



By T. Albert  
Illustrated by: [maillustrations.com](http://maillustrations.com)



# Samuel The Boy Scientist

Samuel the Boy Scientist is a fun book with two simple experiments for the inquiring mind. It's intended to stimulate the young reader's interest in the Sciences and written towards the interests of boys. It's sequel, Samantha the Girl Scientist, is written towards the interests of girls.



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“Hi! My name is Samuel and I want to be a scientist. You may be wondering why and my answer is simple. I am amazed at all the wonderful things like rockets to the Moon, fire trucks pumping out all that water, fast race cars, space ships, and the list goes on. But those are big things and I just don’t understand everything about them yet.

I also wonder about small things like-how does sugar turn into crystals called rock candy? Or how are those rock formations in caves made? Hmm – I know it has something to do with Science. My sister Samantha wants to be a scientist too, but she likes things that I don’t-like why her dolls eyes open and close. But even though we don’t like the same things, it’s still Science so we get along just fine. In fact, our teachers help us better understand Math, technology, current events and trends - all of which are important. We even help each other and have lots of fun.



I like to experiment or take things apart to see how they work. No matter what I do, I tell my mom or dad what I am going to be doing and sometimes even ask for their help. I would never just do something – I could get hurt.

Sometimes it's best to start small, that's what I did. I remember my first experiment in detail and it was a lot of fun to do. It had to do with growing small crystals, much like the way rock candy is made. You may be wondering why that is important and all I can say is that it's the basis for making any type of crystal. Their shape and size depends on many things and the more you read about them, the more you experiment, the more you grow interesting crystals. Try this experiment; I call it The Crystal Bowl. It's lots of fun and there is nothing dangerous about it. Because I am using a common chemical I let my mom know what I am doing. Here is what you need:

- A small clear bowl to grow the crystals in
- Epsom salt (a common chemical)
- Food coloring
- A measuring cup



- The Experiment :  
In the clear bowl, stir  $\frac{1}{2}$  cup of Epsom salts with  $\frac{1}{2}$  cup of very hot tap water. The hotter, the better.
- Stir for at least 1 minute. You will be making a saturated solution (scientific talk)-meaning that the water cannot hold any more of the Epsom salts. Some undissolved salt crystals will be at the bottom of the bowl.
- Add a couple of drops of your favorite food coloring. I like red.
- Place the bowl in the refrigerator for at least 3 hours. I put a sign on the bowl – Samantha-Do Not Eat! (I'm so funny.)
- Take out your bowl of crystals and pour out the extra water that may be at the bottom. Have fun examining them.



Okay, it's time to get Scientific. What just happened? You just made Magnesium sulfate crystals. Magnesium sulfate is the actual name for Epsom salt. The temperature of the water determines just how much Magnesium sulfate it can hold. The hotter the water, the more it can hold, and the more crystals it can grow.



So why did we put it in the refrigerator? By rapidly cooling the water we forced fast crystal growth. The quickly cooling water became denser and made the Magnesium sulfate atoms run into each other joining together into crystal structures.

When you grow crystals this way they will be small, thin, and a lot of them. If you let the water evaporate slowly you will get different crystals. You will have to experiment to see the results.

That is Science! Oh, don't forget to clean up any mess and ask your mom or dad to really clean anything you might reuse.

Have you ever seen those really neat formations in a cave? They are commonly called stalactites (they grow from the top of the cave down) and stalagmites (that grow from the cave floor up).

Want to make some? I'll bet you do!



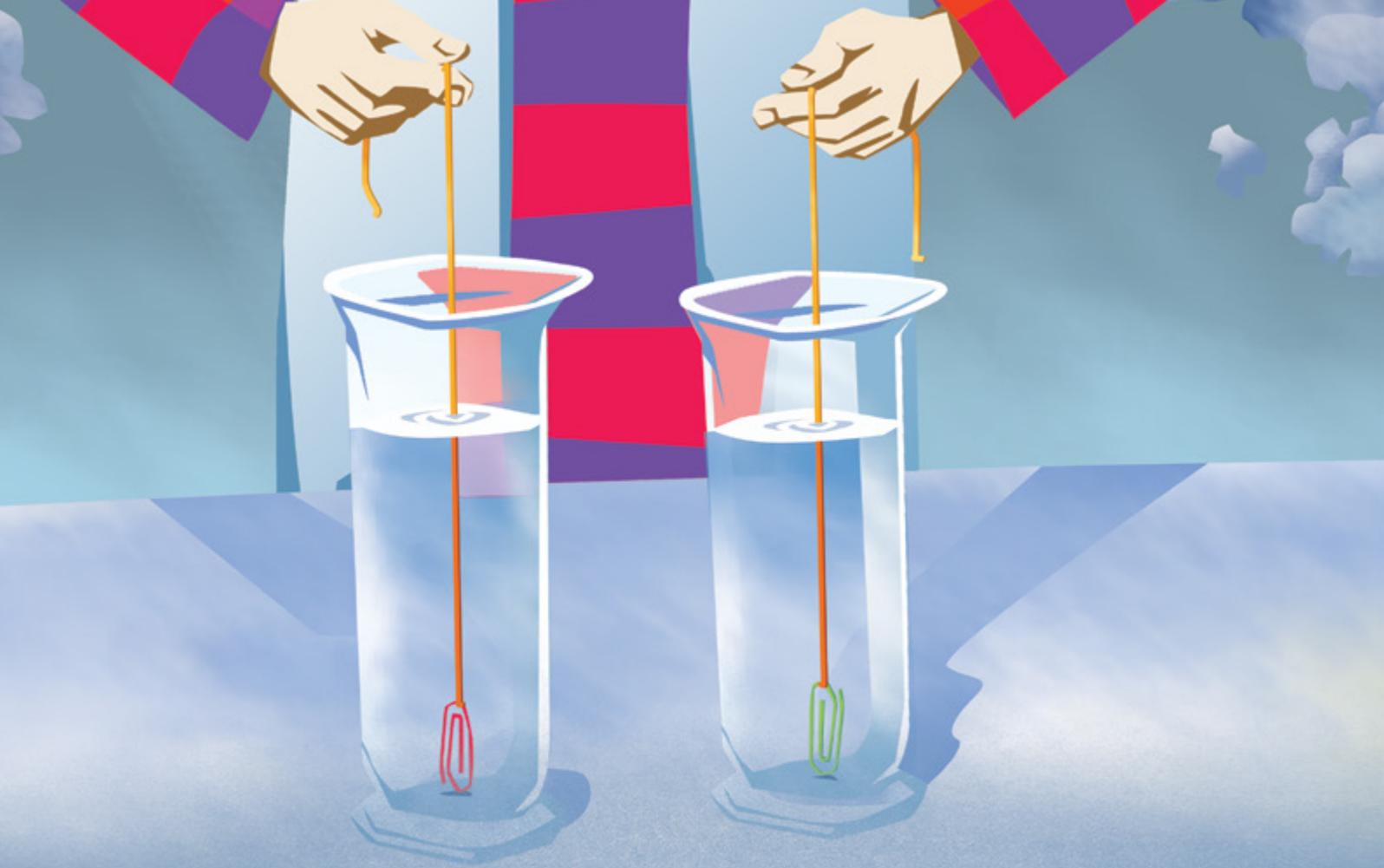
Again there is nothing dangerous, but let your mom or dad know what you are doing. This experiment takes some time and could get a little messy.

### Here is what you need:

- Two glass jars
- A large plate or pan
- Baking soda
- String
- Paper clips
- Water



- **The Experiment :**  
Fill the two jars with hot water. The hotter, the better.
- Stir in as much baking soda as will dissolve in the water. Mix it up well and make that saturated solution.
- Cut the string so it can go close to the bottom of the jars and go between them when they are several inches apart. Then tie a paper clip to each end to act as weights.
- Put one end of the weighted string into each of the jars.
- Place the jars on the large plate or pan, making sure the string has a little dip in the center. The plate or pan is needed to catch the drips of your scientific solution.
- Put your experiment in a safe place for 3 to 4 weeks. Keep an eye on it and watch your formation grow.

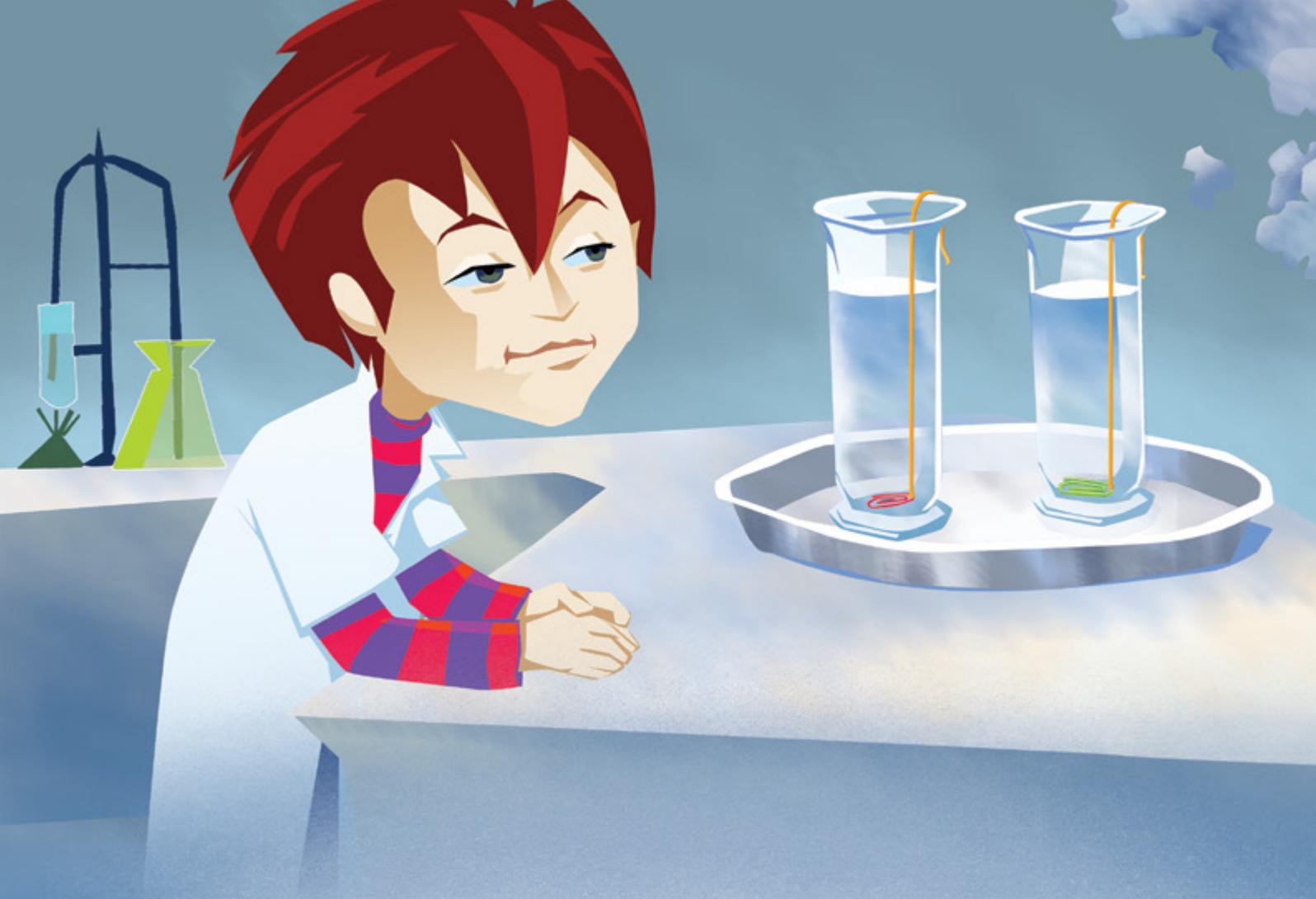


## What has happened?

The saturated solution is carried through the string. This process is called Capillary action.

When it gets to the dip in the string it drips onto the plate or pan. It is similar to water passing through the ground, picking up minerals, and falling through a cave.

Over time the dripping water evaporates and creates stalactites and stalagmites.



It's magic! Well, actually it is Science and takes place all over the world. Science is fun and I am glad I am going to be a scientist. Maybe you'll decide to be one too."

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