

Baltimore County Public Schools

Outdoor Science

Maryland Green Schools

Best Management Practice – Solid Waste Reduction

Grade Level – 3

BCPS Unit – Eco-Detectives

Voluntary State Curriculum

Standard

3.0 Life Science – The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.

Topic

E. Flow of Matter and Energy

Indicator

1. Recognize that materials continue to exist even though they change from one form to another.

Objectives

- a. Identify and compile a list of materials that can be recycled.
- b. Identify what happens to materials when they are recycled.
- c. Observe and record the sequence of changes that occur to plants and animals that die and decay.
- d. Ask and develop possible answers to questions about what happens to the materials that living things are made of when they die.

Introduction

There are seven BMP's offered as choices for the Green School application. As a school, you are required to select four different BMP's to obtain Maryland Green School status. This document provides three possible projects for the Solid Waste Reduction BMP. The projects are given for a specific grade level and are based on the BCPS curriculum and the VSC indicators. They execute the *Extension* piece of the 5E format for science curriculum fulfilling the Green School criteria for Best Management Practices through instruction as they broaden the existing science units.

Time will need to be allotted for implementation of these projects. The amount of time will vary with the complexity of the project. Your project might be defined as on-going activities (e.g., curbside recycling) or an annual event (e.g., Earth Day Celebration or a unit specific project). Teacher discretion will determine how to facilitate the project. Factors including student needs, time management, and available resources will need to be taken into consideration.

The three projects described below are only a few of the many possible projects that could be used to fulfill your school's BMP requirement. Please do not feel that you are limited by these suggestions.

BMP – Solid Waste Reduction

Solid waste is any discarded material including trash, recycling, grass clippings, construction waste, appliances, etc. Solid waste reduction encompasses reducing any of these materials. In the school system, this can be accomplished by considering where waste reduction might occur. Locations which can be assessed include the cafeteria, classrooms, main offices, teacher lounges, copy rooms, and maintenance areas. Items such as paper, aluminum, plastic, steel, batteries, ink cartridges, outdated computers, or non-working electronic equipment should be identified for possible recycling.

The Baltimore County Department of Public Works, <http://www.baltimorecountymd.gov/Agencies/publicworks/recycling/index.html>, states that (2008):

More than 2 billion pounds of waste are generated in our County each year. There are three ways that we handle our waste: landfilling, recycling, and taking it to a waste-to-energy facility. Half of our only landfill's space has already been used. One of the best ways we can prolong the life of our County's landfill is for residents and businesses to recycle as much as possible. . . . By recycling all that you can, you will make tons of difference! (p. 1)

BMP Project 1 – Paper Recycling

Background

All types of recycling serve to benefit the environment. Numerous recycling facts, percentages, and numerical data can easily be found on the internet. Recycling paper can be beneficial for the following reasons:

- **Removing Material from Landfills:** Reducing paper from the waste stream will lead to increased landfill space and potentially reduce pollution by eliminating the need to incinerate the paper.
- **Conserving Natural Resources:** Substituting previously used paper to be utilized in place of living trees, recycling reduces the demand to cut down trees.
- **Saving Energy:** Significantly less energy is used when recycled materials are transported to commerce (including collection, processing and transportation) as compared to when transporting virgin materials (which would include extraction, refinement, transportation, and processing). Typically, energy savings related to the recycling of materials occurs during the manufacturing process itself, since the typical recycled material has already been recovered and reused more than once.
- **Reducing Greenhouse Gas Emissions:** Energy sources typically used in manufacturing processes and in transportation involve nonrenewable fossil fuels such as oil (used to produce gasoline, diesel fuels, and plastics) and coal. By decreasing the aggregate energy used by industry, recycling reduces greenhouse gas emissions which contribute to global warming.

Resources

- Department of Public Works
Bureau of Solid Waste Management
111 W. Chesapeake Avenue, Room 225
Towson, Maryland 21204
Telephone 410-887-2000
Fax 410-887-2931
E-mail: solidwaste@baltimorecountymd.gov
- Baltimore County Recycling and Waste Prevention Manager
Mr. Charles Reighart
(410) 887-2000
Fax: (410) 887-2931
- A Recycling Revolution: *Recycle Newspaper: Have an Old Fashioned Paper Drive*
<http://www.recycling-revolution.com/recycle-newspaper.html>
- Abitibi Paper Retriever: *Home Page*
<http://www.paperretriever.com/default.asp?ID=1>
- Catalog Choice: *Eliminate Unwanted Catalogs*
<http://www.catalogchoice.org/>

Cross Curriculum Connections

- Math: Weigh the amount of trash per class after lunch. Then sort out and weigh the amount of paper which could be recycled. Chart the amount of trash per grade level outside of the cafeteria. Over the course of a week, determine which grade level produced the least amount of trash. The class that produces the least amount of trash could be congratulated during the morning announcements!
- Math: Weigh the amount of trash per classroom at the end of the day; then sort out and weigh the amount of recyclable paper. Chart the recycled amount of paper per grade level and display the chart in a frequently traveled corridor of the school.
- Math: Weigh the amount of trash from the office at the end of the day; then sort out and weigh the amount of paper that could be recycled.
- Technology: Have students research specific facts to include in flyers.
- Language Arts: Create flyers reminding students and adults to recycle in the classrooms, special area rooms, offices, and cafeteria. Create flyers to send home to parents and family members or to give to community businesses to bring paper to school for recycling.
- Art: Use paper from recycling bins to create art for display around the school.

Tips for Implementation

- Before paper even goes into the recycling bin, be sure that:
 - copies have been made front and back;
 - if the paper is a front only copy, the back has been used for a second purpose;
 - when possible, documents are saved from year to year for student reuse;
 - documents are edited on the computer instead of on a hard copy.
- It is strongly recommended that an organization putting in place a recycling program should have one person to oversee its implementation. This coordinator should act as the liaison among administration, staff, custodial staff, and other pertinent staff.
- It is vital that all staff and students are involved in the recycling program. All ages of students can participate in the collection of the recycled paper. It will be useful to provide small recycling bins near a teacher's desk and/or strategic spots around the school. Don't forget to provide a recycling bin for the student cafeteria and teachers' lounge for the cardboard from boxed lunches. The goal is to make recycling bins readily available. Recycling bins can be made from paper boxes.
- The custodial staff must not only be involved, but buy into the notion of recycling. They play a vital role in the process and should receive a thorough education on the merits of recycling. It is recommended that there be an open line of communication between them and the coordinator in case problems arise.
- Educating the staff and students is essential to any recycling program. Students can take on this job! Without employee and student support, and knowledge of what and how to recycle, the program will not be successful. Announcements made by students about the program should be completed prior to the program's beginning. These announcements should show administrative support for the recycling program and include information about collection procedures. Staff and students should be given a list of contaminant material that should not be placed in the recycling bins. Common contaminants include:
 - foil and other food wrappers
 - carbon paper and copy paper wrappers
 - paper cups
 - used tissues
- Periodic memos sharing the successes of the school's recycling program will aid in reinforcing the stakeholder's interest. Including updates and successes in the school newspaper/bulletin can be useful. The school might want to emphasize how much paper has been recycled, an estimated number of trees saved, removal costs saved, or ask for ideas for expanding the program.
- Some of the cost savings from the recycling program can be put towards grade level funding.

BMP Project 2 – Ink Cartridges

Background

In a typical year, more than half a billion inkjet cartridges and 70 million laser cartridges will be purchased in the United States. As a result, over 400 million cartridges, weighing over 200 million pounds, are jettisoned into local landfills.

Unfortunately, it takes over 1,000 years for the plastic from inkjet cartridges to decompose. According to the EPA, 67% of our trash is sent to landfills, 15% is incinerated, while only 18% is recycled. Therefore, the vast majority of inkjet cartridges used in the United States are accumulating in landfills.

Resources

- Free Recycling: *Customer Application for Your Free Ink Cartridge Recycling Account*
<http://www.freerecycling.com/ID/13529.htm>
- A Recycling Revolution: *Printer Cartridge Recycling: Cash from Trash*
<http://www.recycling-revolution.com/printer-cartridge-recycling.html>
- FundingFactory: *How FundingFactory Works*
<http://www.fundingfactory.com/programs/recycling/>
- Green School Project: *Registration*
<http://greenschoolproject.com/>

Cross Curriculum Connections

- Language Arts: Write a letter to parents asking for donations of their used inkjet cartridges.
- Language Arts: Write a letter to community businesses asking for donations of their used inkjet cartridges.

Tips for Implementation

- It is strongly recommended that an organization putting in place a recycling program should have one person to oversee its implementation. This coordinator should act as the liaison among administration, staff, custodial staff, and other pertinent staff.
- It is vital that all staff and students are involved in the recycling program. All ages of students can participate in the collection of the inkjet cartridges. It will be useful to provide small recycling bins near a teacher's desk and/or strategic spots around the school. The goal is to make recycling bins readily available. Recycling bins can be made from paper boxes.

BMP Project 3 – TerraCycle

Background

TerraCycle is an “eco-capitalist” company that uses waste products to produce new products. They collect soda bottles, juice pouches, yogurt containers, and energy bar wrappers to be reused for new products. Their main product is organic plant food and fertilizer made from worm castings (waste). The company uses recyclable or waste products in every stage of production from packaging to labeling to boxing for distribution (when you buy the product, all the bottles and boxes look different, but the labeling is the same). The company also creates products such as seed starter kits, potting soil, bird feeders, compost bins, rain barrels, and deer repellent.

Resources

- TerraCycle: *TerraCycle Home Page*
www.terracycle.net

Cross Curriculum Connections

- Math: Weigh the amount of trash per class after lunch. Then sort out and weigh the amount of material which could be recycled. Chart the amount of trash per grade level outside of the cafeteria. Over the course of a week determine which grade level produced the least amount of trash. The class that produces the least amount should be congratulated!
- Technology: Have students research specific facts to include in flyers that will be distributed to the student body.
- Language Arts: Create and distribute flyers reminding students and adults to recycle in the classrooms, student cafeteria, and teachers’ lounge. Create flyers to send home to parents and family members to bring containers to school for recycling.
- Language Arts: Hold a competition to invent a new use for another form of solid waste. (TerraCycle currently has a competition looking for a use for bottle caps, but students could use any solid waste material.)
- Art: Use other forms of solid waste to create art for display around the school.

Tips for Implementation

- It is strongly recommended that an organization putting in place a recycling program should have one person to oversee its implementation. This coordinator should act as the liaison among administration, staff, custodial staff, and other pertinent staff.
- It is vital that all staff and students are involved in the recycling program. All ages of students can participate in the collection of the recycled containers. It will be useful to provide small recycling bins near a teacher’s desk and/or strategic spots around the school. Don’t forget to provide a recycling bin for the student cafeteria and teachers’ lounge for the recyclable containers. The goal is to make recycling bins readily available. Bins can be made from recycled paper boxes.

Additional Project Ideas for the Solid Waste Reduction BMP

- Coordinate a computer recycling day for the community to bring in outdated computers or other electronics. The website, www.mdrecycles.org, lists locations in Maryland to take various materials. The website is organized by material and lists multiple donation sites.
- Reduce school-wide junk mail by taking teachers and school names off mailing lists. Involve the community by making them aware of the website <http://www.obviously.com/junkmail/>, a how-to guide for reducing junk mail coming to their house or company.
- To help with elimination of lunch trash, visit the site <http://www.wastefreelunches.org/> which gives great facts and examples of trash free lunches. The site also helps walk you through the process of converting your school to a trash free lunch place.
- Set up on-site composting. Small bins for collecting compostable items (e.g., banana peels, egg shells, apple cores, etc.) could be placed in the kitchen, at the cafeteria doorway and in the teacher's lounge. This material can create a nutrient-rich soil.
- Use mugs, silverware, and cloth napkins in the teachers' lounge. Have a dishwashing station set up in the lounge to encourage use of waste free products.
- Use rechargeable batteries and solar powered calculators. Collect and recycle non-rechargeable batteries.