Western Engineering Outreach

Floamming around

Grade K-2

Meet Today's ENG HERO!

Elizabeth Gillies - Professor with Western Engineering

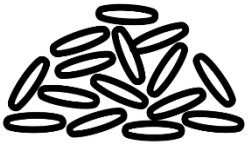
Dr. Gillies leads a research program in smart materials and biomaterials spanning from fundamental discoveries to applications with a focus on polymer chemistry and the design and synthesis of materials with new properties and functions. She is collaborating with other research groups to explore applications of her materials in drug delivery, regenerative medicine, and agriculture. To learn more about Dr. Gillies visit: https://www.eng.uwo.ca/chemical/faculty/gillies_e/index.html

Learning Goal:

- Students will expand their fine motor skills by measuring and mixing ingredients.
- Curriculum connections: Grade 1 - Materials, Objects, and Everyday Structures, Grade 2 - Properties of liquids & solids

Materials Needed:

- PVA based glue (such as Elmer's school glue)
- Laundry detergent **Supervision of children during this activity is highly recommended**
- short grain rice
- Nitrile or Latex gloves **Use of gloves while handling the floam is highly recommended**
- Baking Soda and Water
- Cup or bowl
- Sealable plastic bag or container



Engineering and Science Connections:

Background:

Today we will learn a bit about chemistry as we make our own homemade snow globes, but what even is chemistry?

Chemistry:

Chemistry is the study of chemicals and the reactions between them. Chemists can study two different kinds of reactions: physical changes (where the change can be reversed) and chemical changes (where the reaction cannot be reversed). In chemistry, scientists also study the states of matter: solids, liquids and gasses.

States of Matter:

Solids:

Solids have a specific volume , and a specific shape. This means that the size and shape of a solid doesn't change when you move it to a different container. If you put a rock in a cup, it just sits there and doesn't generally change much.

Liquids:

Liquids have a specific volume, but no set shape. This means that the overall size of the liquid doesn't change much regardless of what container you put it in, but if you move a liquid to a different shaped container, it's shape will change to the shape of the inside of the container. If you put some water in a cup the actual size stays the same even though its shape changes to match the container.

Gas:

Just like liquids, gases don't have a set shape and can change their shape to that of their container. Unlike solids and liquids, gases can change their size depending on how big their container is.

There are actually other (harder to understand) states of matter, like plasmas, supercritical fluids, time crystals, and more! Many of the other states of matter are really hard to make and can behave weirdly so they aren't very common.

Video Recommendation: *The States of Matter*

https://www.youtube.com/watch?v=JQ4WduVp9k4

Activity:

Before beginning, ask the following questions:

- What are the three common states of matter?
- What are examples of each state?
- Can a liquid change state? What are some examples?
- What state of matter will they be when we mix them all together? What about after time has passed?

Make Slime

- distribute a cup or bowl and stirring utensil to every student involved
- add white glue, leaving your cup one third full of glue
- slowly add a teaspoon of laundry detergent at a time to the glue and stir continuously
- when it has thickened to the point where the slime still sticks to the walls of the cup but it mostly sticks to itself, add the long grain rice.
- If you find that the rice falls out, add a teaspoon of glue at a time until the mixture is sticky enough to hold on to the rice. If the mixture continues to stick to the cup or bowl after the rice is added, add half a teaspoon or less of detergent at a time to make it firmer.
- kids can now play with their floam! Be sure to supervise them when they are playing to make sure they do not ingest the floam.
- Once your student is done playing with the floam you can store it for later in either a sealable plastic bag or a Plastic container with a lid, the floam will dry out over time if not stored properly.
- Make sure your student carefully washes their hands after handling their floam.

What Did You Learn?

- What are the three common states of matter?
- What state of matter do you think the floam is?
- How does the amount of glue added affect the stickiness of the floam?
- What about the detergent?

Future Learning

- Turn this floam activity into an experiment! In order to do this, try three different recipes. Use the recipe above in the first trial and split it into three equally sized chunks, add half a teaspoon of water in one of the chunks, and a small pinch of baking soda in one of the other chunks, the chunk we added nothing to will let us compare to the original recipe. Make a prediction: what will happen to each recipe because we have added either a solid or liquid? Compare the end results. Did the water or baking soda make a difference? Which recipe did you like the best and why?

Share your creations!

We would love to see what you made. Email as at discover@uwo.ca or tag us on social media.

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Thanks for discovering with us!