



Polymer Activity from the:

Teachers may reproduce this activity for their use

Grades: K-12

Science Standards: Content Standard B: Physical Science

Pop Bead Demonstration:

A polymer is a huge molecule (macromolecule) made up of many smaller repeating units. These smaller units, or monomers, are molecules containing mostly carbon and hydrogen. However, other atoms such as O, N, Cl, F, Si, and S may also be present.

A polymer can be thought of as resembling numerous beads on a string. Each monomer, or bead, is linked (polymerized) to the next to form chains composed of thousands of atoms in a row. It is the huge size of polymer chains that gives the molecules many of their special properties.

Polymers may be natural or synthetic. DNA, cellulose, and proteins are examples of biological polymers. Plastics, paints, and adhesives are man-made polymers.

To give students an idea of how long polymer chains really are, the following demonstration is recommended:

Procedure:

1. Link together at least 2000 individual pop beads. (Each bead represents a monomer.)
2. Place a plastic bucket on the floor. (A one gallon ice cream bucket works well.) Standing over the bucket, start loading the chain of beads into the bucket. Do this by feeding the beads into the bucket, hand over hand, so that the beads fall “naturally” into place. The beads will fall in a random, coiled fashion. Leave the end of the bead chain just extending over the edge of the bucket.
3. To be more visible, stand on a chair. Holding the bucket at about shoulder height, give a slight tug to the exposed end of the bead chain. The beads will start to self-siphon out of the bucket.
4. If the chain breaks, find the broken end and start again.
5. Examine the pile of beads that forms on the floor. It represents a **small** polymer molecule with its random twisted and coiled configuration.

Sources of Beads:

Pop beads are sometimes difficult to find. If you call the following store in Cincinnati, and ask for Ray Cappel, he will ship beads to you.

Cappel's

920 Elm Street, Cincinnati, OH 45202

513-621-0952

Beads are also available from Oriental Trading Company, 1-800-246-8400