



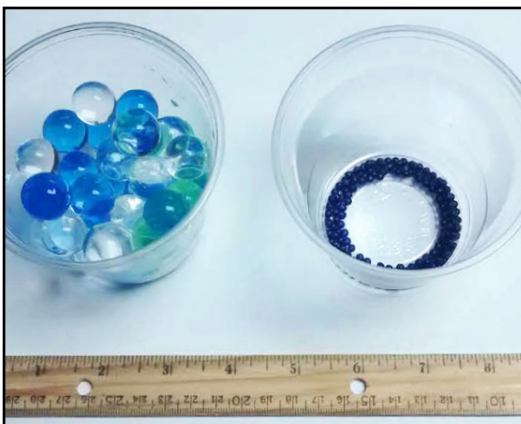
Inquiring Minds Want to Know

Science Activities for Young Minds

Growing Plastic Beads

WHAT YOU'LL NEED

- Multicolor hydrating (water) beads (also known as crystal water beads, magic water beads or water pearls), which can be found in the flower or craft areas at stores or at discount and dollar stores
- Water
- Vinegar
- Clear carbonated beverage
- Salt water
- Salt
- Small containers (1-3 ounces)
- Paper towel
- Clear container (1-2 quarts)
- Flashlight, light box or overhead projector (optional)
- Tape measure
- Ruler



WHAT TO DO

Remember: The purpose is NOT to teach a specific topic but to help children experience the excitement of **science exploration!**

GETTING READY

Hydrate some of the beads by following the manufacturer's directions.

LET'S GO

- 1.** Put some of the dry polymer beads into a container. Then ask the children to **observe** them using multiple senses (eyes and hands).
*What do the beads feel like? What characteristics (physical properties) do they have? Do they roll? Do they bounce? Does light go through them? Are they hard? What do you **predict** will happen to the beads if you put them in water? Will they sink or float?*
- 2.** Have the children add some water to hydrate the beads and allow them to soak. Or show them the beads that you already soaked.
How did the beads change after they soaked in the water? Did their physical properties change? How are they different?
*What do you **predict** will happen to the beads if you soak them in different liquids (carbonated beverage, vinegar, salt water)?*
- 3.** Have the children try **experimenting** by soaking the beads in other liquids.
What happened when you placed beads in different liquids? Did their physical properties change? Use the tape measure, ruler or flashlight to note changes in physical properties such as size, transparency, and translucency. How did they change?
*What do you **predict** will happen if you add the beads to salt water? Do you think the results will be the same as when the beads soak in plain water?*



4. Have the children try **experimenting** by adding salt to some of the hydrated and some of the dry beads.

What happened when you placed salt in with the beads? Did their physical properties change? How did they change?

TALK IT OVER

What would you do with the beads?

How could we use the beads?

What did you learn by observing the beads?

What did you like about growing beads?

What did you learn from growing beads that you didn't know before?

GOOD TO KNOW

1- to 5-year-olds:

Although these beads are non-toxic, some of the bigger beads might be a choking hazard.

6- to 18-year-olds:

Observe the beads in different stages of absorption under a microscope. Look into the chemistry of why the beads work the way they do. You can set up experiments to determine how much water weight the beads will absorb (see <http://www.pslc.ws/macrog/kidsmac/work/index.htm>).

THE SCIENCE BEHIND IT

Polymer beads work very similarly to gelatin dessert – they are super absorbent and swell to hold a large volume of water. Other applications of this principle include contact lenses, disposable diapers, silly putty and “slime”. Polymers are long chains of many smaller molecules called monomers. Super absorbent polymers (SAP) are polymers with additional chemical bonds called cross-links, which hold sections of the polymer together and keep it from dissolving in water. These cross-linked polymer chains form pores similar to the holes in a sponge. When SAPs are placed in water or other liquid, the liquid molecules move into the pores and fill them up. The cross-linked polymer expands in volume as it absorbs the water.

Visit these websites for more on the chemistry of SAPs:

- ▶ <http://ncsu.edu/project/chemistrydemos/Organic/Superabsorbent.pdf>.
- ▶ http://community.nsee.us/concepts_apps/compu_anime/superabsorbent_polymers.swf.

RESOURCES

- ▶ Your local university Extension office – <http://msue.anr.msu.edu/county>.
- ▶ Science Blast website – http://4h.msu.edu/programs/science_technology/science_blast.
- ▶ PBS – <http://www.pbs.org/parents/education/science/activities/preschooler-kindergarten/>.
- ▶ Steve Spangler website – <http://www.stevespanglerscience.com/lab/experiments/water-jelly-crystals-superabsorbent-polymers>.

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