

Surprising Science for Kids:



Magic?
No, It's SCIENCE!

KIT-540

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Welcome to Surprising Science for Kids: Magic? No, It's SCIENCE! Grades 3-6

Your **Surprising Science for Kids: Magic? No, It's SCIENCE!** kit includes almost everything you need to perform hands-on experiments and dynamic demonstrations that will astound you and your friends.

So often we watch magicians perform amazing acts that are seemingly impossible, but once you know the trick, you quickly realize that it's really just science in action. You can use the activities in this kit to amaze your friends, parents and siblings, or you can just enjoy them on your own.



Caution: Keep all materials in this kit away from your eyes, nose and mouth!

Included in this kit:

- Safety Goggles
- 3 Cups
- Sodium Polyacrylate
- Salt
- Plastic Spoon
- Snow Polymer
- Clear Plastic Container
- Pipet
- Plastic Baggie
- 3 Pencils
- Goldenrod Paper
- Baking Soda
- Dissolving Paper
- Tweezers
- Nitinol Wire

You will also need:

- Water
- Flat Tray
- Clear Bowl for 2 Cups of Water
- Container for 1 Cup of Water
- 2 Clear Drinking Glasses
- Paper Towels

Activity 1: Where Did the Water Go?

Materials:

- Safety Goggles
- Sodium Polyacrylate
- Salt
- 3 Cups
- Plastic Spoon
- Container with about 1 cup of water (not included)

The Science:

The powder we're using for this activity is called Sodium Polyacrylate (so-dee-um poly-ack-ra-late). Try saying that three times fast! It's a long scientific word, and it's a really useful chemical. This is the same stuff that's found inside the lining of baby diapers. Since you know what diapers are used for, what do you think the sodium polyacrylate does?

If you said that it absorbs wetness, you're correct! It's actually considered to be a super-absorbent polymer. Anything that has the word *super* in front of it is pretty cool! Sodium Polyacrylate is also called the diaper polymer (for obvious reasons). This powder is hydrophilic. *Hydro* means water and *philic* means loving. So hydrophilic substances are water loving.



This powder traps the water molecules inside it and turns it into a gel-like substance. This diaper polymer can absorb 500 to 1,000 times its own weight. So, for example, if you have one cup of the powder, it can soak up between 500 and 1,000 cups of water! That's pretty amazing!

The Magic:

You will need the three cups that are included in your kit. Before you start this activity in front of an audience, place $\frac{1}{2}$ spoonful of Sodium Polyacrylate into one of the cups. Slide the three cups so they are stacked one inside the other. Make sure that the cup with the powder is on top. In front of your audience, unstack the three cups and place them on a table in front of you. Add about a cup of water to one of the **empty** cups (without the powder).

Explain that the hand is quicker than the eye and have them watch carefully as you shuffle all the cups around in an attempt to confuse them. After you get tired of moving the cups, ask one person to pick which cup has the water. Chances are good that the guess will be correct. That's okay.

Activity 2: It's Snowing Inside!

Materials:

- Safety Goggles
- Clear Plastic Container
- Water (not included)
- Snow Polymer
- Plastic Spoon
- Flat tray (not included)
- Pipet

The Science:

The second powder in your kit is essentially the same chemical as the first. Its chemical name is also Sodium Polyacrylate, but it's manufactured or made differently, and it behaves differently. Although the powder is also hydrophilic (water loving) and absorbs water, instead of becoming a gel, it puffs up like snow!

Water is made up of two elements, hydrogen and oxygen. In science, it's written as H_2O , meaning it has two hydrogen atoms and one oxygen atom. This powder attaches to the hydrogen in the water in a special way. When the two come together, you get something that looks like powdery snow.



The Magic:

Place the clear plastic container from your kit on a flat tray (like a cookie sheet) or in inside a clear bowl. Add one heaping spoonful of the snow polymer to the container. Explain to your audience that water is the liquid form of the molecule scientists refer to as H₂O, and by super cooling it, you can turn it into snow. Quickly pour the room temperature water into the container and watch! When the water comes in contact with the powder it will fluff up right before your eyes and spill out over the edge of the container.

If you initially touch the snow, it will feel a little warm, but if you leave it for about 10-20 minutes, it will start to feel cool just like real snow. Ask your friends to hold out their hands. Use the spoon to put a small amount of the powder in their palm (about the size of a dime). Then using the pipet, squirt water onto the powder. The snow will expand right in their hand!



Activity 4: Mind-Bending Science

continued

Back to the Science:

The pencil will look bent at the top of the water because the light waves move a little more slowly through water than through air, so the pencil image in the water takes longer to reach our eyes. This makes the pencil appear to be bent.

You can also see light refraction in the air on a hot and sunny day when there is a difference in temperature between two surfaces. As hot air rises, it makes the objects in the distance appear to move or wiggle. This also happens in deserts where the sun beats down on the sand and the hot air rises, creating a mirage!



Activity 5: Melting Skin

Materials:

- Safety Goggles
- Plastic Spoon
- Bowl with about 2 cups of water (not included)
- Goldenrod Paper
- Paper Towels (not included)
- Baking Soda

The Science:

This unique paper is made with a very special dye that changes color when certain chemicals come in contact with it. The paper turns bright red when it's exposed to bases like ammonia, Windex, or baking soda. It turns yellow when it's exposed to acids like vinegar or lemon juice. The paper can even change from yellow to red and back again!

You have enough paper to experiment with different substances. You can even use Q-Tips dipped in different liquids (acids and bases) to change the paper from one color to another. Be sure to have adult supervision before using any of the above chemicals.

The Magic:

Before you have gathered your audience, mix the bag of baking soda with about two cups of water in a bowl. Stir with the plastic spoon until the powder is fully dissolved. Place the bowl on the table in front of you. Place a piece of Goldenrod paper on the table.

Once your audience is gathered, you can use any story you like, but this is one that we have used and it gets pretty good results. Explain that you have a new chemical that is being tested in hospitals. It's designed to bring the blood in your body out through the skin, so needles won't have to be used when you need a blood test.

Ask a volunteer to come up and test it. Place the volunteer's hand in the bowl, and swirl it around a bit. Ask if they can feel the blood coming to the surface of their hand. Then have them take their hand out of the liquid and slap it onto the paper. A bright red handprint will appear on the paper and your audience will be amazed!



Activity 6: Now You See It, Now You Don't

Materials:

- Dissolving Paper
- 1 Clear Bowl (not included)
- Water (not included)

The Science:

As you probably already know, paper is made from trees. Ancient Egyptians invented papyrus (derived from the plant of the same name) which was similar to thick paper, but the Chinese are actually credited with making paper more like the kind we have today. Using bark from the mulberry tree, shredded cloth and water, the Chinese mashed the mixture into a pulp and spread it over a screen to press out the water and then dried it in the sun.

Today, paper is made in a similar way. For the most part, paper is pretty strong. The paper in this kit is made a little differently. Though it looks and feels like regular paper, it has special ingredients, so when it's placed into water and agitated or mixed, it will break down and dissolve.

You will have a few pieces to play with. They all have printing on them. Interestingly enough, when the paper is fused with the toner in the copy machine, the printed letters will remain behind when the rest of the paper dissolves in the water!

The Magic:



Fill your bowl with water and place it on your table.

Pass the paper around to allow your audience to feel it. Ask them how it feels or how they would describe what they are holding. Chances are good that the answer will be that it looks and feels like regular paper.

Hold the paper above the bowl. Say the magic words: *abracadabra* is always good for magicians!



Lower the paper into the water. It should begin to dissolve immediately, but if it doesn't, gently jiggle it a bit.

The letters from the printing on the paper should remain behind while the paper disappears!

Just think of all the cool things you could do with paper that dissolves in water!