

Water Gel Spikes

GB-3

Our Sodium Polyacrylate and these lesson ideas will support your students' understanding of these Next Generation Science Standards (NGSS):

Elementary

2-PS1-2

Students can analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

5-PS1-3

Students can use Water Gel Spikes to make observations and measurements to identify materials based on their properties.

Middle School

MS-PS1-2

Students can analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

ETS1.B

A solution needs to be tested, and then modified on the basis of the test results in order to improve it.

High School

HS-PS2-6

Students will observe and communicate scientific information about why the molecular-level structure is important in the functioning of a material.



Suggested Science Idea(s)

2-PS1-2

Students can conduct simple tests using the Water Gel Spikes to better understand the rate at which the polymers absorb or evaporate water. Information gathered can be used as evidence to support or refute student ideas about hydrophilic (water-loving) materials.

MS-PS1-2

Students can analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

HS-PS2-6

Students will observe and communicate scientific information about why the substance is able to absorb so much water. Further study of the structure of the hydrophilic polymers will help students to understand that the molecular-level structure is important in the functioning of a material.

What Are Water Gel Spikes?

Our Water Gel Crystals are made from a polyacrylamide polymer with a strong affinity for water. Chemists call this property **hydrophilic**, or water loving. A hydrophilic substance is one that takes up water easily—just as a dry sponge might if dropped into a pail of water.

Materials with the opposite property are said to be **hydrophobic** or water fearing. An example of a hydrophobic material is our **Magic Sand (SS-2)**, which repels water and never gets wet.

Suggested Activities

1. The Growing Water Gel Spikes

Procedure: Remove a Water Gel Spike from its package and have your students observe its original size. Ask them to estimate its original mass and length. You will need a balance for determining its mass. Ask students to predict how large the Water Gel Spikes will be when placed in water. The Water Gel Spike will take about a week to reach its full size, which may depend on the type of container the spike is placed in, and the purity of the water used.

Place the Water Gel Spike in a container of water and continue making measurements of its mass and length every day at about the same time of day until the Water Gel Spikes reaches its maximum size. In some parts of the country, bottled water may increase the size of the Water Gel Spikes. It is necessary to keep the Water Gel Spikes out of direct sunlight as UV radiation degrades the polymer.

A fun activity for younger students is to measure the height of the Water Gel Spikes with string, and then use those strings to make a string bar graph.

2. The Shrinking Water Gel Spikes

Procedure: Place the expanded Water Gel Spikes on paper towels or newspaper out of direct sunlight. Continue making measurements as the water slowly evaporates. Notice that the shrinkage of the Water Gel Spikes is a much slower process than its growth.

Further Experimentation

Your Water Gel Crystals can be used for many other science projects. For example, your students can investigate the effect of variables on the growth of the spheres by using:

- ✓ Different water sources: pond water, salt water, bottled water, distilled water, etc.
- ✓ Different concentrations of various dissolved substances, such as sugar, baking soda, or salt
- ✓ Solutions with varying pH, such as different concentrations of vinegar, baking soda, etc.
- ✓ Different temperatures
- ✓ Different exposures to direct sunlight
- ✓ Different carbonated beverages, sugar vs. sugar free soda, etc.

Take Your Lesson Further

As science teachers ourselves, we know how much effort goes into preparing lessons. For us, “*Teachers Serving Teachers*” isn’t just a slogan—it’s our promise to you!

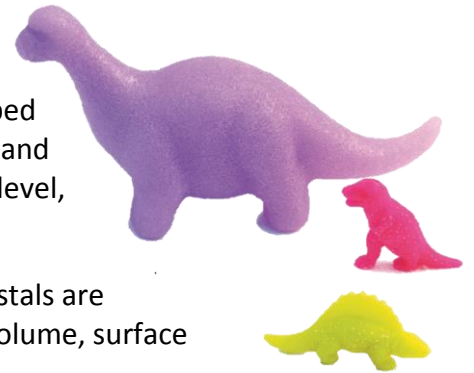
Please visit our website
for more lesson ideas:

www.TeacherSource.com

Check our blog for classroom-tested
teaching plans on dozens of topics:

<http://blog.TeacherSource.com>

Educational Innovations has many hydrophilic materials that can be used in follow-up lessons. Consider our other “Gro-Beasts” shaped of like frogs and dinosaurs. These critters start at 1-3" long and expand by up to 600% when left in water. They are fantastic for any grade level, and affordable enough to hand out to every student in your class.



Hydrophilic Growing Spheres, Cubes, Spikes and Crystals are also excellent for investigating concepts like mass, volume, surface area, absorption and more.

Gro-Beast Dinosaur (GB-1)

Growing Cubes (GB-740)

Growing Frogs (GB-25)

Growing Spheres (GB-702, GB-710, GB-730)

Water Gel Crystals (GB-5C)

Water Gel Spikes (GB-3)



And don't forget our **HYDROPHOBIC** material!

Magic Sand (SS-2)

Magic Sand is regular sand which has been dyed and coated with a hydrophobic material—a substance which repels water. The coating on the outside of the magic sand repels water and keeps the sand dry, even when submerged in water! Available in four fluorescent colors.

