child or take theirs home to keep or give as a gift at the end of the party.

Extensions:

1. Go back to the list generated by the students of ideas for "green" party favors that are either made from recycled materials or made with the intention of being sustainable and re-usable. Have the students create a party favor from their list.

Final Celebration:

Once the students have completed all of the steps to creating their green party, it is time to celebrate and actually have the party. Use all of the materials that the students created (plates, cups, napkins, tablecloths) to set the table, have the treats they prepared ready to be served, make sure there is a gift exchange where they can give their recycled jewelry to a friend in their new gift bag, play the outdoor games they brainstormed, and make sure everyone gets a sustainable party favor.

Have Fun!!

QuickTime™ and a
decompressor
are needed to see this picture.

Part Two: Re-Invent It!

Lesson Topic: The New RRR: Using recycled materials to re-invent, re-use and re-create something new.

Rationale: Re-Inventing/ Re-using materials that are to be thrown away teaches students to conserve natural resources, reduce landfill waste, and use their imagination and creativity to re-think how “trash” can be used.

Objectives:

1. Students will understand and build an awareness that trash that is thrown in garbage cans will end up in a landfill or littering communities and wild spaces.
2. Students will learn that their trash can be re-used for useful purposes in daily activities or for play.
3. Students will use their imagination, creativity and critical thinking skills to re-invent something new and useful from trash and recycled materials.

Recommended ages: This lesson was designed for elementary students entering 1st-5th grades, but can be adapted to fit any age level.

Subjects: Science, math, literacy, art

Duration: Two days: Each day needs to include a 3-4 hour block of time. The days do not need to be consecutive. *This lesson can be divided into any timeframes that work for the educational setting.*

Lesson 1: Building a Mini-Town using recycled materials

Materials: Landfill demonstration created the previous week, "Let's Build a Clubhouse" by Marilyn Singer, paper and pencils, corrugated cardboard boxes from grocery stores or local businesses that were going to be disposed, old cardboard milk, cream or juice containers, paper towel/ toilet paper tubes, any other usable collected recycled materials that will contribute to the project, scissors, staplers and other tools for manipulating the materials, templates or blueprints for how to create different houses and buildings from cardboard boxes, Blueprints for building from cardboard and milk cartons from *Planetpals* (www.planetpals.com), paintbrushes, variety of paint colors.

Engage: Take out the landfill demonstration from the previous week and look as a group at how different items decomposed or did not decompose over a week's time.

Procedure:

1. Discuss with the group what happens to trash over time that is put in landfills. Talk about daily items that get thrown away. Brainstorm as a group, creative ways that those items could be re-used or re-invented in some way to make something useful rather than having them end up in a landfill. Chart those ideas on chart paper that can be posted during the unit.
2. Explain to the students that today we are going to use recycled materials to create a mini-town. Students will re-invent a use for discarded cardboard boxes, milk cartons, and other recyclables. This town will be made into an exhibit at the Jackson Hole Children's Museum that children can interact with, yet the town can be used for a variety of educational and play purposes in different settings.
3. Read the book "Let's Build a Clubhouse" with the students. Talk about how the child in the book made a plan for his clubhouse through creating a design plan, measuring how big he needed materials to fit his plan and gathering all of the necessary tools to create his clubhouse. Explain to the students that they will go through the steps of making a plan before building.
4. Introduce the vocabulary of making a model to represent something larger. Show students maps of the Jackson town square or other towns they are replicating to make their model. Have them decide which building or area they want to focus on in their work today.
5. Introduce students to all of the materials that they will have to work with. In pairs or groups, they will work on a different building that will be part of the town. They will have to design a plan for what their building will look like, how they will make it and what they want the final piece to look like once painted and decorated. Introduce examples of different ideas and designs from *Planetpals* (*See attached*).

6. Once the pairs or groups are formed and different projects/ town buildings have been decided on, let the students begin their planning and creating. Make sure they have access to all of the materials they need including paper and pencils for design, recycled materials and tools for building, and paint and paintbrushes for decoration. As many adult volunteers as possible to support the students would be helpful. Give students 2-3 hours to work on their building projects.
7. **Share:** Come together as a group at the end to share what was made and put the final project together. Discuss with the students the benefits of using everyday items that would otherwise be "trash" to create an exhibit for the Jackson Hole Children's Museum for children to play with and families to enjoy.

Lesson 2: Building the roads and vehicles for the mini-town using recycled materials

Materials: Landfill demonstration created the previous week, "The Dumpster Diver" by Janet Wong, paper and pencils, corrugated cardboard boxes from grocery stores or local businesses that were going to be disposed, old cardboard milk, cream or juice containers, paper towel/ toilet paper tubes, tissue boxes, lids (for wheels), any other usable collected recycled materials that will contribute to the project, scissors, staplers and other tools for manipulating the materials, paintbrushes, variety of paint colors.

Engage: Take out the landfill demonstration from the previous week and look as a group at how different items decomposed or did not decompose over a week's time.

Procedure:

1. Discuss with the group what happens to trash over time that is put in landfills. Extend the discussion from the previous day or session reinforcing concepts about daily items that get thrown away. Brainstorm as a group, more creative ways that those items could be re-used or re-invented in some way to make something useful rather than having them end up in a landfill. Chart those ideas on chart paper or add to previously made list.
2. Read the book "The Dumpster Diver" by Janet Wong with the students. Discuss with the students how the characters in the book re-invented "trash" to make new, useful items. Explain that today we are going to re-imagine uses for recycled materials to add to the mini-town exhibit.
3. Explain to the students that today we are going to use recycled materials to create the roads and vehicles for the mini-town exhibit that was created the previous day or session. Students will re-invent a use for discarded cardboard boxes, milk cartons or other recycled materials by making vehicles. This will add to the mini-town exhibit at the Jackson Hole Children's Museum made during the previous re-invent it day. Children will be able to interact with the full exhibit of the town including the vehicles when they visit the Jackson Hole Children's Museum. The completed town with vehicles can be used for a variety of educational and play purposes in different settings.
4. Re-introduce the vocabulary of making a model to represent something larger. Show students maps of the Jackson town square or other towns they are replicating to make their model. Have them decide which roads they want to focus on in their work today. Note if there are any bus stops or bike paths that they want to make sure they include to reinforce the idea of reducing vehicle emissions.

5. Introduce students to all of the materials that they will have to work with. In pairs or groups, they will work on different vehicles and roads that will be part of the town. They will have to design a plan for what their vehicles and roads will look like, how they will make it and what they want the final piece to look like once painted and decorated.
6. Once the pairs or groups are formed and different roads/ vehicles have been decided on, let the students begin their planning and creating. Make sure they have access to all of the materials they need including paper and pencils for design, recycled materials and tools for building, and paint and paintbrushes for decoration. As many adult volunteers as possible to support the students would be helpful. Give students 2-3 hours to work on their building projects.
7. **Share:** Come together as a group at the end to share what was made and put the final project together. Discuss with the students the benefits of using everyday items that would otherwise be "trash" to create an exhibit for the Jackson Hole Children's Museum for children to play with and families to enjoy.

Extensions:

1. Design a town square or center with the students that only allows pedestrian and bike traffic.
2. Design a public transportation system that could further reduce vehicle emissions and extensive bike paths that could encourage use of bikes rather than cars.
3. Look back at the chart created at the beginning of the session of ideas students had to re-use trash. Let them design and create their new inventions from recycled materials.

Lesson 3: "Junk" Instruments: Using recycled materials to re-invent, re-use and re-create junk instruments.

Objectives:

1. Students will understand and build an awareness that trash that is thrown in garbage cans will end up in a landfill or littering communities and wild spaces.
2. Students will learn that their trash can be re-used for useful purposes in daily activities or for play.
3. Students will use their imagination, creativity and critical thinking skills to re-invent something new and useful from trash and recycled materials.
4. Students will explore music and instruments and show how different materials create different sounds.
5. Students will experiment using music to add effect to words and poetry.

Recommended ages: This lesson was designed for elementary students entering 1st-5th grades, but can be adapted to fit any age level.

Subjects: Science, music, literacy, art

Duration: 1-2 hours

Materials: "Jazz Baby" by Lisa Wheeler, "Farmyard Beat" by Lindsey Craig or "Animal Music" by Harriet Ziefert, a variety of different instruments (drums, shakers, wind instruments, string instruments), a variety of recycled materials to create junk instruments (glass jars of different sizes, tubes, cardboard boxes of different sizes and weights, yogurt cartons and lids...), rubber bands, wire, string, glue, glue guns, other appropriate recycled items and tools for creating instruments.

Procedure:

1. Read "Jazz Baby" by Lisa Wheeler, "Farmyard Beat" by Lindsey Craig or "Animal Music" by Harriet Ziefert. Have the students practice clapping and tapping their feet to different rhythm and beats along with the book. Also have a variety of instruments out to play and experiment with as you read. The books all have a fun poetic beat to play along with. Play music that the children can use the instruments to play and dance along with as well. Point out all of the different instruments and notice with the kids how they are played (ie. Plucking strings, blowing into wind instruments, tapping or beating on a drum).
2. Discuss with the group what happens to trash over time that is put in landfills. Talk about daily items that get thrown away. Brainstorm as a group, creative ways that those items could be re-used or re-invented in some way to make something useful rather than having them end up in a landfill.

3. Explain that today we are going to use a variety of recycled materials and tools to create instruments. Show the students the materials and tools they have to work with. Put out a variety of recycled materials, glue guns, glue, rubber bands, string, pipe cleaners, wire...Have students think about a plan of the type of instrument they want to make and what materials they will need to make it.
4. Give students the time, materials, tools and support they need to create their instrument.
5. Once everyone is finished, bring the group back together. Read the story once again and have the students play their instrument to the beat of the story.

Extensions:

1. Have the students write poetry that has a rhythmic sound to play their instruments with in the background.
2. Have the students write lyrics to a song that could be sung along with their instruments.
3. Have the students brainstorm other ways that recycled materials can be re-invented and try to create some of their ideas with recycled materials.

Part Three: Re-Imagine It

Landfill Review, Composting and Garden Appreciation

Lesson 1: Creating an Edible Landfill (This will be review, but it gets into the details of parts of a landfill in a fun and delicious way.)

Rationale: By learning about where our trash goes after it is thrown away, students will understand the importance of reducing the amount of waste we create in an effort to reduce landfill waste, and conserve natural resources.

Objectives:

1. Students will understand and build an awareness that trash that is thrown into garbage cans will end up in a landfill or littering communities and wild spaces.
2. Students will learn how a landfill works and be able to explain why it is important to keep trash out of landfills.
3. Students will recognize the various elements that comprise a landfill: clay, plastic liner, pipes, trash, methanol, dirt, and grass.

Recommended ages: This lesson was designed for elementary students entering 1st-5th grades, but can be adapted to fit any age level.

Subject(s): Science

Duration: 30 minutes

Materials: Introduction to landfill video from Wisconsin Department of Natural

Resources: <http://dnrmedia.wi.gov/main/Viewer/?peid=2a22db48-c5b1-4d0b-aaba-dc06da415e>, lap top computer, screen for viewing video, projector, packing peanuts, empty soda bottle, blue paper, brown paper, black trash bag circles, straws, cardboard circles, candy wrappers, green construction paper, graham cracker pie crust, chocolate syrup, licorice, pudding, M&M's, Tootsie Rolls, crushed Oreo cookies, green sprinkles, chart paper, markers

Procedure:

1. Gather children to watch the introduction to landfill video.
2. Review key concepts about landfills.
3. Discuss with the students: What is a landfill? What can be put into a landfill? What should be kept out of landfills? How is a landfill designed?
4. Have a pre-made model of a landfill ready to show the students and introduce the layers of the landfill with a visual.

Directions for the pre-made model of a landfill: Using a clean, empty 2 liter bottle create the following layers:

- a. Groundwater- blue paper
- b. Clay-brown paper
- c. Liner-black trash bag circles
- d. Leachate Pipes- straws
- e. Drainage Layer- packing peanuts
- f. Soil- cardboard circles
- g. Garbage- candy wrappers
- h. Vegetation- green paper

5. Review the various layers of a landfill.
6. Discuss the by-products of a landfill (leachate & methane gas). Discuss with the students: What do landfill operators do with these by products? (they pipe the leachate to waste water treatment plants/use a special liner to keep the leachate out of our groundwater/turn the methane gas into energy)
7. Create an edible landfill model with the students as a final review of the layers in a landfill. See the following directions.

Directions for the edible landfill: With the children, use food items to create the following layers:

- a. Clay- pie crust
- b. Liner- chocolate syrup
- c. Leachate Pipes- licorice
- d. Garbage- vanilla pudding & M&Ms
- e. Landfill Gas/Methanol- Tootsie Rolls
- f. Plastic- chocolate syrup
- g. Dirt- Oreos
- h. Grass- green sprinkles

8. **Share:** Have students turn and talk to a partner about how they can help re-duce trash and recycle to reduce the number of landfills.

Extensions:

1. Take students to a local landfill to experience what a real landfill is like.

Lesson 2: Composting: Setting-Up an Instructional Composter

Rationale: The Average American produces approximately 4.4 pounds of garbage a day (*Environmental Protection Agency*). Much of this garbage can be composted! Composting reduces the amount of waste we send to the landfill, returns nutrients to the land, retains moisture in gardens & on lawns, and is a natural fertilizer.

Objectives:

1. Students will understand and build an awareness that trash that is thrown into garbage cans will end up in a landfill or littering communities and wild spaces.
2. Students will learn how composting works and be able to explain why it is important to compost.
3. Students will recognize the various elements that comprise a compost: soil, water, air, biodegradable matter
4. Students will be able to identify which items can be composted and which cannot.

Recommended ages: This lesson was designed for elementary students entering 1st-5th grades, but can be adapted to fit any age level.

Subject(s): Science

Duration: 30 minutes

Materials: Compost Stew by Mary McKenna Siddals, Educational Insights See-Through Composter, soil, water, measuring cup to pour water, banana peel, plastic bag, compostable coffee cup or similar.

Procedure:

1. Read *Compost Stew*. Talk with the students about what types of items can be put in a composter. The story gives examples of various items that can be composted.
2. Review key information about the importance of composting. Remind students that trash often ends up in plastic bags in a landfill. Composting will not only cut down on waste, but will make trash re-usable in a garden.
3. Tell students that together we will create a composter that will enable us to watch the breaking down (decomposition) of common household trash.
4. Use a store bought, see through, small composter divided into 3 parts (*Educational Insights has a good educational composter*) or create one of your own that allows students to watch the decomposition process. To set-up the see-through composter, each section should be filled with dirt. Three different items should be placed in each section of the composter for the students to observe. Three examples may include a banana peel, a plastic toy or bag and a biodegradable fork or cup. Each day,

a students or staff member will need to pour some water on the dirt and stir to help in the decomposition process. Give students an opportunity to be part of the process.

5. Inform students that the composter will be on display for daily/weekly check-ins.

Extensions:

1. Have a staff person (or student(s) depending on age) assigned to photograph the daily progress in decomposition in order to create a time lapse slide show at the end of the process.

Garden Appreciation

The following lessons create garden art projects that enhance gardens through using recycled materials. Before beginning the following projects, it is important to have or create a garden with the students. The students must participate in designing, planting and upkeep of the garden to make the fullest impact on their understanding of how growing their own vegetables, herbs and flowers is an organic, healthy and sustainable practice. At the Jackson Hole Children's Museum we planted vegetables, herbs and flowers with our students in a small outdoor space we named the childrens garden. We used a variety of containers, metal troughs, traditional pots and a hanging "pallet" garden for herbs and small fruit. Students and museum visitors helped plant, water and harvest the garden throughout the summer.



Yard Before...



Garden After!

Lesson 3: Creating Melted Crayon Rocks using recycled (broken) crayon parts to decorate your garden.

Rationale: According to the Environmental Protection Agency, Americans produce on average 4.4 pounds of garbage each day. In the Garden Appreciation lessons that follow students will learn how to creatively reuse materials to decrease the amount of garbage we produce.

Objectives:

1. Students will learn that reducing the amount of trash we create is paramount in protecting the environment.
2. Students will gain an understanding of the concept of reusing materials in order to reduce the amount of trash created.
3. Students will create garden art using materials that would have otherwise been thrown into the trash.

Recommended ages: This lesson was designed for elementary students entering 1st-5th grades, but can be adapted to fit any age level.

Subject(s): Art

Duration: 45 min (15 min. cook time, 30 min. activity time)

Materials: rocks of similar sizes, old crayons with labels removed, reusable lunch trays or recycled pie tins, cookie sheets, aluminum foil, oven mitts

Procedure:

1. Gather a colander full of rocks, wash and dry them.
2. Spread the clean rocks out on a foil-lined cookie sheet and put them in a 350 degree Fahrenheit oven to heat up (approx. 15 min).
3. Once the rocks are hot, transfer them one or two at a time to a protected surface to work. Using aluminum pie plates or reusable paper lunch trays works well as a work surface.
4. The crayon melts over the surface of the hot rocks when pressed on top of the hot rock. It creates a smooth, vibrant, colorful coating that hardens into a waxy shell.
5. The melting crayon becomes a liquid, so it is like painting with crayons. You can use one color or several. Make designs, swirls, dots, stripes, faces...
6. Share rocks with the group and place them decoratively in the garden.

Lesson 4: Creating Wind Chimes from Recycled (found) Metal Materials

Objectives:

1. Students will learn that reducing the amount of trash we create is paramount in protecting the environment.
2. Students will gain an understanding of the concept of reusing materials in order to reduce the amount of trash created.
3. Students will create garden art using materials that would have otherwise been thrown into the trash.

Recommended ages: This lesson was designed for elementary students entering 1st-5th grades, but can be adapted to fit any age level.

Subject(s): Art

Duration: 30-45 min.

Materials: keys, metal washers, metal bolts, metal wing nuts, and any other small metal object that can be tied onto string, string/yarn cut into 7-9 equal lengths per student, metal rings (The tops of canning jars with a hollow center work well), masking tape, chart paper, pens

Procedure:

1. Have a conversation with students about what they think happens with old keys, nuts, bolts... that are no longer being used. Have students brainstorm ideas of how these objects can be re-used. Chart student's ideas on chart paper.
2. Explain to the students that today they will use recycled keys and metal objects to make wind chimes for the garden. Have a model pre-made to show the students and give directions on how to make the wind chimes with the following directions.
4. Each student receives 1 metal ring which will serve as the top of the wind chime.
5. Select 7-9 metal objects for hanging from the metal ring.
6. Wrap a small piece of masking tape around one end of each piece of yarn to make threading through holes easier (optional depending on fine motor skills of students).
7. String one piece of yarn through the hole in a key or other metal object & tie tightly around the metal object. Repeat for all 7-9 metal objects.
8. Hang each string with metal object tied to the end from the metal ring so that all the objects dangle and can bang into each other making a chime sound.
9. Have students hang their wind chimes in the garden.

Extensions:

1. Re-visit the chart made at the beginning of class of how students would use recycled keys and other metal objects. Help students design their own projects from these ideas.
2. Brainstorm other recycled materials that could be made into wind chimes. Have students design and create these as well.