



Effect of Improper Garbage Disposal on the Earth

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Nations Ford Elementary School

This curriculum unit is recommended for:
Kindergarten - 4th grade

Keywords: Reuse, Recycle, Reduce, Pollution, Biodegradable, non-biodegradable, Waste, Garbage, Disposal, Compost.

Teaching Standards: See [Appendix 1](#) for teaching standards addressed in this unit.

Synopsis: This curriculum unit is designed for elementary students to build a basic concept of the effect of improper garbage disposal on the earth. This unit spans 5 to 6 classes and includes four mini lessons that teach basic vocabulary terms, four hands-on lessons, one nature field trip, one project and an assessment. This unit will empower children with opportunities to keep the earth clean and to connect with the earth. It will encourage children to make a family goal to find out about local landfills, how much garbage they generate, and the different ways to dispose of different items properly. This unit is targeted to teach kindergarten through fourth grade. This unit will last approximately 4 to 5 weeks with one class a week.

I plan to teach this unit during the coming school year to approximately 300 students in kindergarten through fourth grade.

I give permission for Charlotte Teachers Institute to publish my curriculum unit in print and online.

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Namrata Gupta

Introduction

One beautiful morning, I found myself stopped at a traffic light. As I looked around to admire the scenery, I saw someone throw a lit cigarette out into the street. The light soon turned green and I started to think about the cigarette. This one was thrown on to the road, but other people throw cigarettes into oceans, creeks and many other places that soil our environment. Where would these all end up if no one came to pick them up? From then on, I had a drive to take action. As a teacher, I felt the best way that I could do this was to make my students aware of trash disposal and the effects on the Earth of littering. I want my students to develop an awareness about how to take care of our earth and how each of us can contribute.

Environmental problems are becoming more and more serious all over the world. The earth is our home and we have the duty to take care of it for our later generations and ourselves. We all want to protect our planet, but we are mostly too busy or too lazy to initiate the big changes that would improve our lifestyle and save the environment. For this reason, I chose this topic so I can teach my students as early as possible about our environment, how to protect it and how everybody can contribute towards it.

One of the major ways to get students to connect to the learning material is to make it meaningful. In order to do this, the material must relate to real life situations therefore making it relatable to the students themselves. For this unit, I would like to connect the children with the Earth by taking them on nature walks so that they can explore nature from a first-person point of view. I would also like to utilize the chromebooks that the students have so that they can learn through technology and incorporate 21st century skills and expectations.

Summer Research and CTI seminars

The CTI seminars are providing me the opportunity to gain a more in-depth knowledge of scientific processes as well as how to implement these processes in a classroom environment. In our seminars, we visit UNC Charlotte research laboratories and have an opportunity to experience hands on activities to acquire firsthand knowledge. We are also able to meet with the professors who head these laboratories to learn about their different research areas pertaining to their individual field of study. After each laboratory visit, we sit together to discuss and share our thoughts.

In one of our discussions with Dr. Susan Trammell, we discussed the problem that first year college students were having when it comes to analyzing the results of an experiment. I felt that this caused these students to not understand the experiments. The students needed to be more aware of the scientific process and ways to portray the results. We concluded our discussion with

the ways and means to make these kinds of experiments accessible to students at primary levels so as to train them in performing these experiments at a very young stage and the ways to present their outcomes.

In my classroom, I have already started to implement the data analysis process, even with our kindergarten students. This ensures that by the time they reach 5th grade, they will be able to make sense of the science experiments using data sheets. In turn, they will be ready for material and laboratory work taught in college.

School Demographics

The Nations Ford Elementary is a Pre K-5 Title 1 school in Charlotte, North Carolina and serves as a home school to students in surrounding neighborhoods. It is a part of the Beacon Learning Community in Charlotte-Mecklenburg School System (CMS). There are approximately 900 students in the school. The current demographics of the school are 75% Hispanic and Latino, 20% African-American, and 5% other races including Whites and Asians.

The Nations Ford Elementary School is committed to social and emotional needs of their students. In order to determine intervention needs, students receive regular benchmark assessments to establish their level of skill and receive instruction that best meets their individual learning levels. The school monitors the progress of students on a regular basis to ensure that students are making adequate academic growth. Along with academic excellence, our school also offers site based counseling and social skills training to help students form positive relationships. This unit is designed to target/benefit students from grades K through five. The unit can also be used to benefit middle and high school students.

As a science lab teacher, I have access to all the 900 students in my school. I get access to my students once a week for 45 minutes. I will travel to each of the different classes because I do not have my own classroom. My schedule allows for one science instruction once a week for each class.

Rationale

Science Standards and Testing

In North Carolina and across the country, science instruction in K-4 classrooms is often put on the back burner to math and literacy instruction. By the time the students reach fifth grade, they are expected to take and pass a NC Science EOG at the end of the school year. They are then required to go to the level of science classes in middle school.

I think a strong foundation attained in Kindergarten is important to the students' success. When people say they do not like science, it is most likely because of a bad experience they have had as a child that has shaped their negative opinion. Hence, it is very important to focus on working with early childhood educators to learn how to create an amazing experience that encourage a discovery through play, asking questions, exploration and using creativity to solve simple problems.

Objectives

North Carolina and Charlotte-Mecklenburg Schools use the North Carolina Essential Standards in Science to guide assessment and curriculum planning. I follow these standards closely and help support classroom teachers in their teaching of objectives.

The curriculum of the Charlotte Mecklenburg Schools introduces the concepts of “3 R’s”: reduce, reuse and recycle at the elementary level. However, the lessons do not get into details on the cause and effect of improper garbage disposal and how it affects all of us in the society. In this unit, I will focus on how the school and individual students can learn about proper garbage disposal techniques and take these ideas home and to their neighborhoods to better their communities.

I want my students to develop an awareness about how to take care of our earth and how each of us can contribute. Environmental problems are becoming more and more serious all over the world. The earth is our home and we have the duty to take care of it for our later generations and ourselves. We all want to protect our planet, but we are too busy or too lazy to implement the big changes that would improve our lifestyle and save the environment. For this reason, I chose this topic, so I can teach my students regarding our environment, how to protect it and how everybody can contribute towards it. Improper waste disposal is an important current issue in today’s society. Currently there is an effort to promote greener living. However, the efforts tend to fall short as people start to make concessions in their efforts.

This unit will focus on reducing, reusing and recycling material waste at the school in hopes that the students will implement what they have learned in this unit in their day-to-day lives promoting a greener planet. In addition to this, the unit will explore where the waste ultimately ends up, as well as, the impacts of improperly disposed wastes on land, air, water, and other biotic factors in the environment. Waste is generated constantly by all humans and improper disposal of this waste can add up and have negative consequences. When waste is not disposed of properly such as illegal dumping along roadsides, woods, lakes, and streams or being improperly burned, the environment can be impacted in a negative way.

The goal of this unit is to teach my students four things;

- Introduce the 3R’s
- Describe how soil organisms recycle organic waste through composting
- Predict where household hazardous waste could end up if it is not disposed of properly
- Understand the contributing causes of improper waste management

Beyond Standards & Testing

Teaching science in schools goes beyond just preparing students for assessments. Our future depends on a public that can use science for personal decision-making and to participate in civic, political, and cultural discussions related to science. Though we have national goals for science education, science is often pushed to the side, particularly at the elementary school level. Over six billion people live on our earth. Every person creates waste such as food packages made of

cardboard and plastic, aluminum cans, worn out tires, used paper etc. Every kid needs to learn about where the trash goes once disposed of, as well as, how they can help the environment. As educators, we need to start teaching about the environment; about global warming, waste management and this process should start in elementary school.

Background Knowledge for Teachers

Reduce

The words reduce first appeared in Old French during the 14th Century, when it meant, “bring back”. The current meaning “to lessen” appeared in the late 1700’s. You reduce something when you lessen its volume, size, or degree. That’s why we say when someone goes on a diet, it’s because they want to *reduce*; it’s a polite way of suggesting they need to drop pounds and become a smaller size.

Reduce always comes first because reducing what we use and what we waste means using fewer natural resources and less energy. Less waste also means less land put aside for burying waste in landfills. Ways to reduce waste include purchasing goods that use less packaging, sharing or renting things (like carpet cleaners) that aren’t needed regularly instead of buying them, and buying household cleaners that do not contain hazardous ingredients. Solid waste reduction is critical. Americans generate an average of 4.5 pounds of waste per person each day! Source reduction or waste prevention helps to conserve resources, reduce greenhouse gas emissions, conserve energy and reduce the costs related to waste handling and disposal. Source reduction/waste prevention is a priority for the U.S. Environmental Protection Agency (EPA).

Good source reduction practices include, donating items, buying in bulk, borrowing or renting infrequently used items, reusing containers and repairing/maintaining durable items. Over the past twenty-five years, a 17-gram reduction in the weight of each two-liter plastic bottle has resulted in a 250-million-pound reduction of plastic per year in the solid waste stream. When a fast-food restaurant reduced its napkin size by an inch, 12 million pounds of paper reduced the solid waste stream! A switch to lighter-weight containers in 1999 conserved of 3,200 tons of cardboard [01].

Reuse

To reuse something is to make use of it more than once. Asking for a plastic bag at the grocery store might seem wasteful, but one can *reuse* that bag many times. Instead of throwing something away after using it once, it would be prudent to ask oneself if there is any way one can reuse it. One can reuse a paper towel roll by putting it in ones’ hamster’s cage, so the hamster can crawl through and chew on it. One can reuse containers like glass jars and plastic tubs by storing leftovers in them. One can even reuse kitchen scraps by composting them and using the compost in your garden.

Reuse comes second because reusing items, using them twice or many times instead of just once, keeps them from becoming waste. Some ideas for reuse include using glass or plastic jars after they are empty, or taking a cloth sack to the store when you shop. When we reuse an item,

which would have normally found its way into the solid waste stream, we save energy and save natural resources.

Reusing, however, can also mean giving away items to friends or neighbors who can use the items. Donating to churches and other community charities are additional ways to reuse items rather than throwing them away and adding them to the waste stream. Buying and selling items through yard sales also helps to reduce the waste stream and save energy. Teachers can reuse items to create classroom crafts, collages, montages and posters. Having an art show to display student creativity sparks viewer imagination for reusing items. Reusing items is a valuable way to reduce the solid waste stream. [01]

Recycle

The prefix *re-* means again, and when you recycle something you process it for another cycle of use. The phrase "reduce, reuse, recycle" gives you three ways to prevent waste. Recycle comes third, but not last. Recycling, converting used items back into raw materials, for making new products with them. Recycling includes collecting, sorting and processing certain solid waste into raw materials for remanufacture into new items. This conserves our valuable natural resources and reduces the need to put waste into our landfills. Many items can be made from recycled materials such as paper, notebooks, playground equipment, furniture, and carpet.

When you recycle plastic bottles, they are made into new bottles or even furniture or clothing. You might do some creative recycling and turn your old textbooks into a coffee table. When you have your washing machine repeat the wash or rinse cycle, that's a different recycle. When consumers purchase products manufactured from recycled material, they close the recycling loop. Glass, aluminum, plastic, newspaper and cardboard, are among the most commonly recycled items. Recycled glass can be used repeatedly. It has been used for road filler and roadway asphalt. Aluminum beverage containers can be recycled into new cans within 90 days. Our entire commercial air fleet could be rebuilt from the aluminum cans Americans throw away every three months. By recycling aluminum cans, we can save 95% of the energy needed to make a new aluminum can from scratch. Recycling, including composting, diverted 79 million tons of material away from disposal in 2005, up 15 million tons in 1980, when the recycle rate was just 10% and 90% of MSW was being combusted with energy recovery or disposed of by landfilling. Batteries are recycled at a rate of 99%; paper and paperboard at 50%, and yard trimmings at 62%. Businesses, governments and community members all recycle.

When participating in a recycling program, it is important to observe the community is following recycling procedures. For example, one may need to sort their items and place them in specially marked containers or bins. Encourage neighbors, friends and classmates to recycle. It is always good that buying products made from recycled materials saves energy, conserves resources and encourages manufacturers to use recycled material. Products made from recycled content perform just as well as those manufactured from non-recycled raw materials. Every day, more and more products are being manufactured from recycled materials.

Causes and effects of improper garbage disposal

Cause: Laziness

People are not following correct rules of proper waste disposal. They throw their waste in whatever place they want without thinking what will be the effect of that improper disposal. They aren't able to give time to finding bins for garbage disposal.

Cause: Ignorance

People are unaware of the consequence of their unwise acts. They do not think about the effect of their actions on Mother Nature. This is related to selfishness for they don't think about how it will affect others.

Cause: Greed

Instead of keeping or trading excess things to maximize uses, people buy new one for only like not a need.

Effect: Health Effects

Lung diseases, heart problems and skin irritation are examples of diseases due to pollution caused by improper garbage disposal.

Effect: Damage to the coastal and marine environment

Dangerous wastes if dumped into the environment leeches into the ground and the groundwater where some communities get their drinking water. In marine environment, improper waste disposal kills aquatic animals due to the excretion of chemicals. or if sea animals consume items such as plastic bags.

Effect: Climate

As some waste decomposes, it releases greenhouse gases into the atmosphere trapping of heat affecting weather conditions.

Effect: Air pollution

Air pollution is caused by Burning waste such as rubber or plastic causes air pollution.

Effect: Soil Contamination

Soil contamination is caused by the presence of man-made chemicals (e.g. petroleum hydrocarbon, solvents, pesticides, lead etc.), leaching from landfills or incorrect disposal of industrial wastes. It is observable by the softness of the ground, having smelly soil vapor and other alterations to the natural soil environment.

Composting

Controlling the natural recycling system of decomposition, which converts organic material into a dark soil like material is called composting. Composting is the oldest form of recycling. In nature, soil organisms called decomposers digest organic material such as leaves, dead plants and animals. The digestion process converts the fresh material into humus, a dark brown component of soil rich in plant nutrients. It provides an opportunity for students to observe the decomposition process and energy cycle at work, produces a valuable soil supplement, and reduces the amount of organic material requiring landfilling or incineration.

A compost pile is a teeming microbial farm. Bacteria start the process of decaying organic matter. They are the most numerous of the decomposer organisms - one tablespoon of soil contains billions of bacteria! Fungi and protozoans soon join the bacteria and, somewhat later in the cycle, earthworms, centipedes, millipedes and beetles do their parts. Each organism has a role in the food web of the compost pile. Successful composting is simply a matter of providing the conditions in which the decomposer organisms will flourish. Like us, they need food, air, water and a habitable temperature.

Health Considerations

If you are aware of any students in the class with allergies or asthma, those students should not handle compost without gloves, and should not stir the compost or put their face into the compost bin. Observing from the side of the bin should not present any problem. They can add material, but another should do the burying or stirring. Observing the compost samples without smelling or touching them should not present any problem. Students with compromised immune systems should not participate in this activity without their doctor's approval.

Practice good personal hygiene when handling compost. Students must always wash their hands with soap or wear gloves after adding material, stirring or handling the compost. The majority of organisms in soil are harmless to humans and cannot survive our body temperature, but prevention is the best. One should avoid certain inputs to the compost pile such as raw poultry or meat wastes, pet feces, and plate scrapings from people who are ill. The composting systems are generally kept hot long enough to reduce pathogens. If the compost is particularly dusty, watering is an option. If possible, allow composts that are produced in a small-scale setting to age for at least a year before use. [02]

Biodegradable

Waste materials can be classified as biodegradable and non-biodegradable. Therefore, categorization and proper disposal of wastes are necessary. Biodegradable wastes are waste materials, which can be degraded by natural factors like microbes (e.g. bacteria, fungi and few more), abiotic elements like temperature, UV, oxygen, etc. Some examples of such wastes are food materials, kitchen wastes and other natural wastes. Microorganisms and other abiotic factors together break down complex substances into simpler organic matters, which eventually suspend and fade into soil. The whole process is natural which can be rapid or slow. Therefore,

the environmental issues and risks caused by biodegradable wastes are low. But the huge dumping of waste can raise some threats to life sooner or later. To avoid this, some people practice composting. In composting, the biodegradable wastes are dumped into a pit and covered for a period. Due to the action of microbes, they will decompose and will be used for cultivation purposes. This will reduce the amount of waste at landfills. [03]

Non-Biodegradable

Unlike biodegradable wastes, non-biodegradable cannot be easily handled. Non-biodegradable wastes are those who cannot be decomposed or dissolved by natural agents. They remain on earth for thousands of years without any degradation. Hence, the threat caused by them is also more critical. A notable example are plastics, which are a commonly used material in almost every field. New plastics are more temperature resistant and more durable even after use. Other examples are cans, metals, and chemicals for agricultural and industrial purposes. They are the main causes of air, water and soil pollution. Since non-biodegradable wastes are not eco-friendly, they need to be replaced. As a part of a development of alternatives, scientists have brought forward many ideas like biodegradable plastics, etc. They incorporated some biodegradable materials with plastics and made them easily and rapidly degradable. Nevertheless, this is quite an expensive procedure. Most of the inorganic waste is non-biodegradable. Non-biodegradable wastes that can be recycled are known as “Recyclable waste” and those, which cannot be recycled, are known as “Non-recyclable waste” [04]

Teaching Strategies

Science as Inquiry Research shows that young students work well in a cooperative learning environment. Students should be actively involved in exploring phenomena in the natural world posing questions and seeking answers as they arise. Students develop simple skills of observation, measurement and number sense as they actively participate in simple investigations. During investigations, students must have the opportunity to use tools such as magnifiers, thermometers, rulers, or balances to gather data and extend their senses. They must have ample time to talk about their observations and compare their observations with those of others. They should be encouraged to employ oral language, drawings and models to communicate results and explanations of investigations and experiments. In a cooperative learning environment, students learn that when people give different descriptions of the same thing, it is better to make new observations instead of debating about what is correct. Students must always use appropriate safety procedures, including listening skills, when conducting simple investigations.

In my class, activities are chosen based to create an inquiry based science experience for my students. Most of the lessons are interactive and are divided into teacher input, guided practice or additional investigation, independent practice or group activity, explanation of results or investigation and finally additional questions or ideas to explore. I incorporate the use of the smart board and videos from Discovery Education, Gizmo, PBS, and Brain Pop on a daily basis. I engage students by including hands-on activities, labs and investigations during most class periods. In order to fully engage the students, the majority of the learning is facilitated by the instructor but led by the students. Students work in cooperative learning teams in order to complete most of the class assignments. Cooperative learning ensures that everyone on the team

is responsible for the accuracy of the measurements, conducting the experiments, completing their own science notebook and staying on task. To run a group activity, I give them a card that has an assigned job, which becomes their responsibility. The cards are Project Engineer, Materials Engineer, Data Engineer, Construction Engineer and Computer Engineer.

At the CTI Summer Research Program held this previous summer, we had the chance to work with graduate students and professors partaking in summer research. Throughout the program, I learned how a lab operates first hand. This includes observing the way in which experiments were conducted, how the lab students and professors worked together, how they analyzed results to reach a conclusion, and finally the findings of the experiments were presented. It will be important to have the students always use the Scientific Method steps:

1. Form a question based on a problem.
2. Research and gather what you know.
3. Create a Hypothesis.
4. Test the hypothesis and experiment.
5. Analyze the data.
6. Communicate the results.

Frayer Model for Learning Vocabulary

Dorothy Frayer and her colleagues at the University of West Virginia came up with vocabulary-based teaching strategies known as "the Frayer Model." used by thousands of educators. This approach to word study relies on teaching strategies that analyze words rather than having students memorize definitions. Somewhat like concept circles, the Frayer Model uses a graphical organizer that asks students to describe words by much more than a memorized definition. In a perfect world, vocabulary is learned in context. The phrases and sentences around the unknown word define the meaning. If that is not sufficient, students use affixes -- prefixes, suffixes, and roots -- to decode meaning. Somewhat like concept circles, the Frayer Model uses a graphical organizer that asks students to describe words by much more than a memorized definition. Students must define the term and then describe essential characteristics, provide examples and provide non-examples. Because the Frayer Model teaching strategies dig deeply into understanding the word, it promotes critical thinking and a familiarity with unfamiliar vocabulary. It draws on a student's prior knowledge to build connections among new concepts and creates a visual reference by which students learn to compare attributes and examples.

Instructional Implementation

This unit will take about four weeks, one (45 minute) class per week.

Day 1

Goal: To introduce vocabulary words used with a Frayer model (Recycle, Reduce, Reuse, Garbage, Disposal, Biodegradable, Non-biodegradable). A lesson Plan and Frayer Model Graphic Organizer are provided in Appendix 2.

Teacher Input

We will begin the first lesson by introducing the important vocabulary words. Reading, writing, and other communication in science requires the use of unique vocabulary. I feel that part of the battle of learning is developing the needed vocabulary so that students can understand the skill that is being taught. Part of disciplinary literacy instruction in science is educating students so that they are able to communicate like scientists, which means they need to use the language of science. In my day-to-day science lessons, I always introduce a new lesson with its vocabulary. I will start by introducing all the vocabulary words from the unit the teacher will provide copies of the Frayer Model Graphic Organizer to students and explain the process. Next, display the Frayer Graphic Organizer and explain each of the sections. Use one common vocabulary word to demonstrate the various components on the form. Once the students finish their graphic organizer, they will share their work with the whole class.

The students will have a chance to explore each vocabulary word through *Discovery Education Animation Explore Activity* where one can type each word and observe live action of each word with explanations. At times animation of each word it is very helpful especially for ESL and EC students.

Day 2

Goal: Students will gain an understanding of how recycled paper can be used to make new paper. By making their own paper students will recognize the importance of conserving and recycling. A lesson plan and Activities 1 and 2 are provided in Appendix 3.

Teacher Input

To ensure students have a clear understanding of their new vocabulary words, the teacher will review the lesson from Week 1 to refresh the students' memory of the topic. This will lead to a better understanding of the material by solidifying the knowledge they acquired during the previous week. The class will then go through the vocabulary words and the teacher will collaborate with the students to think about how to recycle waste. The teacher will then ask students to share what they may know about recycling and then the teacher will explain to the students that recycle means to use something all over again. The following are examples of things that can be recycled: glass bottles, plastic water bottles, detergent bottles, cereal boxes, newspapers, magazines and plastic yogurt cups.

Activity 1: Making recycled paper. Making paper by hand at home or school can be a simple process. It is also a fantastic way to use up our old receipts, scrap papers, junk mail and copy paper that you were about to throw in the recycling bin, and instead create glorious handmade paper. Everything you can imagine from magazines to packaging materials can be used. The paper must still be clean, dry, and free of food, plastic, wax, and other contamination. Paper that cannot be recycled includes: food contaminated paper, waxed paper, waxed cardboard milk & juice containers, oil soaked paper, carbon paper, sanitary products or tissues, thermal fax paper, stickers and plastic laminated paper.

Activity 2: Making Necklaces with scrap papers. Turn junk mail, magazines, brochures, last year's calendars, and gift wrapping paper into cool beads that may be used for bracelets or necklaces.

Day 3

Goal: Students will learn how soil organisms recycle organic wastes through composting. A lesson plan and Activity 1 are provided in Appendix 4.

Materials needed: Popcorn. Zip lock bags small and big sizes, large bottle of juice and packs of juice.

Teacher Input

The teacher will explain to the class the idea of reducing waste with an interactive session with the students. The session begins with the idea of avoiding producing more garbage with examples. Less garbage means less waste and hence a lower need for disposal or recycling. The example starts with an inquiry into the waste produced when making popcorn. Which makes less waste - making small individual bags versus using a big bag. The example concludes with displaying the amount of waste generated in both scenarios. The students learn that individual packing generally generates more waste or garbage. How about replacing the big bag of popcorn with a reusable container? That would generate practically no waste and hence a superior option if that can be used. The second example to present in the class includes demonstrating that a bottle of juice produces practically no waste in comparison to individual packs of juice boxes. The teaching session concludes with more examples and asking the students to predict which of these items makes more waste, telling the students that it takes more paper and plastic to make the wraps and boxes which needs to be disposed of, asking questions to ensure students' understanding of the differences between the items presented to them and encouraging students to think of other examples of how to reduce waste. The following prompts may be used as a guideline to stimulate discussion.

- If you write on both sides of paper, how does this reduce waste?
- If you buy 1 big bottle of detergent instead of 3 small ones, how does this reduce waste?
- If you use a reusable lunch box or bag instead of paper, how does this reduce waste?

After the discussion teacher will introduce the term, compost i.e. composting is controlling the natural recycling system of decomposition, which converts organic material into a dark soil like material called compost.

Activity 1: School garbage compost activity.

Students will observe soil organisms in a compost sample, then fill a compost bin with organic wastes and observe the decomposition of the organic wastes. This activity will take one class, but students will see the final product after 4 weeks. This activity can be done

during spring so after 4 weeks compost will be ready for use in the school garden after spring, before summer vacation.

Day 4

Goal: Students will understand how we can reuse things at home and in school to reduce wastes.

Teacher Input

The teacher will ask the students what they know about reusing things by asking the following questions to access their prior knowledge: Did you ever go to a yard sale? What is a yard sale? Did you ever donate your old toys or clothes to a charity? Did you ever give clothes that no longer fit you to a brother, sister or a cousin? Did you ever use an old glass jar to hold your pencils, pens or paintbrushes? The teacher will tell the students that these are all examples of reusing things. The teacher will show the following items to the class and ask how they might be reused: gift wrapping paper, lunch bags, a toy, an empty peanut butter jar, a Cardboard box, a plastic milk jug, a detergent bottle and an empty plastic soda bottle The teacher will encourage students to bring examples into class. Explain to the class how reusing things instead of throwing them out can help take care of the earth.

Goal: Students will understand the concept of cause and effect of improper garbage disposal.

Teacher Input

There are a variety of types of waste, including household waste and biomedical waste. Each type of waste requires proper disposal. With improper disposal of any form of waste comes increased chances of pollution to the environment and food sources and increased risk of exposure to disease. Before doing this lesson they have to have basic knowledge of cause and effect and how it works. Students will be able to define biodegradable and non-biodegradable waste. A cause is something that makes something else happen. Out of two events, the event happens first. To determine the cause, ask the question "Why did it happen?" An effect is what happens because of the cause. Of two related events, the one happens second or last. To determine the effect, ask the question "What happened?"

Resource: Cause and effect chart (see Appendix 5)

Goal: Students will differentiate between biodegradable and non-biodegradable materials

Teacher Input

The things are broken down by microorganism i.e. fungi and bacteria into simpler things, such things are called biodegradable e.g. food items (fruit, vegetables, grains, flour, bread) paper, clothes, dead body etc. The things that are not breakable by microorganism into simpler things are called non-biodegradable e.g. shopping bags, plastics, rubber things made

of glass etc. Explain the concept of decomposition; inform the students that there are things around us, which are made up of easily degradable materials while others last for thousands of years without any significant decomposition. Divide the students into two groups. Give them following materials.

Activity 1: Why does milk get spoiled? (see appendix 5) In this activity, students will follow the steps of scientific method and draw conclusion based on their lab results.

Activity 2: The Good Litter Survey. Hand out the “Good Litter Survey” (GLS – see Appendix 5). Ask students to cut out all the potential sources of debris we generate in our daily lives. Students can fill in any they think of that aren’t listed. Once the ‘debris items’ are cut out, ask the students to organize them in the table according to where they think they belong. Tape or staple the items in the ‘appropriate’ category.

Assessments K-5

In this assessment students will be presented with the idea of reduce, reuse, recycle and formulate a solution to how as a school, we can reduce our waste and disposals. They will make several advertisements to promote these concepts to the school for Earth Day. Students will research and formulate different projects making awareness posters and school advertisements. (see Appendix 6 for details)

Appendix 1

Implementing Teaching standard

Kindergarten North Carolina Teaching Standards:

KE 1.1, Infer that change is something that happens to many things in the environment based on observations made using one or more of their senses.

KL 1.2, Compare different types of the same animal (i.e. different types of dogs, different types of cats, etc.) to determine individual differences within a particular type of animal.

KP 2.2 Infer that change is something that happens to many things in the environment based on observations made using one or more of their senses.

First Grade Standards:

1. L.1 Understand characteristics of various environments and behaviors of humans that enable plants and animals to survive

1. L.1.3 Summarize ways that humans protect their environment and/or improve conditions for the growth of the plants and animals that live there (e.g., reuse or recycle products to avoid littering).

4th Grade Standards:

4. L.1.1 Organism and Ecosystems: Give examples of changes in an organism's environment that are beneficial to it and some that are harmful.

Appendix 2

Day 1

[Lesson plan:](#)

(see https://drive.google.com/file/d/1CD1qye7rSR_wERY2hkRBpe2y1mKA0JpK/view)

Activity: Frayer Model (see www.theteachertoolkit.com/index.php/tool/frayer-model)

My Definition	Characteristics/Facts
Examples	Non-Examples

Appendix 3

Day 2

Lesson Plan and Activity 1: Making Recycled paper (see http://media.wfyi.org/IndianaExpeditions/IDEXSeason3_2010/IDEX303/IDEX303GreenScienceMakingRecycledPaper.pdf)

Activity 2: Making necklaces with scrap paper (see www.kidspot.com.au/things-to-do/activity-articles/make-a-paper-bead-colour-necklace/news-story/8dce19e0652b58818b5523f4d5d77c65)

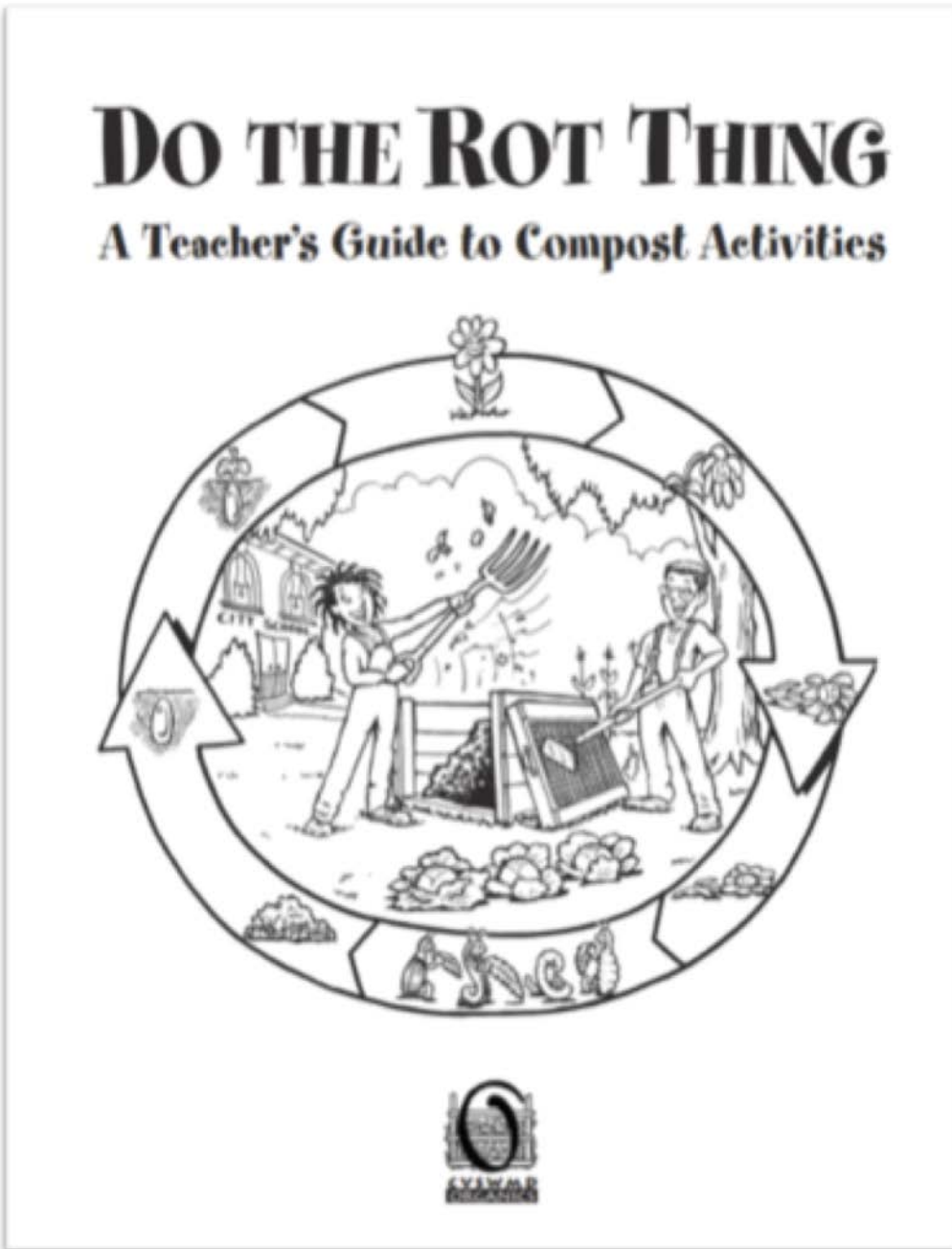


Appendix 4

Day 3

[Compost Activity: School Garbage Compost](#)

www.cvswwmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvswwmd1.pdf



Appendix 5

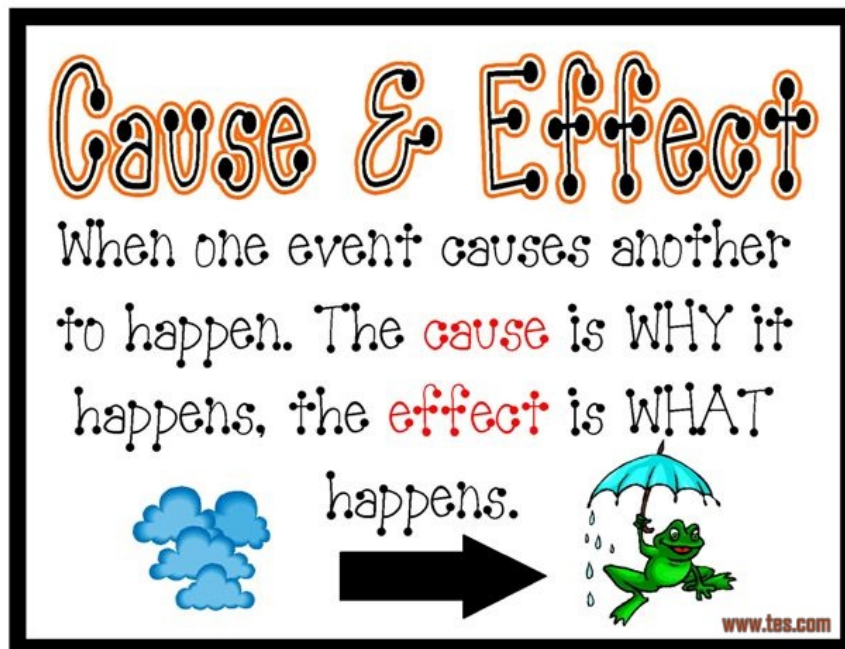
The Good Litter Survey Sheet

<p>Glass Bottles</p> <p>Cigarette Butts</p> <p>Plastic Utensil</p> <p>Cans</p> <p>Fruit</p> <p>Fishing Line</p> <p>Diapers</p> <p>Styrofoam</p> <p>Paper</p> <p>Bones/ Meat</p> <p>Food Wrapp</p> <p>Broken Glass</p> <p>Chip Bags</p> <p>Doggy Poo</p> <p>Food Wrappers</p> <p>Plastic Bottles</p> <p>Needles</p> <p>Types of Trash.</p>	<p>Unacceptable Types of Litter (things you don't want to throw on the ground)</p>	<p>Acceptable Types of Litter (things you that you think ok to throw on the ground)</p>
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Activity 1: Why does milk get spoiled? <https://www.education.com/download-pdf/science-fair/83155/>

YouTube video - Differentiate Between Biodegradable and non-biodegradable materials <https://www.youtube.com/watch?v=f-fcY5v27r0>

[Cause and effect chart](https://drive.google.com/file/d/1Z1cC6jvUxkW4zVtRAPyQI2el_IZKUSXe/view) (see below). You can access a copy of the chart at https://drive.google.com/file/d/1Z1cC6jvUxkW4zVtRAPyQI2el_IZKUSXe/view



Appendix 6

Assessments

K-5 <https://drive.google.com/open?id=0B9zlxh2llgwQUGRjTmhzd1JWLUE>

REDUCE * REUSE * RECYCLE * COMPOST

List two ways that you can reduce waste.

1.

2.

List three things in your home that you can reuse.

1.

2.

3.

List four things you can recycle at home.

1.

2.

3.

4.

List two things you can use to compost at home.

1.

2.

Name: _____

DRAW A PICTURE FOR EACH WORD

I can reduce... _____



I can reuse... _____



I can recycle... _____



I can compost... _____



I cannot recycle... _____



In this assessment students will be presented with the idea of reduce, reuse, recycle and formulate a solution to how as a school, we can reduce our waste and disposals. They will make several advertisements to promote these concepts to the school for Earth Day. Students

will research and formulate different projects making awareness posters and school advertisements

Essential questions: How often do you and your family recycle?

Do you feel as if our school is trying to make a difference in our waste disposals?

Do you know the difference between things that can be recycled and things that should be trashed?

Why is it important that we use the three R?

How is the earth affected by not recycling?

What are some things that you think you can do to help?

How could we promote recycle, reduce, and reuse?

How might we prove that waste has become a problem?

Review assignment sheet with the class. Make sure to read word for word so students can get a good understanding of what is expected of them. The first project consists of research about the earth's waste and what we can do to reduce it.

3. In this assessment students will be working to create an advertisement on one object that can be reused in several different ways.

Rubric

Making A Poster : The 3 R's - Reduce, Reuse & Recycle

CATEGORY	4	3	2	1
Content - Accuracy	At least 7 accurate facts are displayed on the poster.	5-6 accurate facts are displayed on the poster.	3-4 accurate facts are displayed on the poster.	Less than 3 accurate facts are displayed on the poster.
Attractiveness	The poster is exceptionally attractive in terms of design, layout, and neatness.	The poster is attractive in terms of design, layout and neatness.	The poster is acceptably attractive though it may be a bit messy.	The poster is distractingly messy or very poorly designed. It is not attractive.
Graphics - Relevance	All graphics are related to the topic and make it easier to understand. All borrowed graphics have a source citation.	All graphics are related to the topic and most make it easier to understand. All borrowed graphics have a source citation.	All graphics relate to the topic. Most borrowed graphics have a source citation.	Graphics do not relate to the topic OR several borrowed graphics do not have a source citation.

Use of Class Time	Used time well during each class period. Focused on getting the project done. Never distracted others.	Used time well during each class period. Usually focused on getting the project done and never distracted others.	Used some of the time well during each class period. There was some focus on getting the project done but occasionally distracted others.	Did not use class time to focus on the project OR often distracted others.
Knowledge Gained	Student can accurately answer all questions related to facts in the poster and processes used to create the poster.	Student can accurately answer most questions related to facts in the poster and processes used to create the poster.	Student can accurately answer about 75% of questions related to facts in the poster and processes used to create the poster.	Student appears to have insufficient knowledge about the facts or processes used in the poster.

Student Resources: Books

Michael Recycle by Ellie Bethel, Alexandra Colombo
Michael Recycle Meets Litterbug Doug by Ellie
The Dumpster Diver by Janet S. Wong, David Roberts
The Three R's: Reuse, Reduce, Recycle by Nuria Roca, Rosa M. Curto
Why Should I Recycle? by Jen Green, Mike Gordon
Ecoart!: Earth-Friendly Art and Craft Experiences for 3 to 9 Year Olds by Laurie Carlson
My Big Green Teacher: Recycling by Michelle Y. Glennon
Cleaning Up Litter by Charlotte Guillain Reusing and Recycling by Charlotte Guillain
Reducing and Recycling Waste: Improving Our Environment by Carol Inskipp

Student Resources: Videos

http://pbskids.org/eeeworld/index.html?load=gabage_recycling
http://pbskids.org/cgi-registry/kidsbridge.cgi?context=eekoworld_lessonplan_k1
<https://app.discoveryeducation.com/core:builders/boards>
<https://video.nationalgeographic.com/video/environment>
FernGully: The Last Rainforest
Star Trek IV: The Voyage Home
Brainpop jr: Recycle, Reduce and Reuse

Teacher resources

<https://www.vocabulary.com/dictionary/reduce>

<http://questgarden.com/70/28/5/090505100942/>

<http://www.epa.gov/msw/reduce.htm>

GLS :http://www.anglesey.gov.uk/Journals/2013/08/30/1/z/v/Activity_8_litter_survey.pdf

<https://drive.google.com/open?id=0B9zlxh2llgwQUk9ZUklEcmVscVU>

https://drive.google.com/file/d/0B9zlxh2llgwQUk9ZUklEcmVscVU/view?_sm_au_=iVVDbNqn45FDbMsF

Reading resources for the teachers

Jacqueline Vaughn Waste Management: A Reference Handbook ·
L.F. Diaz M. de Bartholdi W. Bidlingmaier Compost Science and Technology, Volume 8 1st Edition ·
1st Editiot by Kanti L Shah Basics of Solid and Hazardous Waste Management Technology 1st Editiot by Kanti L Shah
Ram Chandra Waste Environmental Management ·

William C. Blackman, Jr. Basic hazardous waste management.
North Carolina Hazardous waste management rules and solid waste management law by North Carolina Solid & Hazardous Waste Management Branch
Ramesha Chandrappa, Diganta Bhusan Das Solid waste management: principles and practice
<http://fergusonfoundation.org/wp-content/uploads/2012/08/guidebook.pdf>

Video Resources for teachers

Regionalization/Solid Waste Management Success Stories Waste Disposal
<https://librarylink.uncc.edu/login?url=http://fod.infobase.com/PortalPlaylists.aspx?xtid=5619&wID=149262>

Waste Reduction
<https://librarylink.uncc.edu/login?url=http://fod.infobase.com/PortalPlaylists.aspx?xtid=59347&wID=149262>

School Waste Management <https://www.youtube.com/watch?v=XaMfdgJnq9I>
Kareem Hassan Worldwide Solution for Waste Management by Kareem Hassan
Waste Generation, Characterization, Collection, Transfer, and Disposal
<https://librarylink.uncc.edu/login?url=http://fod.infobase.com/PortalPlaylists.aspx?xtid=11470&wID=149262>

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- [01] Agency, Environmental Protection. “Reduce, Reuse, Recycle.” EPA, Environmental Protection Agency, 6 Nov. 2017, <http://www.epa.gov/recycle>. – This is background for teachers on Recycle, Reduce and Reuse.
- [02] Management Institute Waste. “Waste Management.” Small Scale or Backyard Composting - Cornell Waste Management Institute, 1 Jan. 2100, <http://cwmi.css.cornell.edu/smallscale.htm>. This resource is for teachers’ background knowledge on health considerations handling during compost activity.
- [03] Learning, Byjus “Biodegradable And Non-Biodegradable | Definition Of Non-Biodegradable.”Chemistry, Byjus Classes, 21 Sept. 2017 <http://byjus.com/chemistry/biodegradable-and-non-biodegradable/>. This resource is for biodegradable and non-biodegradable materials.
- [04] Science, Guampedia, <http://www.guampedia.com/lesson-plan-where-the-waste-goes-1/> Resource for how improperly handled trash impacts the environment.
- [05] Teachers’ Guide to Compost Activities, http://www.cvswwmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvswwmd1.pdf. This resource is for making compost activity.