

Educational Innovations[®]

GB-700 series Growing Spheres / Cubes

Hydrophilic water gel Growing Spheres are made from a polyacrylamide polymer with a strong affinity for water. Chemists call this property *hydrophilic*. A hydrophilic substance is one that takes up water easily – just as a dry sponge might if dropped into a pail of water. If placed into water, Growing Spheres will absorb water and swell to several hundred times their original size. Because the amount of water Growing Spheres will absorb depends on the salt content of the water, we suggest you use pure clean water from the tap.

Procedure:

To prepare Growing Spheres, simply place them in clean water and allow them to sit. While you may be able to observe some changes within just a few minutes, the crystals take between two and eight hours to reach their maximum size. Hot water may be used to speed up the process. To color the crystals, food coloring or Color Splash Tablets (#CSP-100) may be added to the water prior to adding the crystals. Approximate mixing proportions are one gallon of water for two tablespoons of Growing Spheres, or one quart of water for 1.5 teaspoons of Growing Spheres.

Once fully expanded, Growing Spheres have an index of refraction almost identical to that of water. This means that when the clear, colorless, expanded hydrophilic polymers are placed in water, they are nearly invisible. It is difficult to see the spheres in water because light rays are not bent when they travel between two substances with the same indices of refraction.

Growing Spheres may be dried and expanded again and again. Simply spread the expanded spheres on a flat surface and allow to dry. When they have returned to their original size, store them in a plastic bag or container. It is recommended that you use distilled water if you intend to reuse your spheres.

Disappearing Spheres:

Tie a thread around a single expanded sphere. Lower the sphere into a cup of water and make an observation. This can be done on an overhead projector as a demonstration for an entire class. Try carefully pushing a small nail or thin wire through the sphere. When lowered into water, the nail or wire appears to be completely suspended.

Growing Bulbs:

Grow flowering bulbs in the clear expanded spheres. This allows you to see the roots as they grow. Simply expand the spheres by placing them in clean water overnight. Pour off any excess water and plant your bulb, stem side up, about $\frac{3}{4}$ way into the spheres. Remember to use a clear container and to keep your spheres out of direct sunlight. (Paperwhite bulbs work the best!)

Important Notes:

While Growing Spheres are generally considered to be non-toxic, they should not be consumed!!! Growing Spheres are sensitive to direct sunlight. Exposure to direct sunlight will decompose the polyacrylamide polymer and slowly destroy the crystals' ability to absorb water. (Teachers, this might make for a good experiment!)

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