



SLIME!

STRETCH YOUR IMAGINATION



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HOW TO USE THE EDUCATOR RESOURCE GUIDE

We hope this resource guide provides ideas on how to prepare for a meaningful, informative and fun visit to the Discovery Center of Idaho that provides a relevant connection to your classroom learning objectives.

This resource guide will help orient you with the exhibition content and layout, provide helpful prompts and activities to prepare students for their visit. Ideas for onsite interactions, as well as follow-up prompts and activities will be provided.

Teachers can pick and choose which sections, activities or themes they want to focus on with their students in the pre- or post- visit materials.

EDUCATION STATEMENT:

After experiencing *SLIME!*, the Discovery Center of Idaho hopes visitors will have a deeper understanding of the physical properties of slime and how it is used by humans and in nature.

The Discovery Center of Idaho's mission is to inspire lifelong interest and learning in Science, Technology, Engineering and Math.

The Education Department at the Discovery Center of Idaho seeks to provide quality educational experiences & programs that reflect excellence in their development, mastery in their delivery and offer relevant and sustainable interactions that inspire lifelong interest and learning in S.T.E.M. for a diverse community.

IDAHO SCIENCE STANDARDS

Elementary School

(2nd Grade/ 5th Grade)



PS1-2-1:

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

PS1-2-2:

Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

PS1.A:

Structure and Properties of Matter: different kinds of matter exist and many of them can be solid, liquid or gas depending on temperature. Matter can be described and classified by its observable properties. (PS1-2-1)

[LINK TO IDAHO SCIENCE STANDARDS](#)



WHAT IS SLIME?

Slime is an example of a polymer (just like plastic) made up of a long chain of molecules connected together. As a polymer, slime can change its viscosity (thickness or stickiness) depending on the different ingredients we add. Slime's ability to change its viscosity, the way we can make it fluffier or oozier, is one of the things we love most about it! It's also known as a "non-Newtonian fluid" which

just means that it doesn't fit the definitions of fluids that Sir Isaac Newton came up with. (Probably because he never came in contact with anything as cool as slime back in the 18th century!) Most slime we have access to now is a result of big molecules binding to other big molecules creating a tangled mass of molecular structure we know and love as slime.

Here's a great video you can watch on your own and then share with your students and chaperones:

<https://youtu.be/4F9ukCQvP20>

FIELD TRIP EXPERIENCE BREAKDOWN

GALLERY LEARNING EXPERIENCE

Up to 60 minutes (self-guided)

Group will be welcomed by our Education team at the "Field Trip Entrance" and given a breakdown of what to expect. This may or may not include a *material science demonstration (*based on staff/volunteer availability)

- Group will then be split into groups of 4-6 students
- Each group will be given a gallery guide & scavenger hunt to complete together along with the help of a chaperone and the volunteers available in the galleries

CLASSROOM ACTIVITY EXPERIENCE

90 minutes

When your group arrives:

Students will be divided into two (or three) smaller groups, depending on size.

GROUP 1: 30-40 minutes (self-guided)

- Take part in gallery learning experience described above

GROUP 2: 30-40 minutes (facilitated)

- Will be led to Classroom 1 and be seated at tables
- Students will be led through a short, hands-on slime making lesson where they will create their own slime to take home with them (project outline & example on page 18)

At the end of the first 30-40 minutes, groups will switch places. Once both groups have completed a hands-on project and gallery learning experience, the full group will exit at the "Field Trip Entrance". If schools are unable to include a classroom activity due to time, teachers may purchase activity kits in advance to pick up after the gallery learning experience and take back to the school.

The student onsite learning experience offers a 60 or 90 minute hybrid of facilitated and self-guided learning, with an option of a classroom activity (or take-home activity kit) inspired by the exhibition.

Group size is limited to 60 students maximum per 60-90 minute Field Trip slot.

For more information or to book a field trip contact the Education Department at education at: 208-343-9895 x224

PRICING:

Gallery Only Option

0%-49% FRL*	\$6/student
50% + FRL	\$3/student
Chaperone/Teacher	\$10
Additional Adult	\$18

**FRL: Percentage of students who qualify for free and reduced lunch.*

OPTIONAL CLASSROOM ACTIVITY (OR TAKE-HOME KIT):

\$3/student



PREPARING FOR YOUR VISIT

PREPARING YOUR STUDENTS (AND CHAPERONES) FOR THEIR VISIT:

We believe that learning is fun, but please remember that we are not an indoor playground! Please remind your students not to treat our exhibits as playground equipment.

The Discovery Center is a space that inspires interest and learning in Science, Technology, Engineering and Math concepts through hands-on play, demonstration and activities.

Review the exhibit descriptions and gallery layout for *SLIME!* in this resource guide and consider integrating versions of the following activities or references to what students will see and do on their visit into your lesson planning for the week leading up to your visit.

Prepare your chaperones!

We created a short video that you can share with parents so that they better understand their role as chaperones. How well you prepare your chaperones can make or break your students' experience.

<https://youtu.be/TV8ZE1o31Y8>

In addition to *SLIME!*, students will also have the opportunity to explore our current exhibitions during their visit. This exhibition dives more deeply into the material science behind slime and overlaps learning objectives, especially for the older grades. We've created a free educational video that can be played prior to your field trip to introduce your students to the concepts covered in *SLIME!*. This might also help your students create a frame of reference for what they can expect to engage with on their visit.

<https://youtu.be/8a-7dIm62fw>

Title: Human Atoms

Description: Students will role play the different attributes of matter to better understand how the molecules move in the different states.

Supplies:

- Gaffing tape for floor
- Chairs

Prep Notes:

Have gaffing tape square already measured and taped down before class

Instructions:

1. Divide students into small groups of 3 or 4. Designate one group to be a solid, one a liquid, and one a gas.
2. Have the solid group sit close together on chairs. Have the liquid group stand in a group inside a box area taped out on the floor. The gas group has no distance requirements.
3. Now have the groups move within the constraints of their material properties.
 - a. The solid group must always sit on their chairs.
 - b. The liquid group is free to move within the box.
 - c. The gas group is free to move anywhere in the room.
4. Do this three times so each group gets a chance to be gas and run around the room.

Guiding Questions:

How does the way the molecules are able to move affect what state matter is in?

ACTIVITY #2



Title: Lavender Extract

Description: Pour a small amount of lavender oil into a diffuser. Have the students hold up their hand when they smell the lavender extract.

Supplies:

- Vial of lavender essential oil or other essential oil*
- Diffuser

Prep Notes:

Make sure diffuser cup is already filled with water before adding oil drops.

Instructions:

1. Discuss how lavender oil is in a liquid state and we have to be very close to the bottle to smell it. Example script: "Here we have lavender oil but most of it is still a liquid so you aren't able to smell it in the room. If I heat it up however, I will add energy and the liquid will turn into a gas. Since the lavender oil extract has a distinct smell, we should be able to smell it around the room; for the same reason we can smell odors around the house when cooking is being done."
2. Pour a few drops of lavender oil into the diffuser.
3. Have students hold up their hand when they can smell the lavender oil, in gas form.

Guiding Questions:

How does adding energy (or heat) change the state of matter?

** Allergy warning: please make sure students are not sensitive to essential oils.*

ACTIVITY #3

Title: Polymers

Description: Students will role play a polymer string to explore the properties of slime.

Supplies:

- Gaffing tape for floor
- Chairs

Prep Notes:

This may need to take place in a larger space or outside.

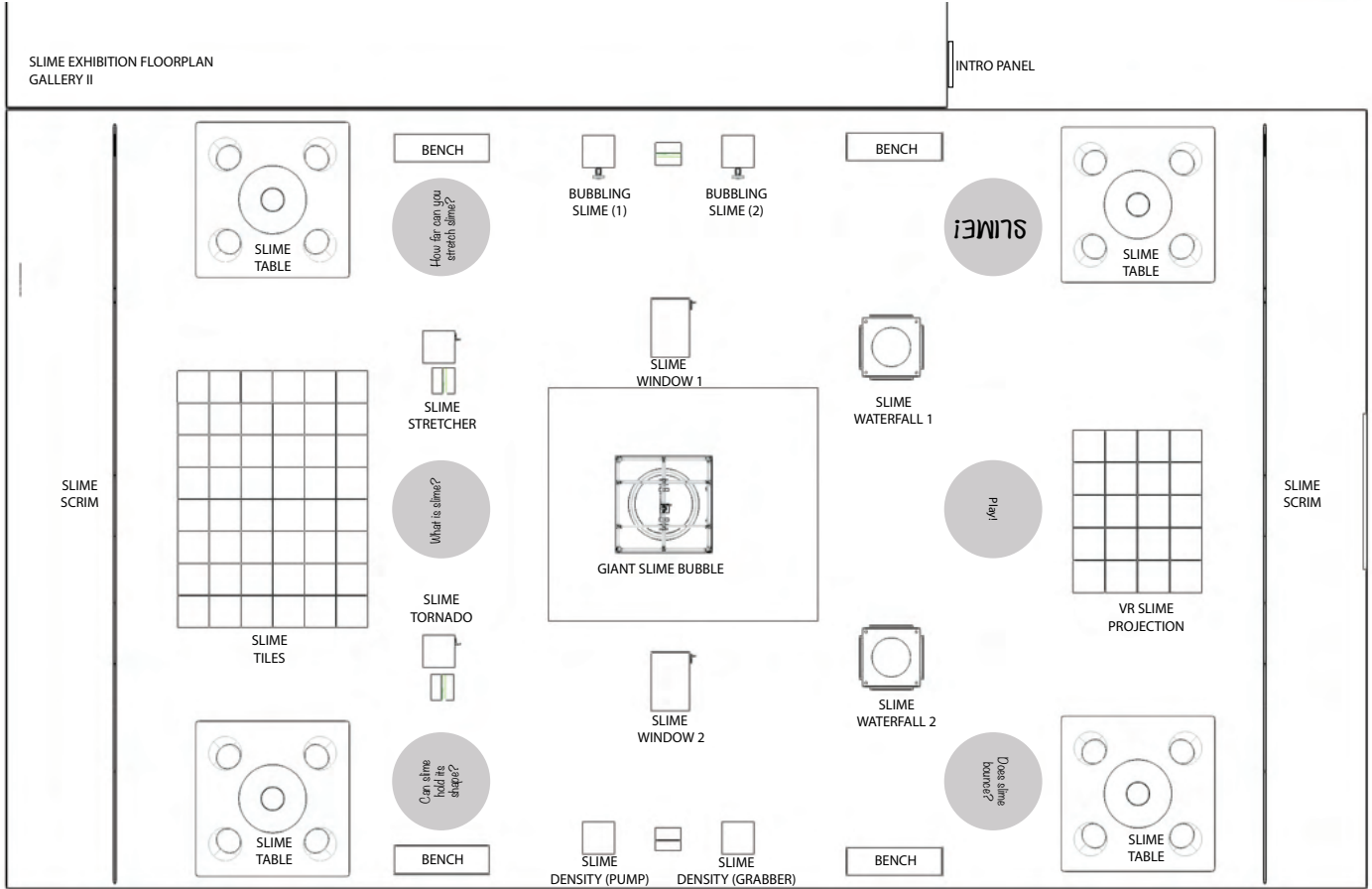
Instructions:

1. Remind students of the states of matter that they embodied in the previous activity. Then provide a definition of a polymer chain: A polymer is a long chain made up of repeating molecules. This particular polymer is unique because it has the properties of both a solid and a liquid. Slime can take the shape of its container like a liquid does, yet you can hold it in your hand and pick it up like a solid. In a solid, molecules are tight together while in a liquid, molecules spread out and break apart. Polymers are special because their molecules chain themselves together so they can stretch and bend. Jell-O, rubber bands, plastic soda bottles, sneaker soles and even gum are all forms of polymers.
2. Have a group of students stand in a line, closely next to each other holding hands. They are now a polymer chain.
3. Now have the groups move within the constraints of their new material properties as slime.
 - a. Have the polymer chain move like a wave, create a circle or different shapes. They can observe that the chain must always stay connected. It can be formed into many shapes, but can always go back to its original shape.

Addition:

If you are outside, students can also form two different polymer chains and play "Red Rover." This is another fun way of visually and actively explaining properties of matter.

GALLERY MAP



SLIME! EXHIBIT DESCRIPTIONS



Messy. Fun. Science!

Slime's gooey goodness has inspired millions of people around the world to play with matter in a whole new way. There is a whole museum dedicated to slime and its anti-stress qualities and "artful, oozy fun" in NYC. But slime starts with science!

Get ready to have fun at the Discovery Center of Idaho as we get messy and explore the science behind **SLIME!**

It's All About Viscosity!

Standards connection:

- Matter and Its Interactions

PS1-2-1

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Viscosity is a word that describes how thick or sticky something is. For example, honey has a higher viscosity than water (it's thicker and stickier).

The exhibit graphic features a large, green, bubbly slime shape at the top. Below it, there are three text boxes. The first box is titled "TEST & OBSERVE" and contains two bullet points. The second box is titled "WHAT'S HAPPENING?" and contains a paragraph of text. The third box is titled "VISCOSITY" and contains a paragraph of text.

Bubbling Slime

TEST & OBSERVE

- Which tube has the thicker liquid?
- How can you tell?

WHAT'S HAPPENING?

Pushing down on the pump forces air into the liquid, just like when you make a bubblegum bubble or blow up a balloon. Air molecules have to work harder to push through the thick, sticky liquid (high viscosity) so the bubbles get flattened and rise slowly. The bubbles in the thinner liquid (low viscosity) are round and rise quickly.

VISCOSITY

These two exhibits contain liquids with different viscosities. *Viscosity* describes how thick or sticky a liquid is. For example, honey is thicker and stickier than water, so it has a higher viscosity than water.

Bubbles are All About Surface Tension

Standards connection:

- Matter and Its Interactions

PS1-2-1

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Surface Tension is about how tightly the force between molecules is hugging them together on a liquid's surface to make a kind of stretchy skin that's just right for bubbles.



TEST & OBSERVE

- What happens when you blow on the giant bubble around you?
- Can you touch the bubble without breaking it?

WHAT'S HAPPENING?

Surface tension describes how tightly molecules hug together on a liquid's surface. Water has a high surface tension, but soap weakens the force between the molecules, making a stretchy skin that's just right for bubbles.

SURFACE TENSION

Bubbles hold their shape due to *surface tension*. Surface tension is how tightly molecules on the surface of a liquid are held together by the force between them.

Vortex

Standards connection:

- Earth and Human Activity

ESS3.B

- Natural Hazards

The pattern you see in this exhibit is called a *vortex*, found in quickly spinning fluids. Funnel-shaped forms such as this occur in both liquids and gases. You make a vortex every time you stir your coffee, flush a toilet, or empty your bathtub. Tornadoes, waterspouts and dust devils are also vortices.



TEST & OBSERVE

- What shape do you see the water making?
- Can you tell what direction the vortex is spinning?

WHAT'S HAPPENING?

A water funnel often forms when a body of water rapidly drains, like in a bathtub. As the water circles it creates a small opening in the center, resulting in a funnel, or *vortex*. Pushing the button makes the water stop spinning, which causes the vortex to slow down and eventually collapse.

VORTEX

The pattern you see here, found in quickly spinning fluids, is called a *vortex*. Funnel-shaped forms like this occur in both liquids and gasses. You make a vortex every time you stir your coffee, flush a toilet or empty your bathtub.

Elasticity

Standards connection:

- Matter and Its Interactions

PS1-2-1

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Elasticity describes how a material (like slime) can change its shape and size – and then return to its original shape and size when the forces causing those changes are removed.



Slime Stretcher

TEST & OBSERVE

- How long can you stretch the slime?
- Does the speed at which you pull the slime affect how far it can stretch?
- How many tries did it take to stretch the slime to its longest?

WHAT'S HAPPENING?

Most materials have some elasticity, but there are limits to how far a material can stretch or change shape. This is called the *elastic limit*. The elastic limit is the amount of force that the material can withstand before it breaks. Slime is a special material which lets it stretch far more than most materials.

ELASTICITY

Elasticity describes how a material (like slime) can change its shape and size—and then return to its original shape and size when the forces causing those changes are removed.

Density

Standards connection:

- Matter and Its Interactions

PS1-2-1

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Density measures how compact something is. The closer together a material's molecules are, the denser it is. The farther apart, the less dense. This happens with solids and liquids. A material's density shapes how it will interact with other materials. Dense materials will sink, while less dense materials or liquids will float or mix with a liquid of equal density.



Slime Density

TEST & OBSERVE

- Does the slime sink more quickly or more slowly as more is moved to the top?
- What would happen if the slime and the clear liquid were the same density?

WHAT'S HAPPENING?

As the slime moves to the top of the clear liquid, the denser slime sinks to the bottom. If the slime and the clear liquid had the same density, the slime would stay suspended in the clear liquid. But because the slime is denser, it sinks.

DENSITY

Density describes how compact a material is. The closer together its molecules, the denser that material is. The farther apart, the less dense. This is true for all solids, liquids and gasses. A material's density determines how it will interact with other materials. Denser liquids sink, while less dense liquids float.



TACTILE INTERACTIONS

Our hands are some of our best learning tools! Here are some exhibits that get our hands messy while we learn about material science:

Slime Waterfalls

Interact with dripping slime

Glowing Slime Tables

Open explore tables with slime

.....

Did you know that we can learn with our feet too? Our whole body is a learning machine. These exhibits have us moving our dancing feet:

Interactive Projection Floor

Projection floor with slime interactive

Slime Floor Tiles

25 interactive slime tiles

SLIME IN NATURE



There are more than 900 species of slime mold in the world. Slime mold are amoebas which grow on rotting wood and other decomposing things.

["Dog Vomit" Slime Mold](#)

[9 secret facts about slime mold](#)

[Watch: Slime Molds](#)

Slime in nature is called mucus, and you have some in your nose right now! The mucus, or snot, in your nose protects your body by trapping dirt and bacteria.



[Watch: About Snot](#)

Slug slime serves many purposes for the slug: protection, communication, food, transportation, hydration and more.



[Watch: Slime Slug](#)



The hagfish is an eel-like fish that secretes a chemical that turns the water around it into sticky slime. The slime clogs the gills of potential predators.

[Watch: About Hagfish](#)

FUN FACTS & FAQs ABOUT SLIME

Did you Know?

Silly Putty was invented by a researcher studying rubber who failed to invent what he wanted. His “failure” became one of the top-selling toys of all time.

[Watch: 15 facts about silly putty](#)



[Watch: How Silly Putty Became
The ORIGINAL Slime](#)

Nickelodeon’s iconic green slime was launched into space the summer of 2020 for a series of NASA experiments. Astronauts tested how slime behaves in microgravity.



[Watch: Slime in Space](#)



Slime can be used as a cleaning appliance. Cleaning slime is a thicker slime that works almost like a lint brush to get crud out of your keyboard and other electronics.



FREQUENTLY ASKED QUESTIONS:

How long does slime last?

Slime doesn't go bad, but you may want to toss it if it develops mold or if it dries out.

Refrigerated slime, kept in a baggie, should last for a couple of weeks and can last months in a sealed bag unrefrigerated. If slime contains borax, it shouldn't spoil at all. Edible slime recipes should be chilled for storage and thrown out.

What's the difference between slime and putty?

To make putty, you use the same ingredients as when making slime, just a different amount of activator.* When making slime you don't want to add too much activator or it will become stiff. Have you ever added too much activator to your slime? Then you've got yourself some putty!

** Activator causes the polymers to stick together, creating more structure.*

What can we use slime for?

Slime is a squishy, stretchable toy for kids and adults. It stimulates the senses with its texture (touch), scent (smell), color (sight) and ASMR noises (hearing). It has been proven by scientists to relax and help reduce stress and anxiety. It's also a lot of fun to play with.



POST-VISIT / FOLLOW UP ACTIVITIES AND PROMPTS

Just because your field trip is over, doesn't mean your discovery time has ended. All the tactile impressions and content exploration is swimming in your students' heads and looking for a way to stick for the long term.

Here are some tips for stretching the impact of the learning that you experienced at the Discovery Center long past the bus ride home:

- 1.** Make sure to reference what the students experienced with what you're doing in the classroom. For example, if you visited before your unit on material science, then remind them of what all these polymers you're having them talk about looked like and how they felt when they were at the Discovery Center.
- 2.** Include reference to their experiences at the Discovery Center into your material science unit review quiz or test. Maybe a gentle reminder of a tactile experience will help them choose the better answer.
- 3.** If you didn't get to do the pre-visit activities we provided, then do them now! It's a great way to build physical memory of sometimes difficult concepts.
- 4.** Have students design a new exhibit for the *SLIME!* exhibition that shows off a characteristic of slime that students learned about in a new way at the Discover Center of Idaho.
- 5.** One of our favorite things to get are letters from students telling us about all the stuff they learned at the Discovery Center! We LOVE to share the letters with our colleagues and post them up on our walls to remember the importance of what we do for STEM education.
- 6.** Finally, please complete the teacher survey we will send after your trip. We love to hear feedback from teachers! We're always looking for areas to improve and grow in, so please share with us your thoughts and suggestions.

DIY Slime!

Try this in your classroom!

Slime Recipe

- 1 large mixing bowl
- Craft sticks for stirring
- 1 cup white Elmer's glue
- ½ tablespoon baking soda
- Liquid food coloring (optional)
- 1 tablespoon contact lens saline solution – add more as needed

*** Important: your brand of contact solution must have boric acid and sodium borate in the ingredient list.*



DISCOVERY
Center of Idaho



EDUCATION AT DISCOVERY CENTER OF IDAHO

INFORMATION & CONTACT

The Discovery Center of Idaho's mission is to inspire lifelong interest and learning in Science, Technology, Engineering and Math.

The Education Department at the Discovery Center of Idaho seeks to provide quality educational experiences & programs that reflect excellence in their development, mastery in their delivery, and offer relevant

and sustainable interactions that inspire lifelong interest and learning in S.T.E.M. for a diverse, local, regional and state-wide community.

If you have any questions or need help in any way while planning your class trip to the Discovery Center of Idaho, please reach out to education@dcidaho.org.

