

Lesson 2: Polymer Fun

Grade Level:

Grades 6-8

Concepts Taught:

modeling

Essential Questions:

- What is plastic made of?
- Where can I find plastic in the everyday world around me?
- How are plastic items different?
- Why are there numbers on the bottom of some plastics?
- How is each number plastic different from another?

NCSCOS Correlations:

Grade 6: Math 6.NS.7.a; Science 6.P.2.1– 6.P.2.3

Grade 8: Math 8.SP.1; Science 8.P.1.1, 8.P.1.2

Materials:

water, glue, Borax, food coloring, plastic cups, wooden stirring sticks, plastic sandwich bags



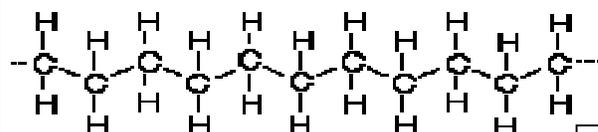
Objectives:

- Students will understand that plastics are polymers.
- Students will model plastic polymer formation.
- Students will create a polymer substance.

Procedure:

PART 1:

Brief Background: Plastics are made of polymers. A polymer (poly = many) is a chemical substance created when multiple basic units known as monomers (mono=one, single) are joined together to form complex molecular structures. Most plastics are hydrocarbon polymers which means they are constructed of mainly hydrogen and carbon atoms.



polyethylene

For more detailed background information:

<http://www.americanchemistry.com/plastics>

Activity:

Have students stand together in an area of the room where there is open space and enough room to spread out. Each student in the classroom will act as a monomer. Then have students link arms to create one long polymer chain. See if they can come up with ways to create more complex structures by forming more linkages.

For a seated activity option: have students make paper chains or link paper clips into chains.

PART 2: Polymer Slime

Recipe: (to make one portion of slime – prepare enough materials for each student to make their own individual portion)

30 mL glue-water solution

10 mL Borax – water solution

2 drops food coloring

To make glue-water solution

500 mL water : 500 mL glue

All About Plastics

To make Borax – water solution

60 mL Borax powder dissolved in 1000 mL water

Directions:

Pour glue-water solution in plastic cup.
Put 2 drops of food coloring. Stir with wooden stirring stick.
Pour Borax – water solution into mixture. Begin stirring immediately.
Mixture should begin to thicken. Keep stirring until formation of a semi-solid. Final substance should have the consistency of Silly Putty®.
Store in plastic sandwich bag. Keep in refrigerator when not in use.

Have students reflect on the slime-making process by recording their experience in their science journals or science notebooks. They should describe the ingredients used and the steps they took. They should also write a brief description of their final product.

Then have them answer the following question:

Q: How does this explain and model polymer formation?

A: A polymer (slime) is a complex molecular structure made from combining simpler molecular structures (water, glue, and Borax) together.

Extension:

Plastic polymers are very important; plastic is used in hundreds of ways in our daily life.

1. Have students keep a log for one day that lists everything they do or use that involves plastic. Include use of products that are made of plastic and/or have plastic parts. (Example: brushing teeth – toothbrush and toothpaste tube are made of plastic, riding to school – vehicle parts are made of plastic, CD player – cord is covered in plastic, etc.)
2. Have students research one of the following areas where plastics are being widely used in new and innovative ways to improve life:

Medicine & Health

Industrial Safety

Packaging

Automotives

Building Materials

Clothing