



Drexel-SDP GK-12 ACTIVITY

Activity: Pampering Polymers: A Basic Introduction to Polymers

Subject Area(s) Chemistry

Associated Unit Polymers, module 1

Associated Lesson none

Activity Title Pampering polymers: A basic introduction to polymers

Grade Level 6 (3-8)

Activity Dependency None

Time Required 30 minutes

Group Size 3

Expendable Cost per Group 4 dollars

Summary

Students investigate what a polymer was by testing the absorbency of the super absorbent polymers in diapers. Students will be able to explain what a polymer is, build a model of a polymer, and examine their importance in everyday life.

This module will introduce the students to the world of polymers. Students will learn what a polymer is, how they are made, and how they are used. Students will learn how important polymers are in their everyday lives. Students will also investigate polymers' connection to renewable and nonrenewable resources, landfills, and recycling through various inquiry based lessons and activities.

Engineering Connection

Chemical engineering is the application of science, mathematics and economics to the process of converting raw materials or chemicals into more useful or valuable forms. Chemical engineers work to produce the household items we use and appreciate every day, such as Teflon-coated cookware, plastic cups and brightly-colored candies. Plastics ranging from milk jugs to ladies' handbags to thermal underwear are also designed by chemical engineers – these plastics are often referred to as polymers. In this activity, students will investigate the absorption property of a polymer and will try to guess its identity.

Keywords

Polymer, chemical engineer,

Educational Standards

- Science:4.2.7 Renewable and non-renewable resources, A. Know that raw materials come from natural resources, B. Examine the renewability of resources, 3.1.7 Unifying themes, C. Identify patterns as repeated or recurring elements in science and technology., 3.2.7 Inquiry and Design, B. Apply process knowledge to make and interpret observations., 3.4.7 Physical Science, Chemistry, and Physics, A. Describe concepts about the structure and properties of matter
- Math: 2.5-Mathematical Problem Solving and Communication, E. Develop problem solving strategies (drawing a picture or a diagram), 2.6- Statistics and Data Analysis, A. Organize and display data using pictures, tallies, tables, charts, scatter plots, bar and circle graphs, 2.8-Algebra and Functions, B. Discover and describe patterns including linear, nonlinear relationships, D. Represent relationships using pictures, words and tables

Pre-Requisite Knowledge

Be familiar with the practice of adding liquid in a controlled, measured way.

Learning Objectives

After this lesson, students should be able to:

- Explain the properties of a polymer
- Give some examples of polymers around their house

Materials List

Each group needs:

- 1 plastic bag with sample in it
- 1 baby diaper
- 1 plastic cup
- 1 container of colored water
- 1 dropper
- paper
- pencil

Introduction / Motivation

Students will be able to explain what a polymer is, build a model of a polymer, and examine their importance in everyday life.

Vocabulary / Definitions

Word	Definition
Polymer	A chemical compound made up of a large number of identical components linked together like a chain. This substance is often referred to as a plastic.
Absorb	To suck up; to take in; collect; accumulate.

Procedure

Background

Nearly all materials that make up living organisms involve polymers. Stages of civilization are characterized by the building materials used. The Stone Age was first, followed by the Bronze, Iron, and Steel Ages. We are now living in the age of polymers. The word polymer might be unfamiliar, but without them life as we know it would not exist.

Before the Activity

Put the students into groups of 3 and distributed materials.

With the Students

1. Remove sample from plastic bag and place into plastic cup.
2. Make a guess as to what the material is made from. Write down your guess. Use descriptive words to explain what the material looks like, feels like.
3. We know that diapers absorb water, but how much do you think it can absorb? If we count by drops added to the sample, how many do you think it will hold? Write down your guess and compare with your group members. Come up with a group estimate.
4. Wait for Ms. Slade & Ms. Comolli after you finish 1-3.
5. Slowly add drops of the colored water to the sample material. Keep the material and water drops IN THE CUP. Count the number of drops that you add. When the material no longer absorbs the water you can stop adding drops. Record the number of drops you added and wait for the rest of the groups to finish. What does the material look like now? How is it different?

Safety Issues

- Do not ingest the material

Troubleshooting Tips

Students may add too much liquid at one time. Give the students another sample and supervise as they add the liquid one drop at a time.

Investigating Questions

1. Guess at what the material is made from:
2. Description of the material before adding drops:
3. Tally of drops your group added:

- Class comparison of actual number of drops added to estimated. Which group was the closest to their estimate?

Group	Estimate number of drops	Actual number of drops	Difference

- What does the material look like after the water is added? Use descriptive words to explain.
- Does this change your guess at what the material is?

Assessment

Pre-Activity Assessment

None

Activity Embedded Assessment

Each student completes worksheet of questions during class.

Post-Activity Assessment

For homework have students look around their house and come up with a list of what they think are items made of polymer materials. Students will share their list during the next class session.

Activity Extensions

Suggested Reading:

Polymers All Around You!- Linda Woodyard

Owner

Drexel University GK-12 Program

Contributors

Noelle Comolli

Copyright

Copyright 2007 Drexel University GK12 Program. Reproduction permission is granted for non-profit educational use

Version: Mar 2007