



Outreach Playbook

SWE Girl Scout Brownie Home Scientist Outreach Event

Metrics:

Grade Level:	# of Student Participants:	Duration (hrs):	# of SWE Volunteers:	Partner orgs (if any):
K-5	30	2 hours	6	Girl Scouts

Overview of Activity

Society of Women Engineers – Columbia River Section performed 2 hands on science experiments with local Girl Scouts.

The event was promoted in the Girl Scout Activity Guide.

“Come join the Society of Women Engineers at the Portland Service Center to become a home scientist! Daisies, Brownies, and Juniors will get the chance to dive into some exciting and fun hands-on science and engineering experiments! From activities like discovering how a lava lamp works to creating a cloud in a bottle – you won’t want to miss this engaging workshop! You will also earn a special Society of Women Engineers patch to take home!”

Selected activities were chosen that tied to the Brownie Home Scientist Badge. Event was open to Daisies, Brownies, and Juniors. However, Brownies completed 2 of the 6 steps toward the Brownie home scientist badge:

<https://drive.google.com/file/d/1V3Cf9O43gbRoNJe2lxPEVOsjABGnPahg/view?usp=drivesdk>

Activity 1 – Create your own lava lamp

Badge connection: Step 3 – Dive Into Density

Girls learned about density by creating a lava lamp with vegetable oil, water, and salt.

Activity 2 – Oobleck slime

Badge connection: Step 5 – Play with Science

Girls learned about non-Newtonian fluids and created their own slime with cornstarch and water.



Outline and Script

Introductions + snack

Time Allotment: 30 minutes

- Introductions to SWE and SWENext
- Volunteer introductions

Activity #1 - Lava Lamp

Video: <https://www.youtube.com/watch?v=yJ8NCEQIRQ8>

Badge Connection: Step 3 – Dive into density

Time Allotment: 30 minutes

Materials Needed:

- Water
- Empty bottle
- Vegetable oil
- Salt
- Phosphorescent powder
- UV light
- Safety glasses

Steps:

1. Divide girls into groups of 2-3 and make sure each group has all required materials.
2. Have girls fill the empty bottle with water about 2/3 full.
3. Fill the rest of the bottle with vegetable oil. The oil should float on top of the water because it is less dense.
4. Ask the girls to pour some salt and share with the group what they see happen. The salt is less dense than the oil so it will sink down to the water layer, but it will bring an oil bubble with it. The oil and salt together are denser than water, so they sink together in the water. Then, the salt dissolves and the oil bubble is again less dense than the water and floats back up to the top.
5. Add phosphorescent powder to the cup. Use the UV light to make it glow!
6. Ok to add more salt to start the process again.

Science Discussion

- Oil floats on the water because it is less dense. If you had a gallon of each, the oil would weigh less than the water
- What is the purpose of the salt in the lava lamp?
- What is more dense - a basketball or a bowling ball?

Activity #2 – Oobleck Slime

Video: <https://www.youtube.com/watch?v=sJ0mrC13hZM>

Badge Connection: Step 5 – Play with Science

Time Allotment: 45 minutes



Materials Needed:

- Water
- Cornstarch
- Food coloring
- Large bowl
- Gloves
- Safety Glasses

Steps:

1. Divide girls into groups of 2-3 and ensure each group has all the required materials.
2. Have girls add 1 cup water to the bowl, 2 cups cornstarch, and a few drops of food coloring
3. Put on the gloves and mix all ingredients together
4. Encourage girls to play with the slime. Try moving your hands slowly into the oobleck vs quickly. What differences do you see?
5. Hold a handful in your open palm—what happens?
6. Try squeezing it in your fist or rolling it between your hands—how does it behave differently?

Science Discussion

- Oobleck doesn't behave like a normal liquid.
- Non-Newtonian: can behave as liquid or a solid
- Oobleck changes properties with pressure (how hard you squeeze it) vs other liquids (water) change properties with temperature
- Applying pressure to the mixture increases its viscosity (thickness). A quick tap on the surface of Oobleck will make it feel hard, because it forces the cornstarch particles together. But dip your hand slowly into the mix, and see what happens—your fingers slide in as easily as through water. Moving slowly gives the cornstarch particles time to move out of the way.

Activity Wrap up + clean-up

Time Allotment: 10-15 min

- Pass out SWE patches
- SWENext sign-ups



Lessons Learned

Include an activity during snack time to keep students engaged.

Oobleck slime can get messy. Make sure that room is set-up for easy clean-up. Use tablecloths and plastic bags to protect floors and furniture.

Accessibility Adaptations

All materials can be found in most homes or kitchens or on Amazon. Additionally, SWE CRS has done the same activities virtually through zoom for elementary students. For virtual outreach event, boxes of materials were sent to students in advance. Funding for materials was partially provided from PDG.



Materials and Costs

Item	Quantity	Where to Buy (link if applicable)	Total Cost
Vegetable Oil	4	https://www.amazon.com/Amazon-Brand-Vegetable-Gallon-Ounces/dp/B07MK2XKKV/ref=sr_1_2?crd=1VQO18SP69MD3&keywords=happy+belly+vegetable+oil&qid=1653499982&srefix=happy+belly+vege%2Caps%2C144&sr=8-2	\$36
Salt	3	https://www.amazon.com/Morton-Iodized-Table-Salt-pack/dp/B07RCK4WFT/ref=sr_1_2?crd=10OLSXKDDYWBN&keywords=morton+salt%2C+iodized%2C+26+ounce&qid=1653500129&srefix=morton+salt%2C+iodized%2C+26+%2Caps%2C107&sr=8-2	\$10
Phosphorescent powder	3 ordered	https://www.amazon.com/Luminous-Non-Toxic-Festivals-Concerts-Halloween/dp/B07BNHCK4Q/ref=sr_1_3?crd=2H5GCATTXGVAE&keywords=hxdzfx+glow+in+the+dark+pigment+UV+powder&qid=1653499733&srefix=hxdzfx+glow+in+the+dark+pigment+uv+%2Caps%2C127&sr=8-3	\$30
UV light	30 total (15 sets of 2 ordered)	https://www.amazon.com/Morpilot-Flashlight-Ultraviolet-Blacklight-Inspection/dp/B01MZ0D414/ref=sr_1_1_sspa?crd=6C7BSNKWPZ8F&keywords=morpilot%2Bblack%2Blight&qid=1653499600&srefix=morpilot%2Bblack%2Blight%2Caps%2C120&sr=8-1-spons&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUEwMjhZRVU2VVc4QjRYJmVuY3J5cHRIZEIkPUEwNjUwMDcwVUMxQzIRU1NHNUZTJ	\$150



		mVuY3J5cHRIZEFkSWQ9QTA2MjU1MjQxOVVTNDBPVEMzU0pBJndpZGdldE5hbWU9c3BfYXRmJmFjdGlvbj1jbGlja1JIZGlyZWN0JmRvTm90TG9nQ2xpY2s9dHJ1ZQ&th=1	
Bottles for oil	30	https://www.amazon.com/Empty-Plastic-Bottles-Tamper-Evident/dp/B07WYS5Z2V/ref=sr_1_3?crid=1JD6H7SJ097BP&keywords=16+oz+empty+plastic+juice+bottles+with+tamper+evident+caps&qid=1653500249&srefix=empty+plastic+juice+bottle+with+tamper+%2Caps%2C120&sr=8-3	\$26
Food coloring	1	https://www.amazon.com/Food-Coloring-Rainbow-Decorating-Crafts-25/dp/B07Z4SMX8J/ref=sr_1_2?crid=2S1P1YPKOLURE&keywords=food+coloring+-+24+color+rainbow+fondant+cake+food+coloring+set&qid=1653500287&srefix=24+color+rainbow+%2Caps%2C148&sr=8-2	\$15
Corn starch	30	https://www.amazon.com/Argo-Corn-Starch-pack-Gluten/dp/B00INYRCIS/ref=sr_1_2?crid=2DVEUH3MJW9K3&keywords=cornstarch+16+oz&qid=1653500631&srefix=cornstarch+16+oz+%2Caps%2C116&sr=8-2	\$35
Gloves	1	https://www.amazon.com/Disposable-Medical-Clear-Gloves-Industrial/dp/B0888JB5SS/ref=sr_1_3?crid=CKJ213U7O3RD&keywords=disposable%2Bmedical%2Bclear%2Bvinyl%2Bexam%2Bgloves&qid=1653500372&srefix=disposable%2Bmedical%2Bclear%2Bvinyl%2Bexam%2Bglove%2Caps%2C121&sr=8-3&th=1	\$15



Safety Glasses	2	https://www.amazon.com/amoolo-Resistant-Lens-Protective-Industrial-Carpentry/dp/B0833VW43J/ref=sr_1_3_sspa?crd=1IOC9WKL3ZEJ5&keywords=amoolo+safety+glasses+clear&qid=1653500491&prefix=amoolo+safety+glasses+clear%2Caps%2C115&sr=8-3-spons&psc=1&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUEyV0hFNFpWSlo4SEQ0JmVuY3J5cHRIZEIkPUEwNjc3MDk5MUM4R01DNDFURUdIMiZlbnNyeXB0ZWRBZEIkPUEwODA5NzgzM1NST05CN1dQR0o0VyZ3aWRnZXROYW1IPXNwX2F0ZiZhY3Rpb249Y2xpY2tSZWRpcmVjdCZkb05vdExvZ0NsaWNrPXRydWU=	\$60
<p>Describe any additional funding sources outside of section budget (if applicable):</p> <p>There was a charge of \$5 per girl for participating in the activity Materials were purchased as part of SWE PDG grant</p>			