



girl scouts
of maine

Ooey Gooley Science Toolkit

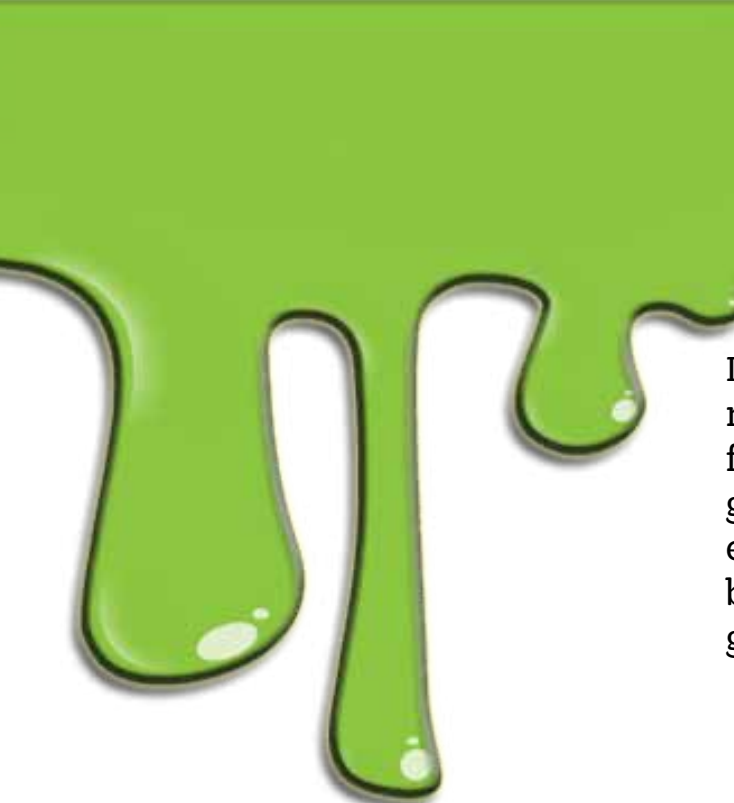
Based on the Home Scientist badge for Brownies, this event toolkit is designed to show Brownies and Juniors that science is all around you. In Ooey Goey Science, you'll combine messy science fun with hands-on experiments - all while finding out where science has been hiding in your own home.

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This event toolkit has been a wonderful compilation of ideas and resources, and we are thankful for the following groups:

- Girl Scouts of Wisconsin Southeast
- Girl Scouts River Valleys
- Scientific American



In this packet, you will find most everything needed to make planning a successful STEM event for Brownies and Juniors as simple as can be. The goal is not only to help you plan a STEM themed event utilizing the Brownie Home Scientist badge, but also to help you plan a hands-on event that will get the girls excited about science.

In this kit, you will find:

- ◆ Sample checklists, timelines, and tips and tricks to help you plan your Ooey Goey Science event
- ◆ Suggested activities with extension ideas for Juniors
- ◆ Materials lists to take the guess work out of what you need
- ◆ Marketing flyer you can print or email to promote your event
- ◆ Sample evaluations to help the girls and the leaders share their thoughts and suggestions to make next year's event even better!

Station Rotations

The event will focus on the steps for the Brownie Home Scientist badge. While the girls will not complete all the steps, they will be well on their way to understanding how science is all around us. Since this event is for Brownies and Juniors, there are adaptations to deepen and enhance the experience for the Juniors. However, keep in mind that Juniors are not eligible to earn the Home Scientist badge as this badge is for Brownies. The four steps of the Home Scientist badge covered in this event are:

Step 1 - Be a Kitchen Chemist

Step 3 - Dive into Density

Step 4 - Make Something Bubble Up

Step 5 - Play with Science

Planning Your Event

Event Planning Checklist

At Least 3-4 Months Prior to the Event

Names

- Form your event committee. Remember, at least half of the committee members must have participated in the CEO workshop.
- Decide roles and responsibilities for each person in the group.
- Decide on the date, time, and location of the event. Make sure your site follows guidelines in the Safety Activity Checkpoints.
- Conduct a site visit noting the location of doors, electrical outlets, and open areas.
- Reserve your facility based on the facility use agreement/requirements for your specific location.
- Submit your Intent to Hold an Event or Opportunity form to your Service Team Program Coordinator and Volunteer Support Specialist at GSME.
- Draw/sketch a floor plan of the venue - draw a bird's eye view of the venue so that you can determine the lay out of your event. Be sure to include a check-in table, an open area for your opening and closing, and breakout rooms (if available).

8-10 Weeks Prior to the Event

Names

<input type="checkbox"/> Plan the specific activities for your event from the Event Toolkit. <input type="checkbox"/> With any costs for the facility and materials in mind, develop your budget for the event. Determine how much you want to charge for the girls to attend your event. <input type="checkbox"/> Submit your budget to your Service Unit and your Volunteer Support Specialist for approval. <input type="checkbox"/> Develop your registration procedures. <input type="checkbox"/> Develop your marketing strategy for the event. How will you promote the event? Facebook? Social media? Email? Start to spread the word about your event. <input type="checkbox"/> Develop a list of volunteers needed and start contacting potential volunteers. <input type="checkbox"/> Arrange for your event first aider following the guidelines in Safety Activity Checkpoints.				

6-7 Weeks Prior to the Event

Names

<input type="checkbox"/> Publicize the event for registration. <input type="checkbox"/> Develop a written emergency plan, "Plan B," and cancellation plan. <input type="checkbox"/> Continue to fill volunteer positions as needed.				

4-5 Weeks Prior to the Event

Names

- Review the event schedule and activities. Make a list of materials that will need to be purchased or borrowed and decide who will get the needed materials.
- Check in with presenters and send them the information for their station/ job for the event.
- Develop the event's check-in and check-out procedures.
- Request non-member insurance through the council office, if needed.
- Decide on how the facility will be set up - chairs, tables, stations, decorations, check-in tables, first aid station, parking. Brainstorm possible problems and implement potential changes or backup solutions if need be.
- Make a list of tasks that can be completed by volunteers. Recruit Program Aides, leaders, parents, and whoever else you may need to volunteer during the event.
- Review event budget.
- Review your registrations and continue to promote the event as needed.

2-3 Weeks Prior to the Event

Names

- Confirm that all committee members are finalizing their responsibilities.
- Confirm final number of registrants and send out confirmations.
- Notify all committee members and event volunteers of final numbers.
- Make final plans for the event. Purchase any materials needed.
- Review as a committee who will be responsible for what before and during the event.
- Review the schedule and program for potential problems.
- Create event signs such as parking, directions, etc.
- Communicate with any presenters to ensure they are still attending.

1 Week Prior to the Event

Names

- Prepare check-in materials: welcome letter, agenda, map, attendance sheet, evaluations, and pens/pencils.
- Schedule your wrap up meeting following your event.
- Catch up on everything you haven't completed.
- Have a final committee meeting to go over what the group has done and what lies ahead.



Day of the Event

Names

- Arrive early. Meet with committee to review responsibilities, to do a pep talk, and to set up.
- Post direction signs first.
- Set up the check-in site and first-aid station next.
- Greet presenters. Help with set up/clean up of their space. Provide them with a basic packet. Go over schedule of the day.
- Communicate expectations of the day to girls and adults.
- Put on a great event!!
- Have participants and presenters complete an event evaluation.
- Leave site clean and picked up—better than you found it!

1-2 Weeks After the Event

Names

- Hold a committee meeting to evaluate and celebrate the event.
 - o What went well/what will you change?
 - o Review participant evaluations.
- Complete and turn in the Event Final Report Form to the Service Team Program Coordinator and report final attendance to your Volunteer Support Specialist.
- Complete and turn in the Event Budget Worksheet to the Service Team Program Coordinator or Treasurer.
- Pay any outstanding bills.
- Send thank you notes as appropriate.
- Report out to the whole Service Unit at the next Leaders' Meeting.



Sample Event Schedule

This event is scheduled to last 3 hours plus set up and clean up time to allow for enough time in each of the 4 rotations to make it meaningful for the girls. If you anticipate having a large number of girls, you might consider having multiple rotations to reduce the number of girls at each station and to allow for more participation from each girl.

Here is a sample schedule:

Time	Activity	Description
1 hour +	Set up venue	Organize check-in area, arrange tables, chairs, stations, orient your volunteers and ensure any last minute details are completed.
25-30 min	Check-In and Start-Up Activity	Using your pre-determined check-in procedures, check-in the troops as they arrive. Give any special instructions as needed. Hand out start-up activity and provide instructions as needed.
5-10 min	Opening	Start the event with an opening flag ceremony. Introduce yourself and volunteers, briefly go over what will happen at the event, make sure everyone knows where the bathrooms are and go over any special instructions for the day.
30 min + 5 min transition time	Activity 1	Girls will rotate through the stations as assigned.
30 min + 5 min transition time	Activity 2	Girls will rotate through the stations as assigned.
30 min + 5 min transition time	Activity 3	Girls will rotate through the stations as assigned.
30 min + 5 min transition time	Activity 4	Girls will rotate through the stations as assigned.
10 min	Kapers & Evaluations	Each troop should be assigned an area to help clean up. Remember to include common areas in addition to station locations.
5-10 min	Closing	Thank participants for coming, have a Friendship circle (optional), end with a closing flag ceremony, and have troops return their evaluations.
30 min +	Final Clean-Up	Remember, a Girl Scout always leaves a place better than she found it. Make sure you remove your items, put tables and chairs back (if applicable), check the bathrooms, and collect any lost and found items.



Things to Think About

Where should we have the event? Here are some things to consider:

- ◆ You will need a space that is large enough for the number of girls and adults you anticipate will attend with break out rooms for the stations. If you plan on having the event in one large space, think about how loud the room will get. Break out rooms would help contain the activities as well as the noise.
- ◆ Since this is a STEM event, consider the floor at your proposed location. Does it have carpet? Is it easy to clean?
- ◆ If your event is in the warmer months, you might consider finding a location where you could go outside if the weather cooperates.
- ◆ You might also want to consider the ease of the location, parking, whether or not your space allows food and drinks, if there a fee for the space, and whether or not the space has tables and chairs for you to use.

Who will help run the Ooey Goey Science event?

- ◆ Think about who you may ask to help at the stations. Cadette, Senior, and Ambassador troops are great resources for younger girl events. Younger girls love seeing older girls in action, and the older girls could use this time as part of their Service to Girl Scouting Award or community service hours for school.
- ◆ In addition to older girls and Girl Scout volunteers, don't hesitate to recruit volunteers from the community. Are there professionals connected to any of the troops that would be interested in volunteering? A mom that is an engineer? An uncle who is a chemist? Bringing in people from the community is a great way for the girls to learn, and it shows them some of the career opportunities available.

Check-In

As a committee, you will want to decide what your check-in process will be. If you have run events in the past and have a check-in process that works for your Service Unit, continue to use what is familiar. If this is your first event, here is a sample check-in procedure:

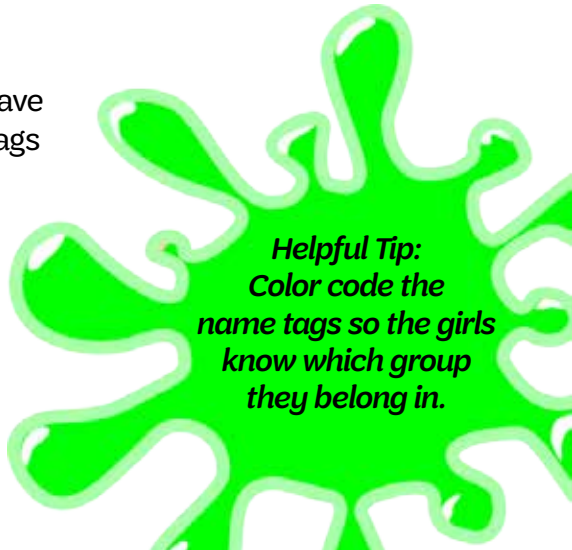
Set up two tables for check-in. (You may decide one is enough if this will be a small event). Divide the troops so that troops 1-X go to one table, and troops X-Z go to the other table. This will cut down on how long it takes to check in the troops. When they check in, they should tell you how many are present that day from the total number they registered. This will allow you to get an accurate count of how many girls and adults attended your event, which helps with planning and evaluation purposes. Once they check-in, you can give them their packet for the day and give them any instructions they need to know. (This is a great place for them to get their name tags.)

Name Tags

The easiest name tags to create would be sheets of blank labels and have participants make their own name tag. You could pre-print the name tags or add a design to them, however, this is not necessary.

Ceremonies

Ceremonies are an important part of Girl Scout traditions. Each event should start and end with a flag ceremony. Additional information about flag ceremonies and flag care can be found in the appendix.



Helpful Tip:
Color code the name tags so the girls know which group they belong in.

Based on the activities your committee chooses, use the following materials list when shopping for or acquiring your materials.

General Materials

- Name tags
- Pencils/pens
- Markers
- Tables
- Chairs
- First aid kit
- Tape
- Scissors
- Paper
- Flags and flag stands
- Color Guard uniforms

Start-Up Materials

Poke a Potato

- Stiff plastic drinking straws of various sizes
- Raw potatoes
- Activity directions for display

Water Symphony

- Five or more glasses (must be glass)
- Water
- Wooden sticks or pencils

Be a Kitchen Chemist Materials

Ice Cream

- Ice
- Duct tape
- Ice-cream toppings (optional)
- Gloves or hand towels (optional)
- A pair of scissors (one for the whole group)

- Bowls- one per girl
- Spoons- one per girl
- Music (optional)

- Rock salt, kosher salt, table salt

For each girl (or pair of girls), you will need:

- 1 Tablespoon sugar
- 1/2 Cup whipping cream or half & half
- 1/4 Teaspoon vanilla
- 6 Tablespoons rock salt
- 1 Pint-size ziplock bag
- 2 Gallon-size ziplock bags – have more handy in case of leaks

Marbled Milk Paper

- Whole milk
- Dish soap
- Q-tips
- Food coloring
- Shallow plate or tray
- 3-4 pieces of postcard size watercolor paper for each girl (or group/pairs if you have a large event)
- Pens
- Almond, rice, or coconut milk (optional Junior extension)



Dive into Density Materials

Magic Ketchup

- Several clear 1 liter plastic bottles - labels removed
- Water
- Ketchup packets (like the ones you get at a fast food restaurant)
- Salt - preferably kosher salt (it helps keep the water clear)
- Tablespoons
- Small bowls (to put the salt in so it is easier for the girls to scoop)
- Bucket(s) for the used water
- Several smaller bottles and several 2 liter bottles
- Different kinds of food packets such as mayo, mustard, soy sauce
- Lemon
- Lime
- Clear deep container

Rainbow Jar

- The following liquids: corn syrup, dish soap, water, rubbing alcohol, olive oil or vegetable oil, Optional: honey, milk, maple syrup
- Small bowls or cups for mixing
- Spoons
- Food coloring
- Small jars or other containers that can be sealed - one for each of the liquids
- Small baster or eye dropper
- Squeeze containers - optional for the different kinds of liquid, one for each liquid for each group
- Tall & narrow glasses (one for each group)
- Lemon
- Lime
- Clear deep container
- Paper and markers - optional
- Various household items such as a safety pin, key, staple, peanut, raisin, chocolate chip, small rubber bouncy ball, ping pong ball, etc

Make Something Bubble Up Materials

Elephant Toothpaste

- Yeast
- Hydrogen peroxide (as close to 6% as you can find. Although the regular hydrogen peroxide you can get at the pharmacy will work, you just won't have as strong of a reaction.)
- Dish soap
- Empty, rinsed 16-24 oz soda/water bottles - 1 per small group
- Additional bottles in varied sizes (optional)
- Food coloring
- Small roasting pans - 1 per small group
- Warm water
- Small cups
- Spoons or popsicle sticks to stir with
- Safety goggles (optional - one per girl)

Soda Geyser

- 2 liter bottles of diet cola - several per group (regular cola can be used, but diet cola is less sticky and can create a bigger reaction)
- Rolls of Mentos candy - at least 2 rolls per group (mint works the best)
- Paper
- Paper towels/wipes to help with clean up
- Buckets
- Water
- Tea kettle or other source for hot/warm water
- Fridge or other way to cool the soda
- Several different brands of cola
- Large measuring cups - at least 4 cups (or another way to measure the remaining volume of soda left in the bottle)
- Baking soda
- Vinegar
- Shallow bowl or plate
- Poster paper or butcher paper
- Markers
- Our Soda Geysers handout - see appendix
- Different kinds of small candy: Skittles, mint Mentos, fruit Mentos, Lemonheads or other round candy, M&Ms, Sweet tarts, jelly beans, Lifesavers, Mike and Ikes, Tic Tacs

Play with Science Materials

Slime

- School glue
- Water
- Liquid starch
- Small cups
- Permanent marker
- Stirring sticks or spoons
- Food coloring
- Small Ziplock bags (one per person)

Bubbleology

- Pennies
- Eye droppers
- Small cups
- Cups or jars
- Measuring cups
- Measuring spoons
- Water

- Liquid dish soap
- Glycerin
- Light corn syrup
- Permanent markers
- Masking tape
- Popsicle sticks, spoons, or other ways to stir
- Stopwatch
- Wide and shallow bowls (optional)
- Pencils
- Rulers
- Clipboards (optional for the groups to use to record their results)
- Butcher paper or poster paper
- Pipe cleaners, water bottles with the bottom cut off, straws, and other items to use to blow bubbles
- Our Bubble Results handout - see appendix
- Bubbleology Bubble Solution Recipes handout - see appendix

Item	Quantity	How Acquired (purchase/borrow, order, print)	Person Responsible
e.g. Glue	100	Purchased at Walmart	Sarah



Ooey Goey Science Start - Up Activities

Start-Up Activities

As troops/girls arrive, encourage them to work on at least one of the provided start-up activities while they wait for the program to start at the opening. The start-up activity is designed to help them start to explore science fun. Depending on the size of your event, you may want to have multiple stations for each of the start-up activities.

Poke a Potato

Girls will see if it is possible to stab a potato with a drinking straw. This experiment shows that air pressure can be used in surprising ways.

Materials

- ◆ Stiff plastic drinking straws of various sizes
- ◆ Raw potatoes (can be used multiple times)
- ◆ Directions handout - see appendix

Directions

- ◆ Holding a plastic drinking straw by the sides, see if you can poke a potato by quickly stabbing the potato with the straw. What happens? (Make sure you are not covering the top of the straw.)
- ◆ Repeat the experiment with a new straw, but this time cover the top hole of the straw with your thumb. What happens?

What Happens?

When you first tried to stab the potato, the air in the straw rushed out so the straw wasn't strong enough to pierce the potato. Covering the straw with your thumb traps the air inside the straw. As you stab the straw into the potato it makes that air pack closely together. This is called compression. The compressed air makes the straw strong enough to pierce the potato.

Water Symphony

Materials

- ◆ Five or more drinking glasses (must be glass)
- ◆ Water
- ◆ Wooden sticks or pencils
- ◆ Directions handout - see appendix

Directions

- ◆ Prior to the event, line up the glasses next to each other. Fill them with different amounts of water. The glass at one end should have only a little water while the glass at the other end should be almost full. The glasses in between should build from little to most.
- ◆ At the event, place the glasses on the table in a random fashion.
- ◆ Girls should use a pencil or wooden stick to gently hit the side of the glasses and observe the sound. Which one makes the highest sound? Which one makes the lowest sound?
- ◆ Work together to arrange the glasses from lowest to highest in tone.
- ◆ See if you can make a tune by hitting the glasses in a certain order.
- ◆ When you are finished, mix up the glasses so they are in a random order.

What's Happening?

When you hit the glass, small vibrations are made. This creates sound waves which travel through the water. More water means slower vibrations and a lower sound. This is called tone.

Opening

The opening will be the official start of the Ooey Goey Science event. This is a time to welcome everyone, get the girls excited about exploring the Home Scientist badge, and discuss any housekeeping items.

Materials

- ◆ Flag stands
- ◆ Flags - American flag and possible Service Unit flag
- ◆ Flag Ceremony Uniforms for each of the girls in the Color Guard (white gloves, red sash)

Directions

- ◆ Prior to the event, ask one of the troops to lead the group in an opening flag ceremony.
- ◆ Gather everyone in the designated space for the opening. This could be an auditorium, large room, the middle of a gym, or other large space.
- ◆ Welcome everyone to the event and introduce yourself.
- ◆ Ask everyone to stand for the flag ceremony.

Flag Ceremony

Materials

- ◆ Flag stands
- ◆ Flags- Preferably an American flag, WAGGGS flag, Girl Scout flag, and possible Service Unit flag
- ◆ Flag Ceremony Uniforms for each of the girls in the Color Guard- white gloves, red sash (available by reservation in the South Portland Office)

Directions

To begin...Girls that are calling are waiting quietly "off stage" ready to come when called. Flag Bearers wait with flags ready and in line at back or room or in next room/hallway (avoid having girls and flags having to pass through doorways at the start of the ceremony).

When caller is called forward she proceeds to podium/position in the front of room to get ready.

<p>Girl Scouts Attention</p>	<p>The audience rises if seated. Stands silent with their hands at their side if they are standing. Audience can be standing in a number of different formations: rows, horseshoe, etc. depending upon the number of participants. Most important is to have a clear aisle wide enough for the Color Guard to walk through.</p>
<p>Color Guard, Advance <i>("Color Guard Attention" can be used as a command before this command, however, the Color Guard should already be standing at attention from the moment they have the flags in their hands.)</i></p>	<p>The Flag Bearers and Color Guard proceed in order to the front of the room. Once at the front of the room, they stand next to their flag stands. (If there is room stand behind or next to the stands. Otherwise do what "looks good".)</p>
<p>Color Guard, Post the Colors</p>	<p>The Flag Bearers place their flags into the flag stands and then stand at attention. The American Flag should be posted first and the others follow.</p>
<p>Color Guard, Honor the Flag of your Country</p>	<p>Suggested Action: The Flag Bearers and Color Guard silently count to three. On three they quietly place their hands over their heart for a moment and then return their hands to their sides and all stand at attention (other traditions have developed but any action honoring the flag should be quiet and respectful).</p>
<p>Please Join Me in the Pledge of Allegiance. <i>"I Pledge allegiance to the flag of the United States of America, and to the Republic for which is stands, one nation under God, indivisible, with Liberty and Justice for all."</i></p>	<p>The audience and caller recite the pledge with hands over their hearts. The Flag Bearers and Color Guard stand at attention with hands at their sides and do not participate in the recitation.</p>

Day of Event Information to Share

- ◆ Review any safety or housekeeping items:
 - Fire exits
 - First aid station
 - Bathrooms
 - Walking and other safety items for the space
- ◆ Explain the rotations and stations.
- ◆ Have any committee members present raise their hands, stand up, or in another way show themselves. Explain that if anyone has any questions, they can ask any of the committee members.
- ◆ Dismiss the girls for their first rotations.

Station Options

Each station topic will have options for you to choose from based on the location of your event. Select the activities that you feel your girls will enjoy the most based on the space you have reserved, the time of year of your event, and your budget.

Be a Kitchen Chemist (Select One)

Girls will experiment with one of the coolest places in your house for science, the kitchen!

Select Ice Cream or Marbled Milk Paper.

Ice Cream

Girls will explore the freezing properties of cream and discover that with the help of salt, ice cream stays creamy instead of turning into a block of ice. This is a great activity to do outside if you are able.

GSLE

- ◆ Learning by Doing
- ◆ Cooperative Learning
- ◆ Girl-led

Materials

- ◆ Ice
- ◆ Duct tape
- ◆ Ice-cream toppings (optional)
- ◆ Gloves or hand towels (optional)
- ◆ A pair of scissors (one for the whole group)
- ◆ Bowls- one per girl
- ◆ Spoons- one per girl
- ◆ Music (optional)
- ◆ Rock salt, kosher salt, table salt



For each girl (or pair of girls), you will need:

- 1 Tablespoon sugar
- 1/2 cup whipping cream or half & half
- 1/4 Teaspoon vanilla
- 6 Tablespoons rock salt
- 1 Pint-size ziplock bag
- 2 Gallon-size ziplock bag(s) – have more handy in case of leaks

Directions

- ◆ Have the girls work in pairs. This will help the girls' hands from getting too cold.
- ◆ Have the girls measure their sugar, cream, and vanilla into their pint-size bag. Seal the bag with duct tape and double bag if necessary.
- ◆ Fill the gallon-size bag half way with ice and then add the salt. What do you think the salt will do?
- ◆ Place the pint bag inside the gallon bag, and make sure it is sealed completely. Double bag if

necessary.

- Working in pairs, shake the bags for about 5 minutes. You can also play music, and make it into a dance party to help pass the time. What does the ice cream look like after 5 minutes? What happens to the ingredients as you shake them in the bag? What about the ice cubes - how do they change and what do they look like? You should start to see ice cream forming in the small bag.
- Now, put the small bag with the ice cream ingredients into a gallon-size bag with only ice. Shake the bag again for around 5 minutes - checking it every few minutes. What does the ice cream look like now? What about the ice cubes - what do they look like? Did they change in the same way?
- Compare the two gallon-size zip lock bags. Did one feel cooler than the other?
- If you are satisfied with the consistency of the ice cream, you may cut open the small bag and scoop out the ice cream into the girls' bowls.
- If you do not have ice cream yet, try putting the small bag back into the large bag with the salt and shake some more. If needed, add more salt.
- Remind the girls that a Girl Scout always leaves a place better than she found it, so they should help clean up their space and the common spaces

Discussion

Lead a discussion as the girls eat their ice cream about what happened in the two bags - the one with salt and the one without. What did the girls notice? How did this affect their ice cream? Share with the girls some of the science behind making ice cream.

Junior Extension

What happens if you use different kinds of salt? Allow girls to try using different kinds of salt to see if it makes a difference on how the ice cream forms - rock salt, kosher salt, table salt.

What's Happening?

In the winter, the snow plows spread salt on the roads. This helps lower the temperature in which water freezes. For the roads, this means that the ice will melt even if the temperature is lower than the freezing point, making the roads less slick. For ice cream, the bag with the salt should have melted more and felt cooler than the bag without the salt. The salt helped keep the temperature low enough to freeze milk so that it hardened and turned into ice cream. The bag without the salt wasn't cold enough to freeze the cream, so it remained liquid.

Marbled Milk Paper

Girls will create colorful creations using the power of molecules.

GSLE

- ◆ Learning by Doing
- ◆ Cooperative Learning
- ◆ Girl-Led (Junior extension)

Materials

- ◆ Whole milk
- ◆ Dish soap
- ◆ Q-tips
- ◆ Food coloring
- ◆ Shallow plate or tray
- ◆ Water color paper cut into post card size pieces -
3 to 4 pieces for each girl (or group/pair if you have a large event)
- ◆ Pens
- ◆ Almond, rice, or coconut milk (optional Junior extension)



Directions

- ◆ If you have a large event, divide the girls into pairs or small groups.
- ◆ Give each group their watercolor papers and have them write their names on the back of the paper. Place the paper near the working area, once you start swirling the colors, you will have to work quickly to get the best results.
- ◆ Give each group a shallow tray (like a baking sheet), and fill the tray with whole milk so that it just covers the bottom. You do not need the milk to be very deep.
- ◆ Have the girls add about 6-8 drops of food coloring onto the milk in different spots. Try to use at least 2 different colors of food coloring. More colors will result in a greater marbled effect.
- ◆ Carefully drop about 5 drops of dish soap onto the drops of food coloring. If you have young girls, they might find it easier to dip Q-tips into the dish soap so that the tip is generously covered in soap and then dip the Q-tip into the milk near/on the food coloring. Watch the fun show as the color “bursts”. This fun effect does not last long, though.
- ◆ Gently swirl the Q-tip through the different colors to add to the marbled effect. Remind the girls to do this gently and to only swirl a little bit. Too much swirling will end up in a brown muddled mess of milk.
- ◆ Once the desired look is accomplished, lay a piece of watercolor paper on top of the milk mixture and gently press down. Carefully lift the paper and set aside to dry. Continue with the additional sheets of paper.
- ◆ Let everything dry completely.
- ◆ Remind the girls that a Girl Scout always leaves a place better than she found it, so they should help clean up their space and the common spaces.

Discussion

Lead a short discussion about what happened. What did the girls notice when they added the dish soap? Explain the science behind this activity.

Junior Extension

After the girls have tried this experiment with whole milk and you have had a short discussion about what happened, encourage them to think about what would happen if they used different kinds of milk. Does it make a difference? If time allows, girls may test another form of milk to see if it impacts the reaction that occurs. This can also be done as a large group to save time.

What's Happening?

The purpose of dish soap is to break up fat so that it can be washed away. Since there is fat in whole milk, the molecules in the dish soap are attracted to the fat molecules in the milk. When you drop the dish soap onto the milk, the molecules race around trying to bond causing the fat in the milk to break down and produce a “burst” as the color gets pushed around.



Dive into Density (Select One)

How come some things float while others sink? It's all about density.

Select Magic Ketchup or Rainbow Jar.

Magic Ketchup

Girls will work in small groups or pairs to try to make a pack of ketchup float and sink while it is sealed inside a bottle.

GSLE

- ◆ Learning by Doing
- ◆ Cooperative Learning
- ◆ Girl-Led

Materials

- ◆ Several clear 1 liter plastic bottles - labels removed
- ◆ Water
- ◆ Ketchup packets (like the ones you get at a fast food restaurant)
- ◆ Salt - preferably kosher salt (it helps keep the water clear)
- ◆ Tablespoons
- ◆ Small bowls (to put the salt in so it is easier for the girls to scoop)
- ◆ Bucket(s) for the used water
- ◆ Several smaller bottles and several 2 liter bottles
- ◆ Different kinds of food packets such as mayo, mustard, soy sauce
- ◆ Lemon
- ◆ Lime
- ◆ Clear deep container



Directions

- ◆ Prior to the start of the event, fill the bottles almost to the top with water.

Introduction

- ◆ Lead a short introduction about the concepts behind this experiment- density and buoyancy.
 - Density- deals with the amount of mass an item has
 - Buoyancy- describes whether or not something sinks or floats
- ◆ To help explain the concept of density, use a lemon and a lime that are around the same size. Ask the girls to make a prediction about whether they float or sink. Pass them around for the girls to see and feel. Put the lemon in the water and ask them if it sinks or floats (floats). Put the lime in the water and ask them if it sinks or floats (sinks). Ask the girls why they think this happened. Ask the girls which was heavier, the lemon or the lime (lime) Explain that the lime is denser than the water but the lemon is not.

Make the ketchup packet float:

- ◆ Add a ketchup packet to a bottle filled with water.
- ◆ If the ketchup packet floats, go on to the next section.
- ◆ If the packet sinks, add about 3 tablespoons of salt to the bottle. Cap it and shake it up until the salt dissolves.
- ◆ Continue adding salt, a few tablespoons at a time, until the ketchup floats.

Make the ketchup pack float AND sink

- ◆ Once the ketchup packet is floating in the bottle, make sure the bottle is filled to the top with water and cap it tightly.
- ◆ Squeeze the bottle. The magic ketchup should sink when you squeeze the bottle and float up when you release it.
- ◆ Try to get the ketchup to stop in the middle of the bottle.

Discussion

- ◆ Lead a short discussion about what happened during this activity.

Junior Extension

After the girls try their experiment with room temperature water, encourage them to think about what they would want to change in their experiment to see if they get the same result. Options might include:

- ◆ Using warm or cold water - Does this affect how the ketchup floats?
- ◆ Using a different size bottle - Does this affect how much you have to squeeze the bottle to get the packet to sink?
- ◆ Do different types of food packets have different densities? What happens if you try the same activity with different kinds of food packets like soy sauce, mayo, or mustard?
- ◆ Lead a short discussion about what the girls decided to test, what happened, and why. Allow the girls to lead the discussion, giving them prompting questions if needed.

What's Happening?

Although you can't see it, there is actually a little air bubble inside of the ketchup packet. Much like the pool floaties you might wear on your arms when you swim, the air bubble helps the ketchup packet float. If you had to add salt to the water, you were adjusting the water's density to make the ketchup float. When you squeeze the bottle hard enough, it puts pressure on the packet. This makes the air bubble become smaller and the entire packet become denser than the water around it and the packet sinks. When you release the pressure, the air bubble expands, making the ketchup packet less dense, and the packet floats back up.

Rainbow Jar

Girls will work in pairs or small groups to explore the density of various liquids to make a rainbow in a jar.

GSLE

- ◆ Learning by Doing
- ◆ Cooperative Learning
- ◆ Girl-Led (Junior extension)

Materials

- ◆ The following liquids: corn syrup, dish soap, water, rubbing alcohol, olive oil or vegetable oil, Optional: honey, milk, maple syrup
- ◆ Small bowls or cups for mixing
 - ◆ Spoons
 - ◆ Food coloring
 - ◆ Small jars or other containers that can be sealed – one for each of the liquids
 - ◆ Small baster or eye dropper
 - ◆ Squeeze containers - optional for the different kinds of liquid (one for each liquid for each group)
 - ◆ Tall & narrow glasses (one for each group)
 - ◆ Lemon
 - ◆ Lime
 - ◆ Clear deep container
 - ◆ Paper and markers - optional
 - ◆ Various household items such as a safety pin, key, staple, peanut, raisin, chocolate chip, small rubber bouncy ball, ping pong ball, etc

Directions

- ◆ Optional: Prior to the event, you may choose to color the liquids on your own to cut down on time and potential mess.
- ◆ Prior to the event, measure out the same amount of the recommended liquids and pour them each into a jar. Cover the jars so they don't spill. If you are coloring the liquids prior to the event, make sure you color the liquids in the jars the same color as the ones the girls will be using at the event. For example, color all of the corn syrup red.

Introduction

- ◆ Lead a short introduction about density. Density deals with the amount of mass an item has based on the size of that item (volume).
- ◆ To help explain the concept of density, use a lemon and a lime that are around the same size. Ask the girls to make a prediction about whether they float or sink. Pass them around for the girls to see and feel. Put the lemon in the water and ask them if it sinks or floats (floats). Put the lime in the water and ask them if it sinks or floats (sinks). Ask the girls why they think this happened. Ask the girls which was heavier, the lemon or the lime (lime) Explain that the lime is denser than the water, but the lemon is not.

Making Your Rainbow Jars

- ◆ Now that the girls have a basic understanding of density, they will make predictions about the density of the provided liquids. Explain that much like the lemon and the lime, liquids also have

different densities. Pass around the jars of colored liquids and ask the girls to think about which liquids they feel are denser than others. Allow them to make their predictions - write them down or line up the jars in the order they predict from most dense to least dense.

- ◆ Depending on the size of your group, divide the girls into groups of 3 or 4. Give each group a jar or glass to use for their rainbow.
- ◆ If you pre-colored the liquids you are ready to begin, if not, have the girls color their liquids.
- ◆ Use the following chart to pour the liquids into the jars. If you do not have one of the liquids, simply skip to the next one on the chart.

Order	Kind of Liquid	Directions
1	Honey	Pour the honey slowly into the center of the container. Be careful to avoid touching the sides.
2	Corn Syrup	Pour slowly into the center of the container. Be careful to avoid touching the sides.
3	Maple Syrup	Pour slowly into the center of the container. Be careful to avoid touching the sides.
4	Milk	Pour slowly into the center of the container. Be careful to avoid touching the sides.
5	Dish Soap	Pour slowly into the center of the container. Be careful to avoid touching the sides.
6	Water	Pour slowly into the center of the container. Be careful to avoid touching the sides.
7	Olive Oil or Vegetable Oil	Pour slowly into the center of the container. Be careful to avoid touching the sides. It is recommended to pour a thick layer of oil to help with the next step.
8	Rubbing Alcohol	Using a dropper or baster, drop the rubbing alcohol alongside of the container so that it slides down the side. Go slow! Do not “break through” the oil layer

Allow the girls to admire their rainbows. Remind them to be careful not to shake their jars- this will cause the liquids to mix.

Remind the girls that a Girl Scout always leaves a place better than she found it, so they should help clean up their space and the common spaces.

Junior Extension

- ◆ Encourage the girls to take their density knowledge to the next level by making a hypothesis about what household items have more density than others.
- ◆ Provide each group with a sample of household items such as a safety pin, key, staple, peanut, raisin, chocolate chip, small rubber bouncy ball, and ping pong ball. Encourage them to think about the density of each item, guessing which ones are denser. They can line them up if they choose.
- ◆ Encourage them to test their hypotheses by carefully dropping each item one by one into their jar. Some items will stay towards the top of the liquids, others will sink towards the bottom.
- ◆ Why does this happen? The densities and masses of the items vary. If the layer of liquid is denser than the item, it will stay on the top of that layer of liquid. If the item is denser than the liquid, it will sink through that liquid until it reaches a layer that is denser than the item.

What’s Happening?

Density is a measure of how much mass is in a given volume. If mass is a measure of how much “stuff” there is in the liquid, density is a measure of how closely packed that stuff is. Liquids that are denser are very tightly packed. This will result in them sinking to the bottom. Less dense liquids will float on top of the denser liquids because they are not as tightly packed.

Make Something Bubble Up (Select One)

When mixed, some household items can have a fun reaction. Check out how much fun you can have with chemical and physical reactions.

Select Elephant Toothpaste or Soda Geyser

Elephant Toothpaste

Girls have some ooey goey fun as they explore chemical reactions.

GSLE

- ◆ Learning by Doing
- ◆ Cooperative Learning
- ◆ Girl-Led (Junior extension)

Materials

- ◆ Yeast
- ◆ Hydrogen peroxide (as close to 6% as you can find; although the regular hydrogen peroxide you can get at the pharmacy will work - you just won't have as strong of a reaction)
- ◆ Dish soap
- ◆ Empty, rinsed 16-24 oz soda/water bottles- 1 per small group
- ◆ Additional bottles in varied sizes (optional)
- ◆ Food coloring
- ◆ Small roasting pans - 1 per small group
- ◆ Warm water
- ◆ Small cups
- ◆ Spoons or popsicle sticks to stir with
- ◆ Safety goggles (optional - one per girl)

Directions

- ◆ Just before the program, heat water so that it is very warm. Store it in a thermos or find a way to heat the water before every workshop session.
- ◆ Explain that water is a very important part of everyday life and is important in chemistry as well. It helps mix things together. Scientists name chemicals using numbers and letters. Ask if anyone knows the scientific term for water (H_2O). Explain that the H stands for hydrogen, and the O stands for oxygen. The number 2 after the H means that there are 2 pieces of hydrogen connected to every piece of oxygen.
- ◆ Show the girls the hydrogen peroxide bottle and ask if anyone knows what it is used for. If they don't know, state that hydrogen peroxide is used as a disinfectant or as a kind of bleach. Explain that just like water, hydrogen peroxide can also be named with numbers and letters- H_2O_2 . Ask the girls if they know what that means; it is water with an extra oxygen.
- ◆ Explain that the extra oxygen can be "kicked out" of the H_2O with a special kind of energy. Today, we are going to see what happens when you cause a reaction to create that energy.
- ◆ Divide the girls into pairs or groups of 3. Give each group a pan, bottle, cup, and something to stir with.
- ◆ In their groups, girls should put their bottle in their pan and take turns holding and measuring their ingredients.
 - O Measure a $\frac{1}{2}$ cup of hydrogen peroxide and pour it into their bottle.
 - O Add up to 8 drops of food coloring into the bottle and give the bottle a little swish.



- Add about 1 tablespoon of dish soap into the bottle and give it another little swish.
 - Show the girls the yeast. Ask them what yeast is used for (making bread rise and be fluffy). In the cup, measure about 3 tablespoons of warm water then add 1 tablespoon of yeast. Stir the mixture to dissolve the yeast in the water.
 - When the yeast is fully dissolved, carefully, but quickly, pour the yeast mixture into the hydrogen peroxide mixture in the bottle.
 - Watch the foaminess begin! Encourage them to use their senses to explore the reaction that is occurring. Girls may play in the foam, but remind them that they wouldn't want to eat the foam because it has soap in it.
- ◆ Lead a short discussion about what happened in the activity. Make sure to reference the What's Happening information.
 - ◆ Remind the girls that a Girl Scout always leaves a place better than she found it, so they should help clean up their space and the common spaces.

Junior Extension

Encourage the girls to think like a scientist. What happened? Why did it happen? What questions do they have about the experiment? If they could redo the experiment, what would they want to test? Encourage them to think of one thing they would change in the experiment to see if it affects the result. For example:

- ◆ Does the amount of yeast change the amount of foam created?
- ◆ Does it work to add just dry yeast instead of mixing it with water?
- ◆ Does the size of the bottle make a difference in the amount of foam created?

What's Happening?

When the girls added the yeast to the hydrogen peroxide, it created foam. The bubbles in the foam are filled with oxygen. The yeast helped remove the extra oxygen from the hydrogen peroxide (H_2O_2). Since this happened very fast, it created lots of bubbles, which was increased by adding the dish soap (to make it more visible). The foam that was created was due to an exothermic reaction; this means it created heat in addition to foam.



Soda Geyser

Girls will experience the power of chemical reactions by making a geyser with soda. Through a reaction between the candy and the soda, carbon dioxide sends soda shooting into the air. This is definitely an outdoor activity!

GSLE

- ◆ Learning by Doing
- ◆ Cooperative Learning
- ◆ Girl-Led

Materials

- ◆ 2 liter bottles of diet cola - several per group (regular cola can be used, but diet cola is less sticky and can create a bigger reaction)
- ◆ Roll of Mentos candy - at least 2 rolls per group (mint works the best)
- ◆ Paper
- ◆ Paper towels/wipes to help with clean up
- ◆ Buckets
- ◆ Water
- ◆ Tea kettle or other source for hot/warm water
- ◆ Fridge or other way to cool the soda
- ◆ Several different brands of cola
- ◆ Large measuring cups - at least 4 cups (or another way to measure the remaining volume of soda left in the bottle)
- ◆ Baking soda
- ◆ Vinegar
- ◆ Shallow bowl or plate
- ◆ Poster paper or butcher paper
- ◆ Markers
- ◆ Our Soda Geysers handout - see appendix
- ◆ Different kinds of small candy: Skittles, mint Mentos, fruit Mentos, Lemonheads or other round candy, M&Ms, Sweet tarts, jelly beans, Lifesavers, Mike and Ikes, Tic Tacs

Directions

- ◆ Gather the girls in a circle.
- ◆ Ask the girls if they have ever seen the reaction that is created with baking soda and vinegar. Pour some baking soda onto a plate or shallow bowl and then pour a small amount of vinegar over the baking soda. Ask the girls what is happening. Pass the plate around and have the girls listen, look, and feel what is happening between the baking soda and the vinegar. If needed, add more baking soda and vinegar so that each girl can experience the reaction.
- ◆ Explain that the baking soda reacts with the vinegar and creates carbon dioxide. What did this reaction look like? What did it sound like? What did it feel like?
- ◆ Ask the girls if they have ever heard of or seen a geyser. Explain that a geyser is a hole in the earth that sprays out hot water and steam. One of the most famous geysers is Old Faithful in Yellowstone National Park. Explain that today they are going to explore making a geyser from soda.



- ◆ Show the girls a 2-liter bottle of diet soda and Mentos candy. Ask the girls to make predictions about what will happen when you put the candy into the soda.
- ◆ Ask for 2 girls to help roll 7 pieces of candy into paper so that they have a paper tube loose enough to just hold the candy in place, but not too tight that they won't be able to slide out.
- ◆ Take the top off the soda bottle and place it on a level surface on the ground with nothing else around it.
- ◆ Ask for a volunteer to drop the Mentos into the soda. The best way to do this is to hold the tube filled with candy in one hand while using a finger on your other hand to prevent the candy from falling through the bottom. Drop the candy into the soda as quickly as possible, and move away quickly to avoid getting sticky and wet.
- ◆ After the girls have enjoyed the entertainment, ask them what happened. Lead a short discussion about what happened and why. Ask the girls what questions they might want to investigate when doing this experiment again. If desired, write down the questions. Possible questions might include: How many Mentos are needed to create the biggest geyser? Does the temperature of the soda make a difference? Does the kind of soda make a difference?
- ◆ Now it's time to start experimenting. Vote on which question the girls would like to answer first. Younger girls may only have time to answer one question, while older girls may have time to answer several questions. Divide the girls into small groups of 3 or 4. Encourage the girls to work with girls from other troops if possible. Ask an adult to help each group of girls so that the groups can work independently to investigate the question at hand. After they have experimented with each question, regroup and discuss the results. Ask the girls to record their results on a chart or graph so that as a group you can try to answer the question. If there is time, they may try to answer other questions.

O Number of Mentos - To ensure the results are based on the number of Mentos, make sure you are using the same brand of cola and the same flavor of Mentos. In their groups, girls should make their predictions, test their hypothesis, check for evidence (how tall the geyser was or how much soda was left), and then record their results. Give each group doing this experiment at least 4 bottles of soda and several sleeves of Mentos candy. They can then test how the different number of Mentos affects their geyser using a new bottle of soda and new candy for each test. For example, they may decide to test how big the geyser is using 2, 4, 6, and 8 Mentos, or they may decide to use up to 10 Mentos in the last bottle.

O What Brand is Best? - In this experiment, the girls will make a hypothesis as to which kind of cola (or other soda if available) is best. Does generic cola work as well as name brand? Does Pepsi work better than Coke? For this experiment, they will need to use the same number of candies in each bottle and make sure the soda is the same temperature to ensure there are no other variables. In their groups, girls should make their predictions, test their hypothesis, check for evidence (how tall the geyser was or how much soda was left), and then record their results. Give each group at least 3 or 4 different kinds of cola to test.

O The Temperature Test - Girls will experiment with the temperature of the soda to see if it makes a difference. To ensure all other variables are the same, girls should use the same number of Mentos and the same brand of cola for each temperature. Girls will test warm soda (warmed up in a bucket of hot water - you may want to have this ready for the girls so that the soda has enough time to warm up), cold soda (either cooled in ice or the fridge), and room temperature soda. In their groups, girls should make their predictions, test their hypothesis, check for evidence (how tall the geyser was or how much soda was left), and then record their results.

O The Candy Test - Girls will have the opportunity to test different kinds of candy to see which one makes the biggest geyser. To ensure all other variables are the same, girls should use the same number of candies, the same brand of soda, and the same temperature soda. Using the same steps with all kinds of candy, they can test other candies: Skittles, mint Mentos, fruit Mentos, Lemonheads or other round candy, M&Ms, Sweet tarts, jelly beans, Lifesavers, Mike and Ikes, Tic Tack. In their groups, girls should make their predictions, test their hypothesis, check for evidence (how tall the geyser was or how much soda was left), and then record their results.

- ◆ Remind the girls that a Girl Scout always leaves a place better than she found it, so they should help clean up their space and the common spaces.

Junior Extension

Juniors and older Brownies may be able to answer more questions than the younger girls. You can also get a little more precise with the older girls by having them measure the amount of remaining soda after each geyser to see how much of a reaction was created. To do this, give each group a measuring cup. After they set off a geyser, have them pour the remaining soda into the measuring cup to see how much soda was left in the bottle. Have them record the amount of soda that was in the bottle on the handout. Ultimately, girls can try to come up with the perfect combination to create the biggest geyser. If time is a concern, girls may work in small groups to experiment with answering the different questions so that each group works on a different question and then reports back.

What's Happening?

Soda is made with carbon dioxide which is what makes it bubbly. Through carbonation, the carbon dioxide gas is dissolved into the liquid. When you open a bottle of soda, the carbon dioxide slowly escapes, creating a fizz. However, when you drop the Mentos candy into the soda, a rapid physical reaction is created between the candy and the soda. This is due to nucleation - when bubbles form on the surface of the candy. To increase this reaction, the surface of the Mentos candy is actually pitted with tiny holes, resulting in more surface area. When the candy hits the bottom of the bottle, the gas is released. Since there is nowhere for the gas and liquid to go, it shoots up out of the bottle, creating a geyser.



Play With Science (select one)

Science can be used to make things that are just plain fun!

Select either Slime or Bubbleology

Slime

Girls will explore the properties of liquid polymers by making slime/silly putty. This slime is a fun goo that you can stretch, stamp, and play with.

GSLE

- ◆ Learning by Doing
- ◆ Girl-Led (Junior extension)

Materials

- ◆ School glue
- ◆ Water
- ◆ Liquid starch
- ◆ Small cups
- ◆ Permanent marker
- ◆ Stirring sticks or spoons
- ◆ Food coloring
- ◆ Small Ziplock bags (one per person)



Directions

- ◆ Before the girls arrive, mark off the cups into 3 even sections, leaving room at the top of the cup for mixing.
- ◆ Ask the girls if they have ever made slime or silly putty before. Explain that today they will have a chance to make their own silly putty that they can take home. Go over the ingredients needed to make the slime and talk to the girls about what these ingredients are commonly used for.
- ◆ Give each girl a cup, and have her pour glue into the cup up to the first line.
- ◆ Then, pour water up to the second line and stir. If you would like to add color, this is the time. Add 2 or 3 drops of food coloring to the glue and water mixture.
- ◆ Once you have added your food coloring, pour liquid starch to the third line and stir.
- ◆ As you stir, the liquid starch will mix with the glue polymer and start to create the strands of polymer molecules, causing the putty/slime to start to form.
- ◆ Once the putty/slime starts to form into a ball, girls may take it out of the cup and work it in their hands. This is where the fun really begins!
- ◆ Girls may play with their putty until it is time to clean up. When they are finished, they should write their names on a bag with a permanent marker and then put their silly putty in their bag.
- ◆ If there is extra time, and if they are interested, girls can test the viscosity of their slime. Viscosity deals with how fast or easily the slime oozes or flows. A thick and gooey putty/slime has a high viscosity and flows slowly. A slime/putty with a low viscosity will seem very runny and will spread quickly. To test the viscosity of their slime, the girls can place a piece of slime on their fingertip or the corner of a table/desk. How quickly does it spread or drip?
- ◆ Remind the girls that a Girl Scout always leaves a place better than she found it, so they should help clean up their space and the common spaces.

Junior Extension

As the girls may have noticed, each batch of slime turns out a little different. What makes them different? The consistency of the slime is based on the ratios of the ingredients. How much liquid starch and glue are used. If the girls are interested, they can try to make 3 different batches of slime: their original batch, one with more liquid starch, and one with less liquid starch. What do they notice about the difference? What worked well for the consistency they wanted?

What's Happening?

Matter is what everything is made of, and it exists in one of three states: solid, liquid, and gas. Sometimes, something isn't completely in one state or another. Take silly putty or slime for example. Is it a solid or a liquid? It is actually both! Slime is a colloid- a mixture of one substance suspended (or floating) in another. The suspended bits are so tiny that they don't sink in the other substance. Some examples of colloids are smoke, fog, mayonnaise, and butter.

Glue has an ingredient called polyvinyl acetate which is a liquid polymer. A polymer is a long chain of identical, repeating molecules. The solution of school glue with liquid starch and water produces a putty-like material that's elastic and flows very slowly. The liquid starch links the polymer molecules in the glue to each other, creating one large, flexible polymer. This process is called cross-linking. This kind of slime will get stiffer and more like putty the more you play with it as the polymer molecules link together more and more

Bubbleology

What makes the best bubbles? Experiment with different bubble solutions to see which solution works best. This is a great outdoor activity!

GSLE

- ◆ Learning by Doing
- ◆ Cooperative Learning
- ◆ Girl-Led

Materials

- ◆ Pennies
- ◆ Eye droppers
- ◆ Small cups
- ◆ Cups or jars
- ◆ Measuring cups
- ◆ Measuring spoons
- ◆ Water
- ◆ Liquid dish soap
- ◆ Glycerin
- ◆ Light corn syrup
- ◆ Permanent markers
- ◆ Masking tape
- ◆ Popsicle sticks, spoons, or other ways to stir
- ◆ Stopwatch
- ◆ Wide and shallow bowls (optional)
- ◆ Pencils
- ◆ Rulers
- ◆ Clipboard (optional for the groups to use to record their results)
- ◆ Butcher paper or poster paper
- ◆ Pipe cleaners, water bottles with the bottom cut off, straws, and other items to use to blow bubbles
- ◆ Glue (optional)



Directions

- ◆ Divide the girls into small groups of 2 or 3 depending on the size of the group. If it is a small group, the girls may work independently for this activity. Give each group a penny, an eye dropper, and small cup filled with water.
- ◆ Give the girls the challenge to see how many drops of water they can hold on the top of their penny. Give girls a few moments to try this out.
- ◆ Lead a short discussion about what happened. What did they notice about the water as they added more drops to the penny? Explain that the reason the water made a dome on top of the penny is due to surface tension. Surface tension is an invisible bond between the molecules in the water. The surface tension of water tends to hold it in a round shape. That is why the water created a dome on top of the penny.

- ◆ Now, have the girls rub a small amount of dish soap on the surface of their penny and repeat the activity. How many drops of water could they fit on top of the penny?
- ◆ Bring the girls together again and ask them what they noticed in the second activity (the penny held fewer drops of water). Explain that when you added the dish soap it relaxed the surface tension of the water so it did not have as strong of a bond and couldn't hold as many drops of water.
- ◆ Explain that the secret to a good bubble is getting the right surface tension. Ask the girls if they have ever tried to blow bubbles with only water or have tried to blow bubbles in a glass of water? Did it work?- no. This is because the surface tension of water is too strong to create a bubble. In order to make a bubble, you need to help relax the surface tension of the water. This can be done in many ways, but typically this is done by adding soap or detergent to the water, much like we did with the penny activity. There are many different recipes for making a bubble solution. Today we are going to test different ingredients to see which ones make the best solution.
- ◆ For this activity, the Brownies will make two bubble solutions and test them and Juniors can make 3 solutions if time allows.
- ◆ In groups of 2 or 3, allow the girls to make their bubble solutions according to the recipe in the appendix.
- ◆ Give the girls the pipe cleaners or other items to make their bubble wands. To make a wand from a pipe cleaner, take one end of the pipe cleaner and bend it to form a circle. Make sure the circle can fit inside the container you are using for your bubble solution. When you have the shape you want, twist the pipe cleaner so that it stays in place. Brownies should make 2 wands each (one for each bubble solution) and Juniors should make 3 wands each (one for each solution). Each wand should be approximately the same shape and size.
- ◆ Explain that they will have a chance to play with their bubble solution, but they should also test their solutions. As a group, they will need to determine which solution will make the biggest bubbles and which bubbles will last the longest. Encourage the girls to record their results on the handout provided in the appendix.
 - To test which solution makes the biggest bubbles, one person should blow bubbles at a time and have a partner observe. The person blowing the bubbles should try to catch a bubble on the wand so that everyone in the group can observe how big the bubble is. Switch back and forth, allowing all members of the group the chance to blow bubbles several times. It is best to have all girls experiment with one bubble solution before moving on to the next. Girls may try to measure the bubbles with a ruler, but remind them that they can't touch the bubbles or they will pop.
 - To test which bubble lasts the longest, have the girls take turns blowing bubbles and catching them on a bubble wand. One of the girls will start timing the bubble as soon as another girl catches one on her wand. Using a stopwatch, girls will take turns timing one another to see how long their bubbles last. It is best to have all girls experiment with one bubble solution before moving on to the next.
- ◆ Give the girls time to test their bubble solutions before bringing everyone back together for a discussion. Ask groups to report out about what they discovered. Which bubble solution worked best? Lead a short discussion about why.
- ◆ If there is time left, allow girls time to test other items to see how they stand up for blowing bubbles. Make sure to allow enough time to clean up for the next group.

Junior Extension

Juniors will have the opportunity to test three different bubble solution recipes to see which one created



the biggest bubbles and which bubbles lasted the longest. If time allows, they can try to create their own magic bubbles with the solution that they decided worked the best. Magic bubbles are so strong and stable you can touch them without popping them. To make magic bubbles, the bubble solution includes a polymer (like glue) which adds elasticity. Girls can try making their own magic bubbles by adding a small amount of glue to their bubble solution.

What's Happening?

The secret to a good bubble is surface tension. Surface tension is an invisible bond that holds water molecules together. The surface tension of water itself is too strong to make a bubble. This is why you can't blow a bubble when you blow into a cup of water. However, by adding the liquid soap to the bubble solution, you are relaxing the surface tension so that it can stretch more and create a bubble. Bubbles pop when the water molecules evaporate. Glycerin and corn syrup help prevent this from happening by forming weak bonds with the water molecules to slow down evaporation.

Kapers and Evaluations

Before the closing, troops should help clean up their final station. Remember, a Girl Scout always leaves a place better than she found it! Troops should also take this time to complete their evaluations.



Closing

Girls will gather once more as a large group and end with a closing friendship squeeze, a song, and a flag ceremony.

Materials

- ◆ Flag stands
- ◆ Flags - American flag and possible Service Unit flag
- ◆ Flag Ceremony Uniforms for each of the girls in the Color Guard (white gloves, red sash)

Directions

- ◆ Gather everyone into a big circle. Thank everyone for coming and remind them to turn in their evaluations. End the event with a song and a friendship squeeze. If it is a large group, position a volunteer half way around the circle. Send the squeeze around in both directions. The volunteer will receive the squeeze from both sides but not pass it around the circle completely to save time. If it is a smaller group, the friendship squeeze will go completely around the circle.
- ◆ End the event with a closing flag ceremony to retire the colors. Ask everyone to stand in a horseshoe formation..

Closing Flag Ceremony:

Have caller(s) ready to proceed to the podium/position in the front of the room when called and all Color Guard/Flag Bearers ready and in line in the back of the room

Girl Scouts Attention	The audience rises if seated. Stands silent with their hands at their side. Audience can be standing in a number of different formations: rows, horseshoe, etc. depending upon the number of participants. Most important is to have a clear aisle wide enough for the Color Guard to walk through.
Color Guard, Attention	The Flag Bearers and Color Guard are asked to stand at attention proceed. They should be lined up the same way they were for the opening flag ceremony even though they do not have flags.
Color Guard Advance	The Flag Bearers and Color Guard proceed to the front of the room. They stand next to or behind their corresponding flags.
Color Guard Retire the Colors	The Flag Bearers reach for the flags and take them out of the stands. The American Flag should be taken out last. After the flags are retired, Color Guard should stand in formation ready to proceed down the aisle while they wait for the next command.
Color Guard Dismissed	The Flag Bearers and Color Guard recess down the aisle in formation. The American Flag should go first and all others follow in line until they reach the back of the room. If using only the American and one other flag, the flags can move side by side accompanied by the Color Guard. If possible, girls may proceed all the way out of the room or finish at the back of the room. Flags should be placed respectfully in a location where they can be picked up during clean-up
Girl Scouts Dismissed	Audience is dismissed or may sit down. Callers leave the stage.

Clean Up

Remind troops that they are responsible for cleaning their own space and to help clean common areas. Girl Scouts leave the space better than they found it.





Event and Program Budget Worksheet

Event Name _____ Date(s) _____

Number of Participants Projected _____ Actual _____

Income	Projected	Actual
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Should be figured on 85% participation, i.e.: capacity is 200 – figure on 170.

Cost per troop/girl/person	_____	_____
Service Unit	_____	_____
Other (In-kind donations)	_____	_____
Total Income	_____	_____

Expenses	Projected	Actual
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Should be figured on 100% participation.

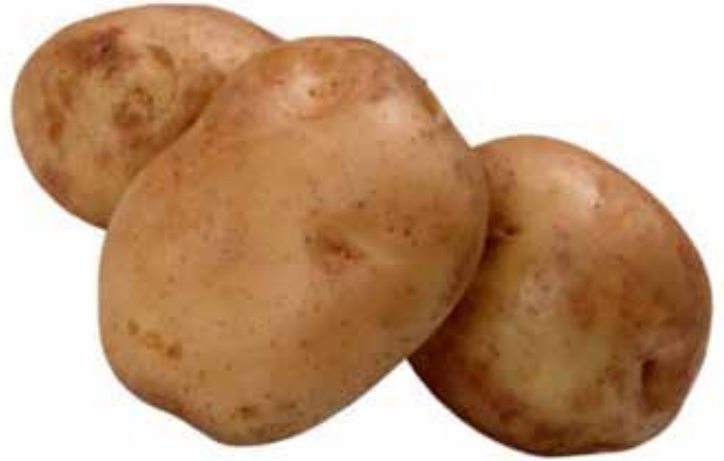
Rental fees (Site/equipment)	_____	_____
Custodial fees	_____	_____
Consultant fees	_____	_____
Program (Supplies/equipment/crafts)	_____	_____
Food	_____	_____
Postage	_____	_____
Recognition (Patches/T-shirts/thank you)	_____	_____
Non-member Insurance (\$5 per ___ person)	_____	_____
Miscellaneous	_____	_____
Total Expense	_____	_____

Start Up Materials

Poke a Potato

Directions

- ◆ Holding a plastic drinking straw by the sides, see if you can poke a potato by quickly stabbing the potato with the straw. What happens? (Make sure you are not covering the top of the straw.)
- ◆ Repeat the experiment with a new straw, but this time cover the top hole of the straw with your thumb. What happens?
- ◆ For additional fun, try different kinds of straws. Does the size of the straw make a difference?



What's Happening?

When you first tried to stab the potato, the air in the straw rushed out so the straw wasn't strong enough to pierce the potato. Covering the straw with your thumb traps the air inside the straw. As you stab the straw into the potato, it makes that air pack closely together. This is called compression. The compressed air makes the straw strong enough to pierce the potato.

Water Symphony

Directions

- ◆ As you arrive at the table, make sure the glasses are arranged on the table in a random fashion.
- ◆ Use a pencil or wooden stick to gently hit the side of the glasses and observe the sound. Which one makes the highest sound? Which one makes the lowest sound?
- ◆ Work together to arrange the glasses from lowest to highest in tone.
- ◆ See if you can make a tune by hitting the glasses in a certain order.
- ◆ When you are finished, mix the glasses back up for the next group.



What's Happening?

When you hit the glass, small vibrations are made. This creates sound waves which travel through the water. More water means slower vibrations and a lower sound. This is called tone.

Opening and Closing Materials

Flag Ceremony

A flag ceremony honors the American flag as the symbol of our country and all the hopes, dreams, and people it represents. If your group includes girls from other countries, invite them to honor their flags too, and together conduct an international flag ceremony. Flag ceremonies may be used for:

- ◆ Opening or closing meetings
- ◆ Opening or closing special events
- ◆ Beginning or closing a day
- ◆ Honoring a special occasion or special person
- ◆ Retiring a worn flag

Flag ceremonies may take place in meeting rooms, outdoor settings, large auditoriums, onstage, or even on horseback. The American flag is carried by a Color Guard for protection during a flag ceremony. All flag ceremonies share one thing—respect for the flag.

Flag Ceremony Guidelines

Keep it simple. Emphasis needs to be on respect for the flag rather than on the commands or techniques. Adults can ask girls these questions when planning:

- ◆ Who will carry the flag?
- ◆ Who will the Color Guards be?
- ◆ Who will give the directions for the ceremony?
- ◆ What song will you sing? Who will sound the pitch and start the song?
- ◆ Will a poem or quotation be included? Who will say or read it?
- ◆ After the Pledge of Allegiance, will the Girl Scout Promise and Law be said?
- ◆ What order will the ceremony follow?
- ◆ When will the group practice?
- ◆ Where will the flags be placed at the end of the ceremony?

Terms Used in a Flag Ceremony

- ◆ The **Color Bearer** (or flag bearer) is the person who carries the flag. There is one Color Bearer for each flag used in the ceremony.
- ◆ The **Color Guard** is a team that guards the flags. Any even number of guards may be used, but usually four or six girls are sufficient.
- ◆ The **Girl Scout in charge** (or caller) is a designated Girl Scout who announces or calls each part of the ceremony.

Possible Commands for a Flag Ceremony

- ◆ **"Girl Scouts, attention."** Used to announce that the flag ceremony is to begin.
- ◆ **"Color Guard, advance."** Signals the Color Guard to advance with the flags or advance to pick up the flags.
- ◆ **"Color Guard, post the colors."** Directs the Color Guard to place the flag in flag standards or to attach the grommets to a flag pole rope.
- ◆ **"Color Guard, honor your flag."** Signals the Color Guard to salute the American flag.
- ◆ **"Please join us in saying the Pledge of Allegiance."** Followed by an appropriate song, quotation, or poem, if so desired.
- ◆ **"Color Guard, retire the colors."** Prompts the Color Guard to remove the flag from standards or to lower the flag, detach it from the rope, and fold it prior to being dismissed.
- ◆ **"Color Guard, dismissed."** Prompts the Color Guard to leave in formation, with or without the flag.
- ◆ **"Girl Scouts, dismissed."** Indicates girls may leave in formation or be at ease where they have been standing

Handling the Flag of the United States of America

Display of the American flag is governed by law to ensure that it will be treated with the respect due the flag of a great nation. This is known as the United States Flag Code. Some of the rules most useful for Girl Scouts are

- ◆ The flag of the United States of America should be at the center and at the highest point of the group when a number of flags of states (or localities or pennants of societies) are grouped and displayed from staffs.
- ◆ When the flags are posted in stands or raised on a pole, the American flag is always kept higher than other flags, so it is placed in its stand after other flags are lowered into their standards, or it is raised up a pole first. When it's time to retire the colors, the American flag is taken out of its stand first so it remains the highest flag at all times.
- ◆ The flag, when carried in a procession with other flags, should be either on the marching right or, if there is a line of other flags, in front of the center of that line.
- ◆ When you display the flag on a wall or in a window where people can see it from the street, it should appear flat with the blue part at the top and on the flag's own right (which is the observer's left).
- ◆ When displayed after dark, the flag should be illuminated.
- ◆ The flag is to be hoisted briskly and lowered slowly, with dignity.
- ◆ The flag should never be allowed to touch anything beneath it, nor should it ever be carried flat or horizontally—always aloft and free.
- ◆ Never use the flag as a cover or place anything on top of it.
- ◆ No disrespect of any kind should be shown to the flag of the United States. It should be kept clean.

Folding the American Flag

Special care should be taken that no part of the flag touches the ground. The Flag is carefully folded into the shape of a tri-cornered hat, emblematic of the hats worn by colonial soldiers during the war for Independence. In the folding, the red and white stripes are finally wrapped into the blue, as the light of day vanishes into the darkness of night.



1. To properly fold the flag, begin by holding it waist high with another person (or persons) so that its surface is parallel to the ground.



2. Fold the lower half of the stripe section lengthwise over the field of the stars, holding the bottom and top edges securely.



3. Fold the flag again lengthwise with the blue field on the outside



4. Make a triangular fold by bringing the striped corner of the folded edge to meet the open (top) edge of the flag.



6. Turn the outer (end) point inward, parallel to the open edge, to form a second triangle



5. The triangular folding is continued until the entire length of the flag is folded in this manner



7. When the flag is completely folded, only a triangular blue field of stars should be visible. The Color Bearer carries it with the point forward away from her or his body.

Activity Materials

Our Soda Geyser

Questions: _____

Experiment	Hypothesis	Results

Questions: _____

Experiment	Hypothesis	Results

Bubbleology Bubble Solution Recipes

Ingredient	Solution #1 dish soap only	Solution #2 dish soap + glycerin	Solution #3 dish soap + corn syrup
Water	1 Cup	1 Cup	1 Cup
Liquid Dish Soap	2 TBS	2 TBS	2 TBS
Glycerin		1 TBS	
Corn Syrup			1 TBS

Brownies will make solution #1 and solution #2. Juniors will make all 3 solutions.

Directions

1. Write the solution number and ingredients on a piece of masking tape with a permanent marker. Tape each label to a cup or jar.
2. Carefully measure and pour the ingredients for the solutions one at a time. Pour them into the appropriate cup and give them a gentle stir. Be careful not to stir them too fast or you'll have a bunch of bubbles in your bubble mix.

Our Bubble Results

For each bubble solution, record your results.

	Solution #1 - Bubble Time (in seconds)	Solution #2 - Bubble Time (in seconds)	Solution #3 - Bubble Time (in seconds)
Trial 1			
Trial 2			
Trial 3			
Trial 4			
Trial 5			
Trial 6			
Trial 7			
Trial 8			
Trial 9			
Trial 10			
Total Bubble Time in Seconds (optional)			



Ooey Gooey Science Girl Evaluation

To be completed by each girl

Age Level (circle one): B J

Circle the response that best fits how you feel after this event.

I feel connected to other girls in Girl Scouting	Yes	No
I learned something about myself	Yes	No
I tried something new today	Yes	No
I learned something I want to share with others	Yes	No

In this program I learned....

My favorite thing about this program was...

To improve this program, I would...

Did this program meet your expectations? Did not meet Met Exceeded

Other Comments:



Ooey Gooley Science Leader Evaluation

To be completed by each leader

Troop Level (circle one): B J Mixed

Circle the response that best fits how you feel after this event.

My girls felt connected to other girls in Girl Scouting Yes No
Comments:

My girls learned something about themselves Yes No
Comments:

My girls tried something new today Yes No
Comments:

My girls learned something they will use later or share with others Yes No
Comments:

In this program my girls learned:

My favorite thing about this program was:

To improve this program, I would:

Did this program meet your expectations? Did not meet Met Exceeded



Ooey Gooley Science Presenter Evaluation

To be completed by each presenter

On a scale of 1 – 5, 1 being low and 5 being high, how would you rate:

Overall Program	1	2	3	4	5
<i>Comments:</i>					

Quality of Workshop	1	2	3	4	5
<i>Comments:</i>					

Materials	1	2	3	4	5
<i>Comments:</i>					

Communication/ Preparation	1	2	3	4	5
<i>Comments:</i>					

Overall Girl Readiness for Workshop	1	2	3	4	5
<i>Comments:</i>					

The best thing about this program was:

To improve this program, I would:

Would you be willing to help at other events? YES NO

Name/Troop #: _____ email: _____

Other program topics I would be interested in helping with (Select all that apply)

- Art STEM The environment/planet Sports First Aid Cooking
- History Financial literacy Journey award related programs
- Programs to help us earn badges Outdoor skills
- Other: _____

Other Comments:



DOEY GOOEY SCIENCE

Join us for some fun and messy science experiments! If it's slimy, sticky, or messy we will be investigating it. Brownies will complete steps 1, 3, 4, and 5 of the Home Scientist Badge.

For more information, contact: