WEEKDAY WONDERS

Content developed by the Tennessee Aquarium Education Department

TENNESSEE AQUARIUM

Mad Scientists: Day 3

Science is an important part of our lives, even when we do not realize it. This week, young scientists will have a chance to explore some of the science topics that we encounter around us every day. Whether it is plants or weather, water or colors, this week young scientists have a chance to find out more about the science around us.

These curated activities are listed in a suggested sequence but may be done in the order that works best for you and your young scientists. Learn more about this series in the Introduction to Weekday Wonders.

Question of the Day

What happened to the ice pop on a hot day?

Daily Nature Journal

Ask your young scientists to spend some time outside completing their daily nature journal. Be sure that your scientist records the temperature outside. Use the Guide to Nature Journaling to see the other prompts to help your scientist nature journal each day.

The Ice Pop

Tell your scientist the following story. “Maya was excited. She and her friend went to the store, and she used her pocket money to buy a nice and cold grape ice pop. It was really hot outside, so Maya knew the ice pop would taste great and help her feel cool. On the way home, they saw another friend who had a new bike. The friend offered to let Maya try the new bike. Maya set her ice pop down carefully on a bench and took a ride. When she came back, the ice pop was gone. In its place, there was a wet, purple stain.”

Have your scientist write more of the story and include what happened to the ice pop. Ask your scientist to include as many details about the ice pop as possible.

Frozen Excavation

Gather several small items, such as plastic animals, LEGO™ figurines, shells, beads, or coins. Also find a freezer safe container. Fill the container halfway with water and put it in the freezer for an hour or so. Then spread the items across the container, fill it the rest of the way with water, and freeze it completely.

Once the block is frozen solid, remove the ice block from the container. (You may need to run warm water over the container to loosen the ice block.) Take the block outside and/or place it in a large bin to catch melting water.

Ask your scientist to "excavate" the items from the block. For the youngest scientists provide them with different tools such as plastic knives, chopsticks, or spoons. It can also be helpful to provide salt and warm water to squirt onto the ice block. For older scientists, you can ask them how they think they could excavate most quickly and allow them to gather the tools they need. Encourage your scientist to try a variety of methods to see which helps him or her remove the items the most quickly.

Extension: If your scientist doesn't try the salt during his or her own exploration, you can suggest it. The fastest way to melt the ice is to spread the salt onto the ice and then drop warm water onto it. Salt lowers the freezing point of water. This means that when salt is added, the water needs to be much colder in order to stay frozen as ice. Since the ice is already warming up outside of the freezer, the salt will help the ice to melt much faster.

Freeze Painting

Gather an ice cube tray, food coloring, and craft sticks or other similar materials. Add water to each section of the tray. Have your young scientist add a few drops of food coloring to each section and add a craft stick. You can challenge your scientist to try to create all the colors of the rainbow. Once he or she is done, place the tray in the freezer.

Once the colored cubes are frozen, release them from the tray but allow them to still sit in it. Take it outside along with some butcher paper or other blank paper. Have your scientist paint a picture with the different cubes, using the sticks as handles.

You can also prompt your scientist to try to make darker and lighter shades of a color, to see what happens if the cube sits in a spot too long, or to try to mix colors on the paper.

Freeze Dance

Tell your scientist the following information. Ice is a solid made of water. Solids keep their shape and size. When ice melts, it is liquid water. Liquids take the shape of a container but do not increase their volume (the amount of it). The difference between ice and water is the way the particles—the extremely small parts that make them up—are behaving differently. In a solid, the particles do not move much and stay close to each other. In a liquid, the particles can move more freely and are faster.

Have your young scientist pretend to be a particle that makes up different objects. Call out the names of different solid and liquid items, such as chair, milk, lemonade, ice cream, watermelon, orange juice, bar of soap, liquid soap, and others. You can also write these on slips of paper and have your scientist choose them from a container. As you call out an object, your scientist should decide if it is a solid or a liquid and then dance like the particles in that object. For example, if you call out "chair," your scientist should dance slowly without moving too much. If you call out "lemonade," s/he would dance fast and move around the room.

Maya's Ice Pop

Ask your scientist to read back through the story s/he wrote about what happened to Maya's ice pop. See if your scientist wants to add any more information to the story now. S/he should be able to discuss the wet, purple stain as well as how the particles were behaving in the ice pop and in the puddle that was left. If s/he has not already, your scientist can also add information about what caused the ice pop to melt on the hot day.

Solid? Liquid? Oobleck!

Most substances can be identified as solids or liquids fairly easily. Your scientist has already found several during his or her journaling activity. However, sometimes a substance doesn't fit very easily into either category. In this experiment, your scientist will make one of these substances called "oobleck!"

Place two cups of cornstarch into a bowl and add one cup of water. If your scientist would like to have brightly colored oobleck, add 10-15 drops of food coloring to the water first. Mix the cornstarch and water together until it reaches the correct consistency. To test this, the oobleck should clump when you try rolling it into a ball, but ooze back into a liquid when you hold it still in your hand.

Give your scientist some time to explore the oobleck. Encourage him or her to try rolling it, pressing on it, holding it still, etc. Ask your scientist if s/he thinks the oobleck is a solid or a liquid. What makes it like a solid? What makes it like a liquid? Can your scientist's actions make the oobleck seem more like one or the other? The answer is that oobleck is not really either one! It has some characteristics of a solid and some characteristics of a liquid, but it doesn't really fit in either category. Substances like this are called non-Newtonian fluids.