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SCIENCE
EXPERIMENTS

INSTRUCTION
MANUAL



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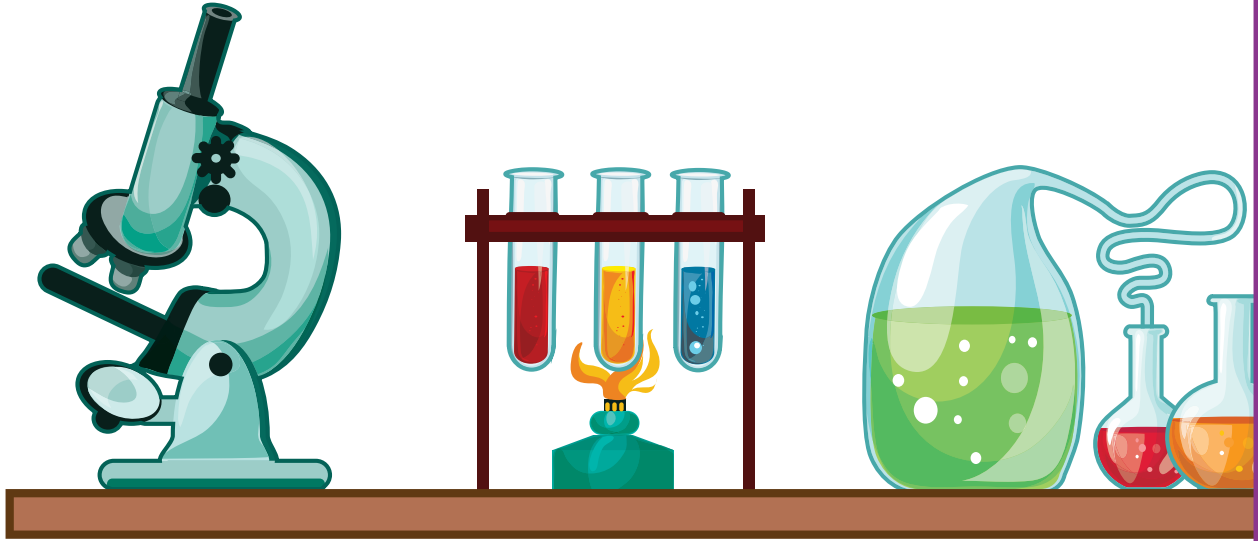
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We are here to help!

For any questions, comments or for assistance with the science kit or manual please contact us. We will be happy to assist you!

support@learnandclimb.com



Slime Kit Contents

1 Beaker

Borax - 0.1 oz

Cornstarch - 2 oz

2 test tubes

Yellow measuring spoon

Test tube stand

Container for your slime

Coloring Agent (Red and Blue)

Pva glue - 2.12 oz

Glow in the dark - 0.1 oz

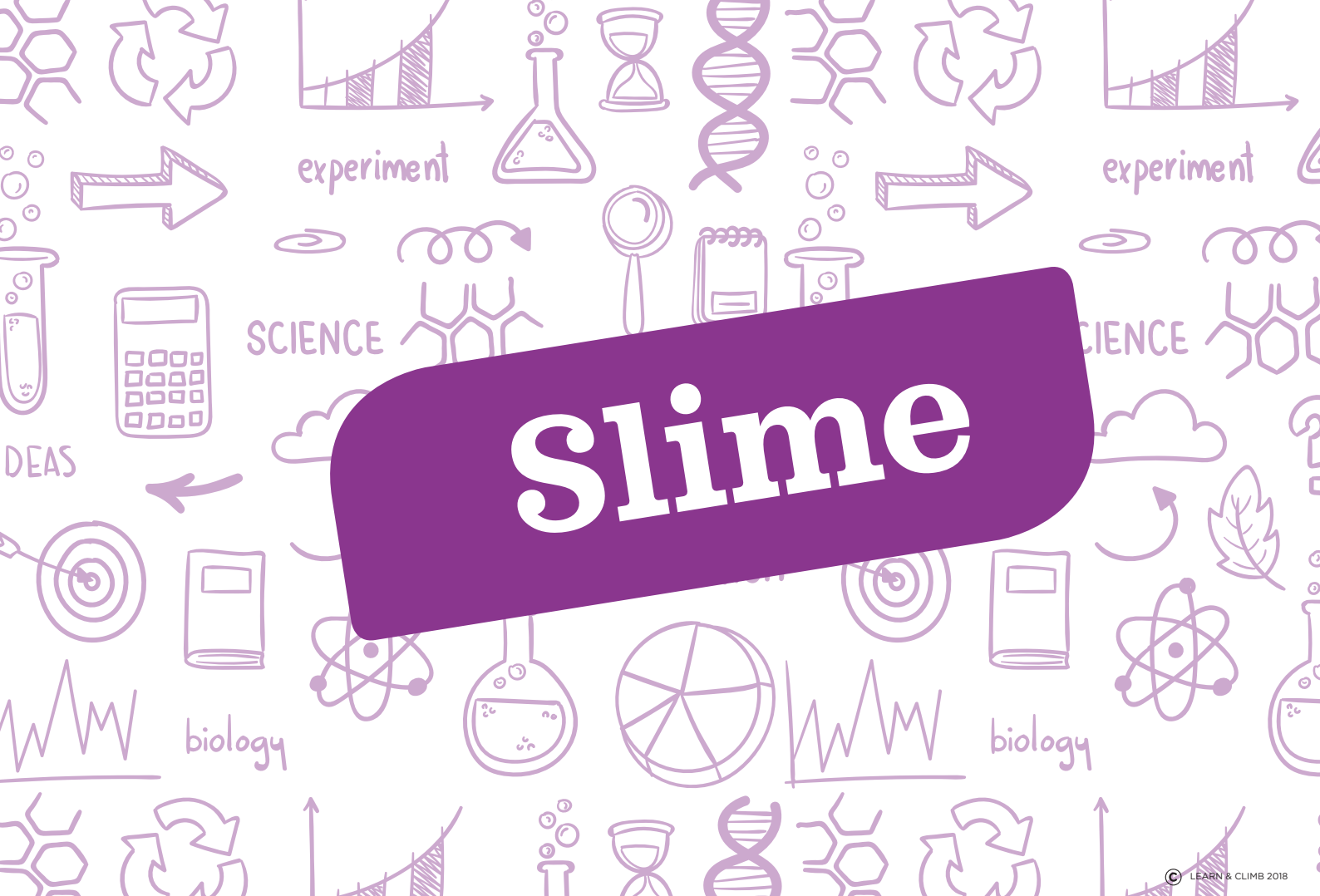
1 stirring stick

Pipette

1 Surprise Dinosaur

1 Surprise Unicorn

Slime



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Slime. Gloop. Ooze.

COMPOUND BACKGROUND

Whatever you call it, it is cool, right? Bouncy balls. Quicksand. Cheese. How are all of these things made? Well, when you combine certain items, they make compounds. Compounds are just combinations of two or more elements. Often, combining two elements makes something entirely new with entirely different properties. If you combine certain liquid and solid substances, they make something that is like a liquid and a solid. Substances like slime or quicksand might feel and move like a liquid, but look like a solid.

AMORPHOUS SOLIDS

There are foods like these — cottage cheese, sour cream, yogurt and gelatin to name a few — that are a combination between liquids and solids. They have properties of both liquids and solids. Sometimes they are called amorphous solids because they do not have a definite crystal structure. They are solids that look like a solid, but feel and move like a liquid. Most solids are made of crystals at the microscopic level. In this guide, you will be making mostly amorphous solids.

Ready?
Let's get started!

1

Time for Slime!

note!

When you first open the glue from the kit, use a toothpick or paper clip to open the top of the glue bottle. Be careful because this glue and others can stick to your hands. Wash beaker out very well after each use!

SUPPLIES FROM KIT

2 test tubes
Beaker
Test tube holder
Yellow measuring spoon
PVA glue
Borax
Coloring Agent



SUPPLIES FROM HOME

Glue (if you need more)
Water



Expand

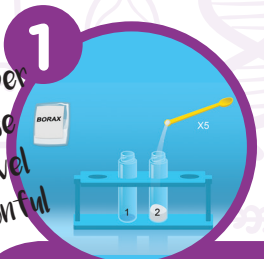
This experiment normally works with glues that have a special compound called PVA, or polyvinyl alcohol. Other glues also contain PVA, like wood glue or Elmer's glue. Try some different glues and see if the experiment still works. Try not to use up all the borax, though! **Did the experiment work better or worse?**

Explanation

You take glue and water — two liquids — and combine them with a solid — borax — and they make an entirely new substance: slime! How does this happen? **The molecules, or smallest parts of the different compounds, bond together with one another and make a stretchy kind of solid.**



Remember to use a level spoonful



Using your yellow measuring spoon, add 5 small spoonfuls of borax to test tube 1.



Add 10 ml of water to test tube 1.

You can use your beaker for easier pouring.



Cap test tube 1 and shake until the borax is dissolved in the water.



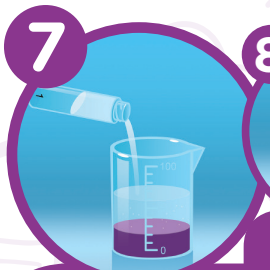
Pour 10 ml of water into test tube 2. Add 1 spoonful of coloring agent from the small end to test tube 2 and shake well.



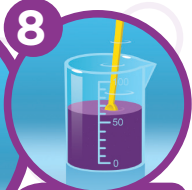
Add 20 ml of glue into the beaker.



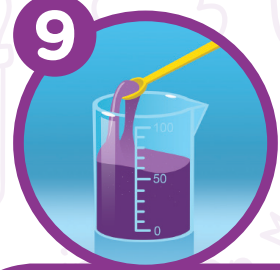
Pour the water from test tube 2 into the beaker.



Pour the mixture from test tube 1 into your beaker.



Stir.



You just made slime! if you feel your mixture needs more borax, go ahead and add more.

Record your results. Try different amounts of ingredients to make different types of slime!



2

Follow the Bouncing Ball

*note!

If it does not work the first time, add more spoonfuls of salt.

SUPPLIES FROM KIT

Yellow measuring spoon
Beaker
PVA Glue
Glow-in-the-dark potion
Coloring agent *optional*

SUPPLIES FROM HOME

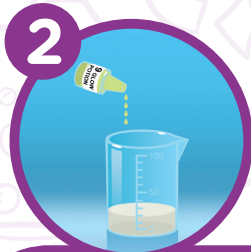
A few spoonfuls of salt

SALT

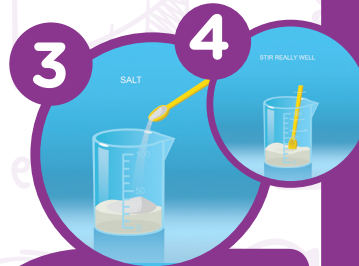




Pour 20 ml of PVA glue into the beaker.



For added excitement, add 2 to 4 squeezes of the glow-in-the-dark powder to the beaker.



Using your yellow measuring spoon, add 5 large spoonfuls of salt into the beaker and stir quickly. When white particles start to form, stop stirring.



Get the solid mixture from the beaker out, Squeeze out the water and try to form a ball.



Drop your ball on a flat surface. Did it bounce?

If you added glow powder hold your ball under a light for a minute before going into a dark room to boost the phosphorescence. Then watch it bounce and GLOW!

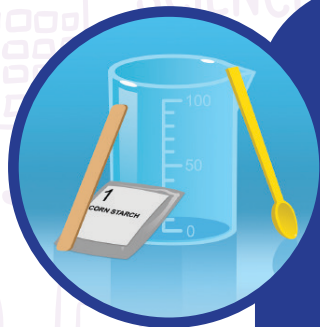


Explanation

This experiment was slightly different than the last one. The salt particles fill in the spaces between the “glue particles.” The PVA particles are pushed aside, and they bunch up and harden into a ball. This process happens with other compound mixtures like tofu or gelatin— you add certain solids to certain liquids, and parts of the mixture harden into a gel-like substance. Sometimes this process is used to purify parts of liquids or get out tiny particles that might otherwise be “stuck” in them.

3

The Great Thickening



SUPPLIES FROM KIT

Beaker
Yellow measuring Spoon
Cornstarch
Stirring stick



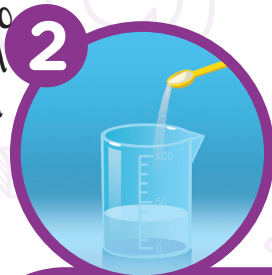
SUPPLIES
FROM
HOME
Water





Pour 20 ml of water into the beaker.

Remember to use a level spoonful



Using your yellow measuring spoon, add 10 to 15 large spoonfuls of cornstarch into the beaker.



Stir.



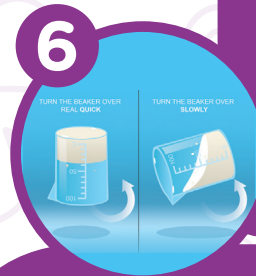
Try to push down the thickened mixture really **FAST** and with a lot of **FORCE**.

See what happens!



Now try to push down on the thickened mixture **SLOWLY** and **SOFTLY**.

What happened now?!



Turn the beaker with the mixture in it over really fast. Did the mixture run out? Now try to turn it over slowly (over a plate or bowl).

What happened now & why?

Explanation

When separate, liquid molecules or particles are farther apart than solid particles. Some substances, though, end up feeling like both liquids and solids.

When you mix cornstarch and water together, you end up producing one of these substances. It actually feels different depending on whether or not you mix it quickly or slowly! If you stir slowly, the particles move together and the substance feels like a liquid. If you stir quickly, the water particles move faster. The cornstarch particles fall behind, and the liquid tends to act like an amorphous solid. Keep trying until you get it right!

4

It Ain't Easy Being Cheesy

**WARNING: ADULT SUPERVISION
REQUIRED. DO NOT USE THE
MICROWAVE OR TOUCH HOT LIQUIDS
WITHOUT ADULT SUPERVISION.**

SUPPLIES FROM KIT

Beakers
1 test tube
Yellow measuring
spoon
Pipette



SUPPLIES FROM HOME

Vinegar or lemon juice
Strainer or cheesecloth
Milk





1 Measure 40 ml of milk into the beaker.



2 Heat the milk in the microwave for 30-40 seconds. watch the milk so it does not boil.



3 Remove the beaker with milk from the microwave with an oven mitt or cloth being careful not to burn yourself.



4 Using your pipette, add 10 ml of vinegar or lemon juice to the test tube.



5 Pour the vinegar or



6 Stir & stir & stir till clumps start to form!



7 Pour the mixture through your strainer or cheesecloth into a cup or bowl and strain well.

Explanation

Have you ever held cheese in your hands and thought, Hmmm... Why does it feel like that? Have you ever wondered how it is made?

Well, you just completed a process that was a lot like the cheese-making process. Looking at the ingredients. What do you know about milk? Milk is high in protein. When the temperature of protein particles increases or decreases, the particles “bunch up” or congeal. It can also happen when milk sours or is exposed to something sour like lemon juice or vinegar. It just so happens that cottage cheese is made like this! The milk molecules were able to bunch up when they came in contact with either the lemon juice or vinegar in this experiment, and that's how you created something like cheese!

You've made yummy cheese!

5

Quicker Than Quicksand



SUPPLIES FROM HOME

Baking pan or anything to mix in
Spoon

Generous amount of water
Something small to bury in the quicksand

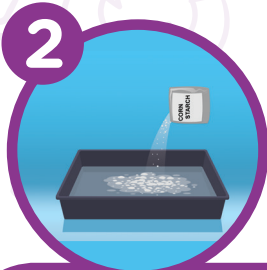


SUPPLIES FROM KIT
Cornstarch





1
Pour the water into the mixing tray.



2
Add cornstarch to the tray of water, a little at a time.



3
Stir.

Add more cornstarch if needed.



4
Play around with the quicksand you just created.

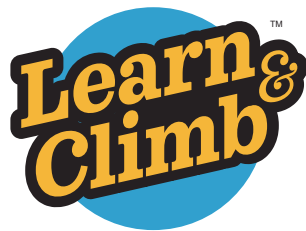


5
Try to skim your finger across the quicksand or write a message.

Explanation

Once your quicksand reaches a certain point, it starts behaving like an amorphous solid. You run your hands through it or try to pick it up, and it is almost solid. If you skim your hand across the top or write messages in it, it is more like liquid. It really depends on how you interact with the substance. The response of the substance depends on its thickness, or more accurately, its resistance to flow. Have you ever poured honey or syrup? These liquids are very thick. How about water or rubbing alcohol? These liquids are very thin. Sometimes temperature can affect how fast or slow a liquid flows, too! You have made a special type of fluid almost exactly like quicksand! Bury an object in it and see what happens.

Notes



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