
SYNOPSIS:

We live in an age of unbelievable comfort and convenience. Much of that is the result of the versatile, manmade materials called plastics. However, some of the advantages of plastics become disadvantages when the time comes to throw them away. In searching for new ways to handle the waste our modern society produces we have discovered the potential of recycling.

In this program, students will get a close look at some of the most flexible and durable materials available — plastics. They'll also see laboratory experiments firsthand and discover how scientists are inventing ways to conserve oil while giving plastics new life through recycling.

CURRICULUM UNITS:

Chemistry	Earth Science
Ecology	Environmental Science
General Science	

CAREER OPPORTUNITIES:

Chemist	Manufacturer	Plastics Engineer
Ecologist	Natural Resource Center	Solid Waste
Environmentalist	Packaging Designer	Management

PROGRAM OVERVIEW:

This program examines the origin, uses, disposal and recycling of plastics. Students will learn that plastic materials begin as oil, a natural resource. They'll see how versatile and flexible plastics are, and how they can be molded into many useful and durable forms. Because we use so many plastics and they are so durable, they can be a problem in landfills when they are not recycled. Students will see how waste plastics can now be incinerated cleanly to produce heat and electricity. They'll also visit a materials recovery plant to watch how plastics are recycled for more uses, such as polyester fiber for clothing. They'll learn how scientists have developed degradable plastics, and are

experimenting with plastics made from sources other than oil, such as food wastes.

ISSUES AND CRITICAL THINKING:

After showing the DVD, can your class...

Explain how oil is processed into plastics?

Distinguish between extrusion and injection methods of molding plastic products and give examples of each?

Explain why disposing of plastics can be a problem?

Describe one way plastic waste can be reused?

Describe one of the new pieces of plastic researchers are developing?

Have students make list of all the plastic products they use in one day. Discuss how eliminating plastics would affect their lives. Examples: How would their food stay warm or cold? Could they buy a tape or compact disc? Could they play it?

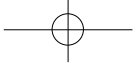
Discuss some products that are made of plastics today, but were not in the past (i.e.: milk containers, automobile parts, pipes, etc.). What are the advantages of using plastics for today's products?

Visit a local landfill or have a landfill operator come to class to explain how a landfill is designed, constructed and made environmentally safe. How much material is disposed of there in a week? What would happen if people were charged for garbage disposal by the pound of waste they sent to the landfill?

Discuss what "degradable" means in terms of waste materials in landfills? What makes them degradable? Why is that preferable to the environment? Have student simulate decomposition in "mini-landfills" made of two-liter soda bottles, each containing a different material such as aluminum foil, glass (smooth edged), paper, plant material, and both regular and degradable plastics. Chart the time it takes for the different materials to decompose. Is there a materials recovery facility at the landfill? If so,

what kinds of materials are recovered, and what is done with them? Is there a mandatory or a voluntary recycling program in the students' communities? Discuss the environmental impact of paper, aluminum, glass and plastics recycling. Why is recycling important to our ecology and the preservation of natural resources?

Have the class brainstorm ways that they can reuse some of the plastic items they usually discard. Then schedule a "recycle project" day. Some ideas are to make terrariums out of clear plastic bottles, airplanes from foam meat, or produce trays, ornamental garlands from foam packing "peanuts," planters and banks from opaque plastic bottles decorated with glued-on scraps of fabric, yarn, glitter, stickers, etc.



GLOSSARY:

COMPRESSED- Flattened and pressed together under pressure.

DECOMPOSE- To separate into simpler parts or components as a result of chemical change.

DEGRADEABLE- Capable of decomposing.

EXTRUSION MOLDING- Shaping materials by forcing them out through a mold.

INCINERATION- The process of disposing of materials by burning them.

INJECTION MOLDING- Shaping materials by forcing them into a mold.

MATERIALS RECOVERY FACILITY- A place where waste materials are brought to be sorted and packaged for recycling.

MOLD- A form used to shape plastics or other materials.

NATURAL RESOURCE- A supply of substance such as water, wood or oil which is not manmade, but present in or made by nature.

PLASTIC- Synthetic materials made from the components of oil and used for a variety of purposes.

PLIABLE- Able to bend without breaking and capable of adapting to many different situations.

POLYESTER- A fiber made out of plastic material.

RECYCLING- Reusing or recovering useful material from something that would otherwise be discarded.

SOLAR ENERGY- Energy produced by capturing the light and heat radiated by the sun.

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PLASTICS: PROBLEMS & SOLUTIONS



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