Polymer Playtime With Marvelous Molecules

Atoms	Atoms are small particles that are the building blocks of all materials.	Nitrogen, Oxygen, Helium
Molecule	A molecule is a group of atoms that are connected together.	Water 2 hydrogen atoms & 1 oxygen atom
Monomer	A monomer is a special kind of molecule that likes to join with other similar molecules.	MONOMER A monomer is a small molecule.
Polymer	A polymer is a group of monomers that are joined together in a repeating pattern.	POLYMER

Polymers are large **molecules** made of small, repeating building blocks called **monomers**. The process by which **monomers** link together to form big **molecule** is called polymerization.

Polymers are generally flexible materials that are made up mostly of carbon **atoms**. However, the **monomers** that are used to make **polymers** can actually include a lot of different **atoms**, including nitrogen, oxygen, silicon, hydrogen and even iron or copper.

The ability to control the composition of a **polymer** right down to **atoms** means that new **polymers** can have almost any type of physical properties: insulators; semiconductors; and conductors. Every day researchers and engineers are finding many new materials and applications for **polymers**.

IDEA! Can you make your own polymers out of craft supplies? Pipe cleaners, puff balls, what else? See how many different shapes, sizes and properties.

Rainbow Worms

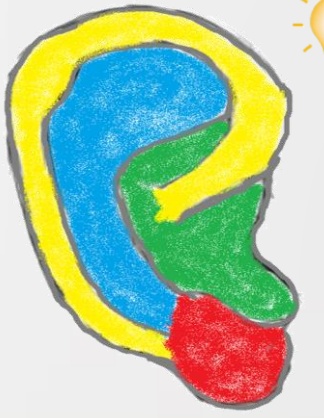
The chemicals used in these activities are common household materials:

- **Calcium chloride dehydrate**
  a common salt used to ice roads and in swimming pool water treatment);
- **Sodium alginate**
  a common food additive used to promote gelation.

When sodium alginate **polymer** is put into a solution of calcium chloride, the calcium replace the sodium. Each calcium atom causes two of the alginate **polymers** to join together creating a bigger polymer.

IDEA! Use food coloring in the sodium alginate solutions for a larger variety of colors.

Did you know that your body has a lot of natural **polymers** in it? Your DNA and RNA are examples of naturally occurring **polymers.** Some scientists, doctors and engineers are working to learn how to make these natural **polymers** in the lab to help grow body parts like skin and ears to help people who are sick.



IDEA! Pretend the **polymers** you made above are different parts of the ear (the soft parts, the harder parts, etc.). Can you arrange your **polymers** on the ear to the left as if you were designing it in the lab? Are there other body parts you would like to make?