

## Spark your child's inner scientist

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The next time you find yourself sliding around on an icy sidewalk, think about the everyday science lessons you can slip easily into your kids' day.

"Children have tons of questions and natural curiosity, which quite frankly is a scientist in training," says Andy Allan, director of curriculum development of Champions Science Adventures. So take advantage of the cold, dark days in Chicago to have fun with a little science.

Science doesn't have to cost a lot and it doesn't require a lot of planning. Something as simple as going on a walk and talking about the differences between fall and winter or showing the chemical reaction of how dough turns into cookies can start the learning process, Allan says.

Looking at the leaves changing and talking about why trees need to save their energy in the winter helps kids begin to notice the natural life cycles around us.

Or take advantage of the shorter days by heading outside at night to identify constellations.

The most important thing to remember is that science should be done, not just discussed-it's about the process and taking advantage of natural curiosity.

Best of all, everyone in the family can learn together and benefit from the lessons. "Some understanding of science is important for the decisions you're making in your own life."

For more ideas on exposing kids to science, visit [www.scienceadventures.com](http://www.scienceadventures.com).

### Quick experiments

1. Fill a paper cup partway with water and use a marker to mark where the water is. Put the cup outside and wait for it to freeze. Kids will see that water gets bigger when it freezes.
2. Take a walk to pick up different objects to classify-things such as rocks and leaves can get kids started with recognizing different attributes and classifying collections.
3. Buy some inexpensive pots and seeds or bulbs to plant indoors in the winter. Radish seeds sprout in a couple of days, letting kids see quick results. Bulbs take longer but the results are gorgeous flowers.

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## Spinning ice skater experiment



Next time you watch figure skating, look at what the skaters do when they spin. They will start with their arms, legs and bodies stretched out. Then they bring their arms in tight to their bodies, making the spin faster. You can feel this effect yourself by doing a simple experiment.

Physicists call this conservation of momentum—anything that is moving wants to keep moving.

Things that are moving in a circle or spinning also have angular momentum, which depends on its speed, its weight and how far that weight is from the center of the spin. When you are spinning in the chair with your arms outstretched, the farther away the weight is the greater the angular momentum, which causes you to move slowly. When you bring your hands into your chest, you reduce your angular momentum, causing you to speed up.

Figure skaters know this physics lesson. Some world-class figure skaters can get up to nearly 300 turns a minute by using a little physics. Think how you would feel if you went that fast in the chair.

What you will need:

- Chair able to spin all the way around
- Two cans of food or small dumbbells
- An open space

What you do:

- 1) Sit in the chair with a can or dumbbell in each hand.
- 2) Stretch both arms straight out.
- 3) Have an adult spin you in the chair.
- 4) When adult lets go, quickly bring your hands closer to your body toward your chest. Do you notice the conservation of momentum?

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## Candy Chromatography



Look at the ingredients on the back of a packet of M&Ms. How many yellow dyes are listed? Why are there four yellow dyes in the ingredients but only one yellow-colored M&M?

The word "chromatography" is derived from two Greek words: "chroma" meaning color and "graphein" to write. Chromatography is a way of separating chemicals that are combined together in a mixture.

In chromatography the chemicals are dissolved and placed at the bottom of something absorbent like a coffee filter. As water is pulled through the coffee filter, the different chemicals will separate out. Some chemicals will dissolve quickly and will travel up the paper with the water while others will stick to the paper and stay low. When looking at mixtures of dyes you will see color trails for the different dyes used.

What you will need: Bag of M&Ms

- Coffee filter
- Scissors
- Clear plastic cup
- Water

What to do:

- 1) Take the coffee filter and cut it into rectangular strips about 1 inch wide and long enough to reach from the bottom of your cup and fold over the rim.
- 2) Fill the cup with about  $\frac{1}{2}$  inch of water. Select a color of M&M. Dip the edge of the M&M into the water for a few seconds. While it is still wet draw a colored line across one end of the filter paper about  $\frac{1}{4}$  inch from the bottom. Place the filter paper in the cup so that the bottom touches the water but the colored line is above it. Fold the top end of the filter paper over the rim to hold the filter in place or use a small piece of tape. Let it sit for a few minutes and observe what happens. Repeat for other colors.
- 3) How many of the M&Ms had yellow in their color? What you are seeing is the different dyes that make up each candy's color separating out on the filter paper. Rarely are pigments of any kind pure color-they are usually mixtures of pigments designed to give the right hue.
- 4) Try this experiment with Skittles!