# HALLOWEEN STEAM

Are you ready for Halloween? It's a fun, spooky time of year that's celebrated on October 31st. In a typical year, many families celebrate by dressing in costumes, carving pumpkins into jack-o'-lanterns, enjoying Halloween parties and going trick-or-treating for candy and other goodies. Some children collect coins for the Trick-or-Treat for UNICEF (United Nations Children's Fund) outreach. Donations help the program save and improve children's lives around the world with immunizations, education, health care, and more.

Halloween began with the ancient Celtic tribes of Britain and Ireland. The Celtic holiday **Samhain** (pronounced "**SAH**-win") celebrated the end of summer and harvest season. During Samhain, the Celts stocked up supplies and prepared for winter. They believed that on October 31st ghosts could return to destroy the harvest that was being stored for winter, so bonfires were set on the hillsides to ward off any evil spirits. The word **Halloween** is a shortening of All Hallows' Evening, also known as Hallowe'en or All Hallows' Eve.

Since we can't all be together to celebrate Halloween at the library this year, we wanted to share some of our favorite spooky STEAM activities for you to try at home. Have a fun and STEAM-y Halloween!

## ACTIVITY #1: SCREAMING GHOST BALLOONS!

Materials:

- white balloons
- hex nuts (six-sided general purpose fasteners with internal screw threads, available at hardware stores and home improvement centers)
- permanent markers for drawing a ghost face

1. Carefully squeeze the hex nut through the mouth of the balloon so that it is loose inside. NOTE: make sure that the hex nut goes all the way into the balloon so that there is no danger of it being sucked out while blowing up the balloon.
2. Blow the balloon up to about 6-8 inches in diameter.
3. Tie a knot in the opening of the balloon so air doesn't escape. You might need an adult's help with this.
4. Draw a ghost face on the balloon with the permanent marker.
5. Hold the top of the balloon and swirl the hex nut gently inside the balloon to make it scream!

**hex nut**


**ghost balloon**

*What made the ghost balloon scream?*

**Physics**, which includes the science of motion and sound, is responsible for that screaming sound coming from the balloon. A balloon's shape creates **centripetal**, or center-seeking, **force** on the hex nut. It's an inward force on an object (the hex nut) causing it to move in a circular path. Since the nut has 6 sides, its flat edges make it bounce and vibrate inside the balloon. The sound itself is made by the sides of the nut vibrating against the inside wall of the balloon.

There's not much **friction** inside the balloon so the nut can move freely inside. Friction is the force between two objects that are touching, keeping the objects in place or slowing them down. If there was more friction, the nut wouldn't be able to move as easily or create those sounds.

## ACTIVITY #2: SLIME WITH MONSTER EYES!

Materials:

- ½ cup clear or white glue (we used Elmer's brand)
- ½ cup water
- ½ teaspoon baking soda
- 1 tablespoon saline solution for contact lenses (we used Target Sensitive Eyes brand)
- Bowl for mixing
- Food coloring
- Googly eyes

1. Add the glue to your mixing bowl.
2. Then add the water to the bowl and mix together.
3. Add food coloring to the bowl and mix well.
4. Stir the baking soda into the bowl and mix well.
5. Stir a handful of googly eyes (or more, as desired) into the bowl.

6. Mix in the saline solution and stir until slime forms. It should pull away from the sides of the bowl.
7. Knead the slime well after mixing in all the ingredients to improve the consistency.
8. Squirt a few drops of the saline solution onto your hands before picking up the slime. If the slime still feels too sticky, add a few more drops of the saline solution onto your hands and knead the slime awhile longer until it's the right texture and not as sticky.

This type of slime is ultra-stretchy but can be pretty sticky. Keep in mind that by adding more solution you will reduce the stickiness, but that will also create a stiffer slime.

*What IS slime anyway?*

Making slime involves **chemistry**, the study of matter (solids, liquids, and gases) and the changes that take place with that matter. Slime is a **non-Newtonian fluid**, which isn't a liquid or a solid and doesn't follow the same rules as those states of matter do. You can pick it up like a solid, but it also oozes like a liquid. It's pretty weird stuff!

Slime is stretchy because it's a type of polymer. Polymers are long, flexible molecules that can slide past each other as a liquid. In this recipe, the glue is made of chains of polymers that easily slide past each other and allow the glue to flow. When you add saline solution, you change the position of the molecules in the glue so those long molecules can't move or flow as easily. The mixture goes from a liquid to something much more rubbery.

## ACTIVITY #3: PUKING PUMPKIN!

Materials:

- One carved pumpkin (we named ours Ralph)
- ½ cup baking soda
- Mixing bowl, pitcher, or other similar container
- 2 cups vinegar
- Food coloring
- Bucket, small trash basket or stool
- A drop cloth for indoors, or an outdoor space that you don't mind getting messy

1. Set your pumpkin on a surface that is easy to clean. You can use an overturned bucket, basket or stool placed on top of a drop cloth or sheet of plastic.
2. Remove the top of your pumpkin, then carefully add baking soda (adjust the amount as necessary for a vigorous eruption). Be careful to not allow the soda to puff right out of the pumpkin's mouth!

3. In a container mix vinegar with a few drops of green food coloring (or whatever color you'd like).
4. Slowly pour the vinegar into the top of the pumpkin.
5. Stand back and watch as your pumpkin erupts!

*Why did my pumpkin puke?*

Our buddy Ralph just introduced you to the wonders of acids and the magic of a well-placed quantity of baking soda. This activity is very similar to the erupting volcano science project that you may already be familiar with. By combining an acid (the **acetic acid** found in vinegar) and a carbonate (**sodium hydrogen carbonate** that's found in baking soda), you create a gas called **carbon dioxide**. That's the same type of gas used to carbonate soft drinks and make them fizzy. The release of carbon dioxide results in Ralph's volcanic reaction.

## ADDITIONAL RESOURCES

Materials available from the Washoe County Library System:

*Friction* by Matt Mullins

*The Halloween Tree* by Ray Bradbury

*The Halloween Tree* [DVD videorecording] by Ray Bradbury, produced and directed by Mario Piluso

*The Halloween Tree* [sound recording] by Ray Bradbury

*How to Make Slime* by Lori Shores

*Karina Garcia's DIY Slime* by Karina Garcia

*Science Stunts: Fun Feats of Physics* by Jordan D. Brown

Videos:

Lawrence Livermore National Laboratory, "What is a non-Newtonian fluid?" https://youtu.be/2IkHlFvBM20

Orlando Science Center, "Simple Sensory STEAM Activities to Engineer for Halloween" https://youtu.be/uPlLJwqpRBo

Websites:

Science Buddies, Halloween STEM Activities https://www.sciencebuddies.org/blog/halloween-stem

The United Nations Children's Fund (UNICEF), Trick or Treat for UNICEF
https://www.unicefusa.org/trick-or-treat