Science Sessions with Professor Emily
Room C
10:20-10:40
Target Audience: All Ages

MONDAY: July 6, 2020  
Wonderful World of Water
Session Description: There’s nothing like a cold glass of water on a hot day, but there are so many cooler ways to use water and other liquids. Join Professor Emily to explore and learn about properties of water and other liquids that will amaze your senses through some incredible demonstrations, as well as a guided hands-on activity you can do right in your own home! We will end our meeting with an optional surprise STEM Challenge that you can share with the group at our next meeting.

Camper Materials included in packet for use during session: Pipet/dropper, skittles
Other material included in packet: STEM Challenge instructions

Camper Materials from home for use during the session: Q-tips, cotton ball, penny (shiner the better), pepper, 1 cup of water, 1 cup of milk (at least 2%), plate that can hold water (can be any material but be sure it has sides that can hold water and is white or light colored in the middle), dish soap, at least 3 food colors, paper towels or rags *these materials are only needed if your camper wants to participate in the guided activities included during this session

STEM Challenge to do at home: make a paper chain.

Tuesday: July 7, 2020  
Crazy Chemistry
Session Description: Chemistry is not just for the lab. Chemistry happens all around us in simple and amazing ways! Join Professor Emily to explore and learn about the magic of chemical reactions that will wow your eyes through some fun demonstrations, as well as a guided hands-on chemical reaction you can do right in your own home!

Camper Materials included in packet for use during session: None
• Other material included in packet: recipe for slime, instructions for making homemade ice cream in a baggie

Camper Materials from home: 16-ounce coke unopened, milk, funnel *can use a curled up paper plate for funnel

Wednesday: July 8, 2020  
Charged UP
Session Description: Did you ever notice how your clothes stick together after getting them out of the dryer? Have you ever shocked someone with the touch of your finger? Join Professor Emily to explore and learn about electricity of all kinds. Discover how charges change the behavior of different materials through some mind-boggling demonstrations, as well as through a guided hands-on exploration you can do right in your own home.

Camper Materials included in packet for use during session: balloon
• Other material included in packet:

Camper Materials from home: paper plate, salt and pepper
How to Make Slime with Borax and White Glue

You can experiment with proportions to alter the results
By Anne Marie Helmenstine, Ph.D.

Possibly the best science project you can do using chemistry is making slime. It's gooey, stretchy, fun, and easy to make. It takes only a few ingredients and a few minutes to make a batch. Follow these step-by-step instructions or watch the video to see how to make slime:

01 of 07 Gather Your Slime Materials

To get started, you will need:
- Water
- White glue
- Borax (found in the laundry isle at any grocery store)
- Food coloring (unless you want uncolored white slime)
- Gloves
- Plastic spoon
- Bowl
- Resealable sandwich baggie

Instead of using white glue, you can make slime using clear glue, which will produce a translucent slime. If you don’t have borax, you can use contact lens saline solution, which contains sodium borate.

02 of 07 Prepare the Slime Solutions

Slime has two components: 1. a borax and water solution and 2. a glue, water, and food coloring solution.

Prepare them separately:
- Mix 1 teaspoon of borax in 1 cup of water. Stir until the borax is dissolved.
- In a separate container, mix 1/2 cup (4 oz.) white glue with 1/2 cup water. Add food coloring, if desired.
  - You also can mix in other ingredients, such as glitter, colored foam beads, or glow powder.

The first time you make slime, it's a good idea to measure the ingredients so that you know what to expect. Once you have a bit of experience, feel free to vary the amounts of borax, glue, and water. You might even want to conduct an experiment to see which ingredient controls how stiff the slime is and which affects how fluid it is.

03 of 07 Mix the Slime Solutions

After you have dissolved the borax and diluted the glue, you are ready to combine the two solutions. Stir one solution into the other. Your slime will begin to polymerize immediately.

04 of 07 Finish the Slime

The slime will become hard to stir after you mix the borax and glue solutions. Try to mix it up as much as you can, then remove it from the bowl and finish mixing it by hand. It's OK if some colored water remains in the bowl.
05 of 07 Things to Do with Slime

The slime will start out as a highly flexible polymer. You can stretch it and watch it flow. As you work it more, the slime will become stiffer and more like putty. Then you can shape it and mold it, though it will lose its shape over time. Don't eat your slime and don't leave it on surfaces that could be stained by the food coloring. Clean up any slime residue with warm, soapy water. Bleach can remove food coloring but may damage surfaces.

06 of 07 Storing Your Slime

Keep your slime in a sealable plastic bag, in the refrigerator. Insects will leave slime alone because borax is a natural pesticide, but you'll want to chill the slime to prevent mold growth if you live in an area with high mold count. The main danger to your slime is evaporation, so keep it sealed when you're not using it.

07 of 07 How Slime Works

Slime is an example of a polymer, made by cross-linking small molecules (subunits or mer units) to form flexible chains. Much of the space between the chains is filled by water, producing a substance that has more structure than liquid water yet less organization than a solid.

You can change the properties of borax and glue slime by playing with the ratio between the ingredients. Try adding more borax or more glue to see the effect it has on how stretchy or thick the slime is. In a polymer, molecules form cross links at specific (not random) points. This means some of one ingredient or another usually is left over from a recipe. Usually, the excess ingredient is water, which is normal when making slime.

ICE CREAM IN A BAG

Supplies Needed:
- 1 Gallon freezer Ziploc Bag
- 1 Quart freezer Ziploc Bag
- Ice
- ½ cup rock salt *can use regular table salt but rock salt works best
- Oven mitt or winter gloves (it gets pretty cold on your hands)

ICE CREAM IN QUART SIZE BAGGIE INGREDIENTS:
- 2 Tablespoons sugar
- 1 cup half and half or whole milk
- 1/2 teaspoon vanilla extract
- 1 1/2 Tablespoons chocolate syrup (optional for chocolate lovers)

INSTRUCTIONS
1. Add sugar, half and half, vanilla extract and chocolate syrup to quart sized freezer bag and seal tightly.
2. Fill gallon freezer bag halfway with ice. Sprinkle ½ cup of rock salt over the ice.
3. Place your quart sized bag inside the gallon bag and seal.
4. Double-check your bags to make sure they're well-sealed. Put gloves on and shake bags vigorously until ice cream forms. Be careful not to bust you ice cream bag.
5. Take quart size baggie out and rinse it off quickly with cold water so you don’t get salt in your ice cream. Open and Enjoy!
THE SCIENCE BEHIND ICE CREAM IN A BAG:

The salt added to the ice lowers the melting point of the ice through a chemical reaction in the salt, just like it does when we add salt to roads in the winter. In order for the ice to melt, however, it has to absorb heat from its surroundings like the ice cream in the bag. The ice pulls the heat away from the ice cream to melt which allows the ice cream to freeze.

Ice cream is also a compound. Once all the ingredients of the ice cream are mixed together they are bound together. The ingredients are chemically combined and cannot be separated by physical means like a mixture. To separate the ingredients in a compound there would have to be another chemical reaction.