
20+
COOL
EXPERIMENTS
Learn & Climb
INSTRUCTION
MANUAL
DYNAMO
LAB

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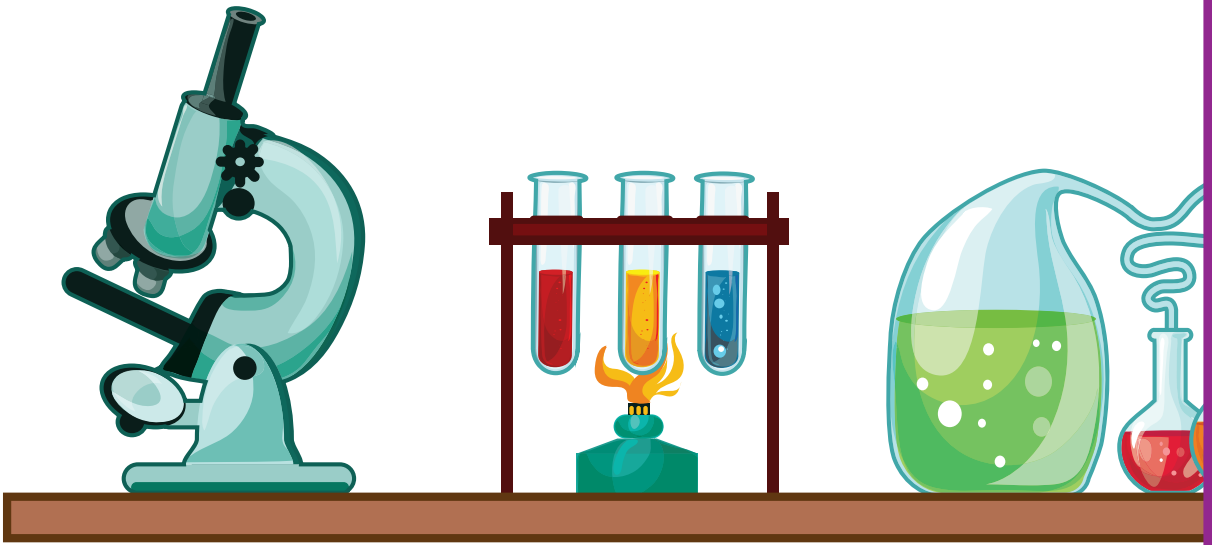
We are here to help!

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

Want to unlock online video's to each experiment in this manual? Simply go here: www.learnandclimb.com and click the "video" tab in the menu bar, then scroll down to Science!



Science Kit Contents

3 test tubes
Test tube stand
1 Purple string
Urea (4.23 oz) 2 Pack
3 petri dishes
Yellow measuring spoon
1 funnel
10 litmus paper
1 beaker
1 pva glue (2.12 oz)
1 stirring stick
Baking soda (1.5 oz)
Citric acid (1.5 oz)
Purple sweet potato powder (.35 oz)
Volcano base
Coloring agent (Red & Blue, .21 oz ea)
Test tube connector
Foaming agent (.53 oz)
Glow in the dark Powder (.18 oz)

Unmixable Water & Oil

MIXOLOGY

Humans have always been interested in how things mix together. In ancient times, before people knew a lot about science, they would try to create different things like medicines, dyes, inks, foods, clothes, and just about anything else from mixing. **They discovered mostly through trial and error, and they were constantly improving their process,** kind of like what you will be doing in this guide!

Have you ever mixed anything together? What happened? Did the thing you were mixing change color? Did it bubble up or start foaming? **Did what you were mixing change or transform into something entirely new?**

PROPERTIES

These ancient people (and then people who came after them, and people who came after them...) discovered that certain materials have special properties. **A property is just a trait or a quality of something.** An example is a bike. Most bikes are hard metal, shiny, and colorful. Or how about modeling dough? Modeling dough is colorful, squishy, and soft.

PROPERTIES OF COMMON SUBSTANCES

What are some common substances that you know of? In this guide, we will focus on liquids. Gasoline, soda, and milk are some common liquids. Water and oil are two very common substances that are also liquids. Draw three columns on a piece of paper. List some things that you might do with water on the left and some things that you might do with oil on the right. Can you do the same thing with both water and oil? Put that in the middle!

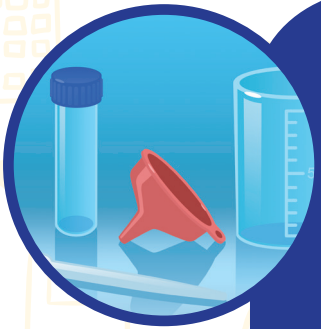
1 You go together like Oil & Water

SUPPLIES FROM HOME

Water

Oil

SUPPLIES FROM KIT



Small test Tube

Pipette

Funnel

Beaker

*note!

When you are done, spill the mixture outside instead of pouring it down the drain.

How to Video - learnandclimb.com/pages/video-library

1

Pour 5 ml of water into your test tube.

2

Pour 10 ml of oil into your test tube.

3

Screw on the cap.

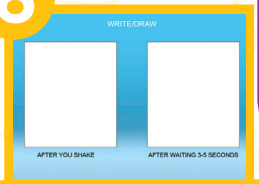
4

Shake.

5

Let it stand for a few seconds.

6



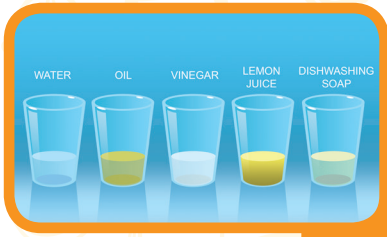
Record your results.

Explanation

Have you ever heard the phrase "They go together like oil and water"? Normally, that describes people who have very different personalities.

Likewise, water & oil do not mix because they have different properties. For one, they are "packed" differently. Oil tends to sit on top of water because it is less dense than water, which means that its particles are not as tightly packed.

2 Mix it Up

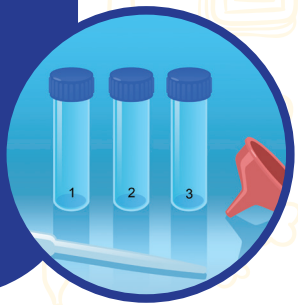


SUPPLIES FROM HOME

Water
Oil
Vinegar
Lemon juice
Dishwashing soap

SUPPLIES FROM KIT

3 small test tubes
Funnel
Pipette



Explanation

What is so special about soap? Soap has special properties that allow it to mix with both water and oil! When it mixes with water and oil, the color changes. It forms a kind of "bridge" between the particles and makes a special mixture called an emulsion. Why might we need oil and water to mix? Hmmm... Think about it some more!

How to Video - learnandclimb.com/pages/video-library

1

Pour 5 ml of water into test tube 1.

2

Then add 5 ml of oil into the same test tube

3

Pour vinegar into test tube 1 till it reaches almost the top of the test tube.

4

Close the cap and shake well.

Are there any other liquids in your house that can help oil & water mix?!

5

Repeat instructions 1 and 2 to test tube 2. Then add lemon juice till it reaches almost the top of the test tube.

6

Close the cap and shake well.

7

Repeat instructions 1 and 2 to test tube 3. Then add dishwashing soap till it reaches almost the top of the test tube.

8

Close the cap and shake well.

9

Record which liquid will make the oil and water mix.

Which liquid will make the oil and water mix?

3 Eggy Emulsion

WARNING: Adult supervision and help needed. **DO NOT USE THE WHISK WITHOUT ADULT HELP** AND/OR SUPERVISION.

SUPPLIES FROM HOME

- Electric whisk
- 10–30 ml of oil
- 1/4 cup vinegar
- 1 egg yolk
- Salt
- Pepper
- Medium/large bowl

How to Video - learnandclimb.com/pages/video-library

1

Separate the egg yolk from the egg white. Place the egg yolk into your bowl.

2

Add salt, pepper, and 1/4 cup of vinegar to your bowl with the egg yolk.

3

Mix all the ingredients in the bowl with an electric whisk — only with adult supervision.

4

While still mixing the ingredients in the bowl, slowly add 10 to 30 ml of oil till you get an eggy emulsion.

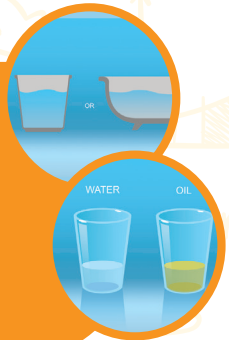
Explanation

You just made another emulsion. You might need to make the emulsion a few times until you learn to get the right thickness. If you were to zoom in on the particles, you would see that they still don't truly mix! Instead, they arrange themselves in a certain pattern, where one particle surrounds another.

Eggs are involved in other emulsions, too. A lot of the things you eat and drink are emulsions, such as different sauces, ice creams, cake, milk, and more! See if you can find other emulsions in your kitchen or refrigerator and write them down.

4 Tick Tock Goes the Oil Clock

SUPPLIES FROM HOME



Bucket or bathtub
Water in a cup
Oil in a cup

SUPPLIES FROM KIT

Test tube holder
2 small test tubes
Coloring agent
Test tube connector

Explanation

You will make an oil clock. This clock uses the properties of oil and water. Based on your results, answer the following questions: What properties do you think are at work? Does it have to do with temperature? With weight? Tip the clock upside-down and right side up to see what happens! Does the water always go below the oil? Is there a barrier?

*note! **This experiment is very messy!** Even if you do it in a bucket, you may want to do it outside. Too much coloring agent may stain hands, clothing, or surfaces.

How to Video - learnandclimb.com/pages/video-library

1

Add 2-4 drops of coloring agent to test tube 1.

2

Add water to test tube 1 until it is half full.

3

Shake the test tube.

4

Add more water to test tube 1, almost till the top..

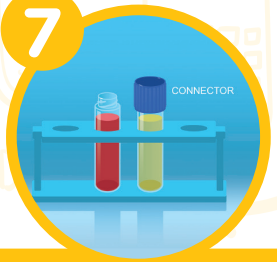
5

Shake again.

6

Fill the second test tube with oil.

7



Screw the test tube connector onto test test tube 2.

8

Close the opening of both test tubes with your thumbs.

9

Put both test tubes into a large bucket or your bathtub filled with water, with your thumbs still on them.

10

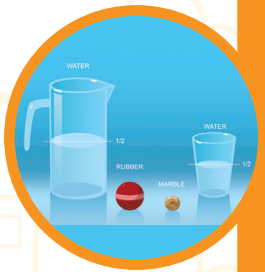
Quickly screw both test tubes together.

11

Create an oil clock by turning over your test tubes every few seconds.

5 Density Exploration

WARNING: KEEP MARBLE AWAY FROM YOUNG CHILDREN. DO NOT PUT MARBLE IN YOUR MOUTH.



SUPPLIES FROM HOME

Pitcher/cup filled halfway with water

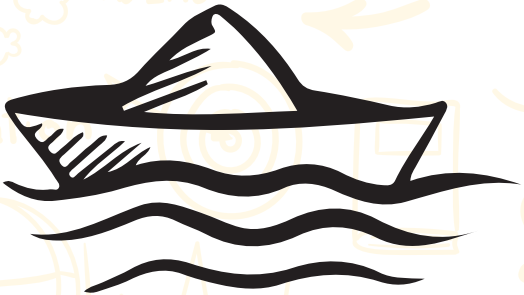
Rubber ball

Marble

How to Video - learnandclimb.com/pages/video-library

Drop both the rubber ball and the marble into the pitcher at the same time.

Watch to see which one sinks first.



Explanation

If you compare a marble and a bouncy rubber ball, which one do you think will sink to the bottom? The bigger one- or the one that is denser? Go ahead and find out!

In this experiment, which one sinks first? Well, the marble, because it is denser! The rubber ball is less dense, so it did not sink as quickly. Density, for our purposes, refers to how compact or "packed in" a substance is. It is normally easy to move or lift less dense objects, while it is harder to move or lift denser objects. So why would we want to change the density of a mixture? There are many reasons, but for us, we want to make things fall slower in our clock. With the next experiment, you will see it in action! Have you ever seen a snow globe before? Well, kind of like that!

6 Changing the Oil Clock

Explanation

The previous oil clock could not "measure time" well. However, dissolving the salt into the water actually increased the water's density. Have you ever been in the ocean? It's easier to float in the ocean than it is in a pool because the ocean water is denser!

SUPPLIES FROM KIT

2 small tubes
Test tube connector
Coloring Agent (optional)

SUPPLIES FROM HOME

Water
Oil
Salt

How to Video - learnandclimb.com/pages/video-library

1

Fill test tube 1 a quarter full with salt.

2

Fill test tube 1 three-quarters full with water.

3

Close the cap and shake.

4

Add more water to the test tube, until it is almost full.

5

Fill test tube 2 with oil.

6

Put the connector onto test tube 1.

7

Place your thumb over the other side of the connector, and your other thumb over the opening of test tube 2.

8

Fill your bathtub with water.

9

Put your test tubes (with your thumbs still on it) into the bathtub and quickly connect test tube 2 to the connector.

10

Turn your connected test tube over every 5 to 10 seconds to watch your oil clock!

7 Floating Egg

SUPPLIES FROM HOME

1 cup of water
Egg
1/4 cup salt
Stirring stick or spoon

How to Video - learnandclimb.com/pages/video-library

1

Add the salt to the cup of water.

2

Stir the water and salt until the salt is dissolved.

3

Put the egg in.

4

Watch your egg float!

Expand

Take it even further and try it with two eggs, three eggs, or more! Do you need to add more salt? The more eggs you use the bigger your cup/bowl will need to be.

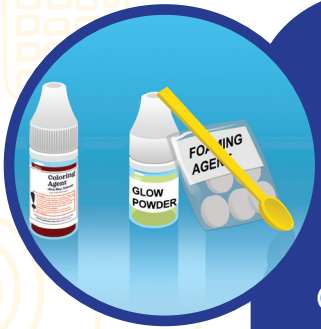
8 Mix the Unmixable Lava Lamp

note!

Oil may spill and/or shoot out of the bottle, so you might want to spread out a towel just in case.

SUPPLIES FROM HOME

- Water
- Oil
- Empty water bottle, medium or large/ about 20+ ounces



SUPPLIES FROM KIT

- Coloring agent (optional)
- Foaming agent
- Glow-in-the-dark powder
- Yellow measuring spoon

Expand

Try to add other ingredients and colors to make your lava lamp even more realistic! Try to make the best lava lamp you can!

How to Video - learnandclimb.com/pages/video-library

1

Put a few drops of coloring agent into your bottle.

2

Pour water into the bottle until it is one-fifth full.

3

Pour oil into the bottle until it is three-fifths full.

4

Close cap and shake well.

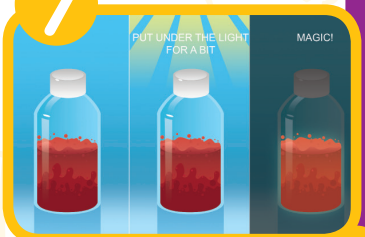
5

Add a few squeezes of glow-in-the-dark potion to the bottle for some extra magic!

6

Put all five foaming agents into the bottle Wait a moment.

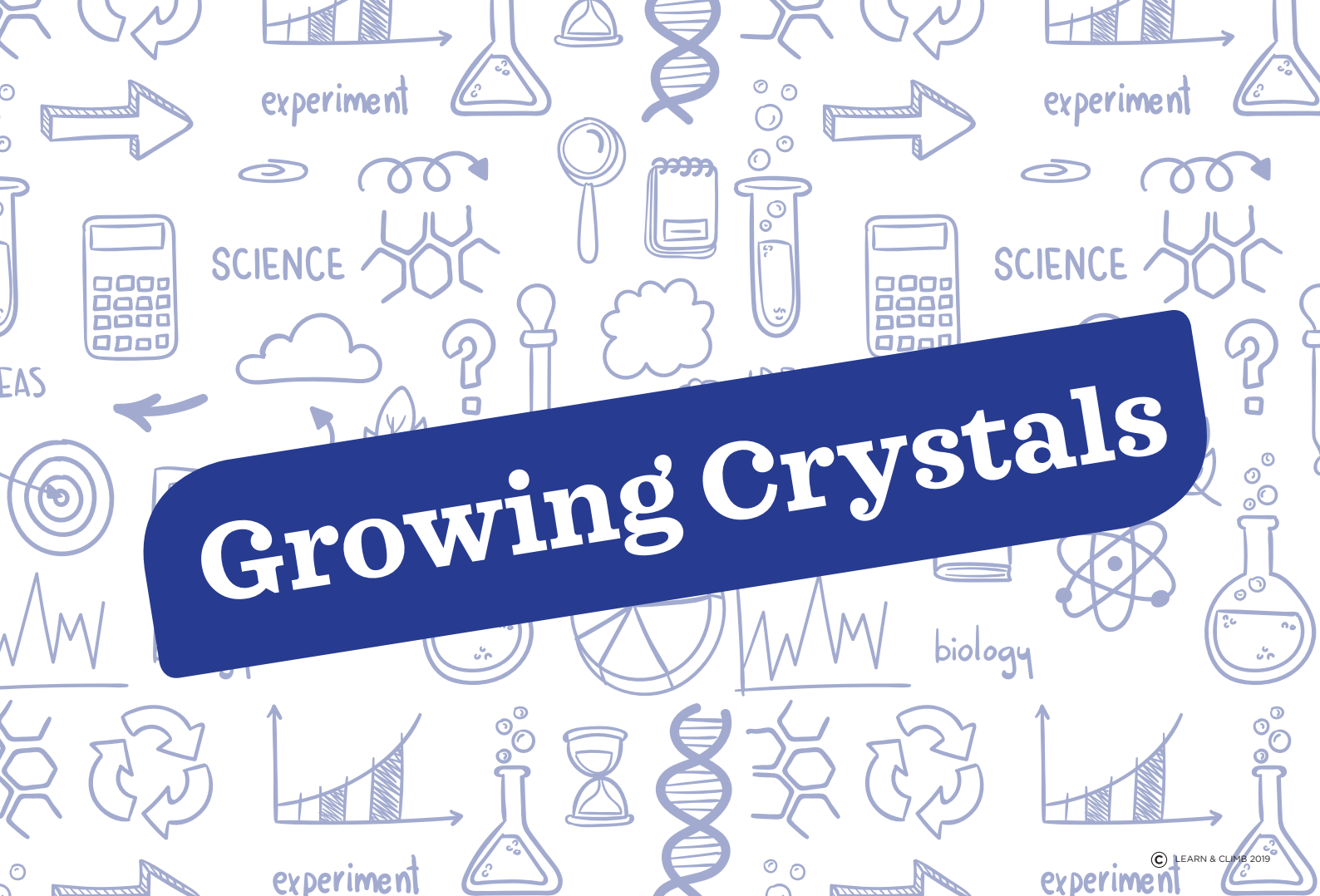
7



Put on the cap and watch! If you used some glow-in-the-dark potion, then go into a dark room to watch the magic.

Explanation

The foaming agent reacts, or makes a new substance. The foaming agent also makes the water rise. But we know that the water is more dense than the oil, so it tries (and does) go back down — only to be pushed back up because of the reaction of the foaming agent! Then it goes back down because it is more dense than oil, and so on! This process happens over and over again due to convection, which is just the movement of liquids within other liquids due to different properties. Therefore, lava lamps continuously go up and down!



Growing Crystals

WARNING: ADULT SUPERVISION REQUIRED: BE VERY CAREFUL WHEN HANDLING THE UREA! Put down a paper plate so that none of it spills onto the ground. Wash your hands after using the urea, or use rubber gloves. Make sure not to touch your eyes or nasal passages. Put all urea mixtures into a plastic bag for disposal and throw away. Do not pour into sink!

CRYSTAL DEFINITION

Crystals appear like a large object made up of many different, tiny objects. But all crystals are made of the same thing! **They can be made of an element or a compound. An element is a pure substance that cannot be broken down into smaller parts. A compound is two or more elements put together.** Do you know any elements? I bet you do; iron, aluminum, and sodium are some common examples. Do you know any compounds? There's salt, sugar, oil, and many more! See if you can recall any other elements or compounds.

Every elements crystal shapes are unique, just like every snowflake or every sand grain is unique.

CRYSTAL FORMATION & GROWTH

Many crystals occur naturally. Some, though, you can grow! The conditions need to be just right, and most times water is involved. That is what you will be doing in following experiments — making your own crystals. You also might be familiar with crystals of the gemstone variety, like amethyst and garnet.

CRYSTALS

Have you ever been in a cave or seen one on TV? Did you notice these tiny, jewel-like objects glistening off the cave walls? These objects are crystals. You can find other everyday objects that are crystals, too, if you know where to look.

Can you think of any other crystals you have seen?

9 The Cooling Effect

SUPPLIES FROM HOME

Water

Sugar

Salt

SUPPLIES FROM KIT

3 petri dishes

Yellow measuring spoon

Funnel

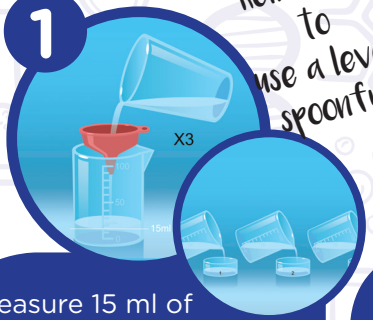
Urea

Beaker

How to Video - learnandclimb.com/pages/video-library

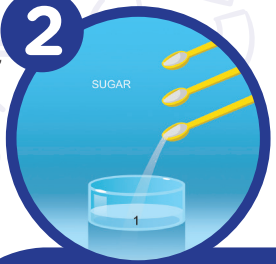
Remember to use a level spoonful

1



Measure 15 ml of water in the beaker
Pour 15 ml water into each petri dish.

2



Using your yellow measuring spoon, add 3 to 5 large spoonfuls of sugar to petri dish 1.

3

Add 3 to 5 large spoonfuls of
salt to petri dish 2.

4

Add 3 to 5 large spoonfuls of urea to petri dish 3.

5

Stir the contents of each petri dish really well until the grains disappear.

6

Place each petri dish in the palm of your hand. Record your results.

Explanation

The petri dish with the urea got colder, didn't it? When urea and water combine, they cause a chemical reaction. A chemical reaction occurs when something brand-new is made, and it tends to cause change in temperature, bubbling, sound, smell or even can create fire! Urea is also used in cooling packs. Have you ever used a cooling pack before? It stayed cold, right? Thats because of the urea in it!

What do you feel? Is one of the petri dishes cold?

10 Too Much or Not Enough

*note

The water that is used for each petri dish should be the same temperature and from the same source.

SUPPLIES FROM KIT

- 3 petri dishes
- Yellow measuring spoon
- Urea
- Beaker

SUPPLIES FROM HOME

- Water
- Sugar
- Salt

How to Video - learnandclimb.com/pages/video-library

1

Measure 10 ml of water in the beaker for each petri dish.

2

Pour the 10 ml of water into each petri dish.

Remember to use a level spoonful

3

Using your yellow measuring spoon, add one large spoonful of salt into petri dish 1. Add one large spoonful of sugar into petri dish 2, and add one large spoonful of urea into petri dish 3.

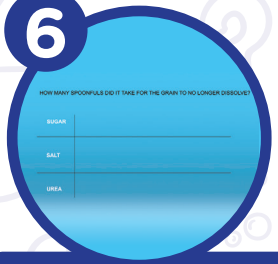
4

Mix the contents of each petri dish until the grains are dissolved.

5

Repeat the instructions of adding one spoonful of salt, sugar, and urea into the correct petri dish, and stir very well in between each spoonful.

6



Keep adding and mixing until the grains do not dissolve any longer.

Explanation

Have you ever been dripping with sweat when it is extremely hot outside? Were your hat or clothes soaked, too? Well, you might say that you were saturated with sweat. That means that your clothes or forehead or anything had the maximum amount of moisture that it could hold. In this case, when you are trying to dissolve the grains in the water, once it reaches its maximum, then no more grains will dissolve! You will see visible grains remaining in the water, no matter how hard you stir. (This saturation will later influence crystals, too!)

11 To Grow or Not To Grow

SUPPLIES FROM KIT

- Petri dish
- Yellow measuring spoon
- Litmus paper
- Urea
- Beaker

SUPPLIES FROM HOME

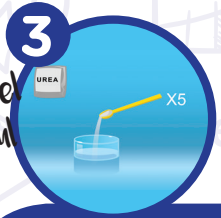
- Scissors
- Stapler
- Paper clip (or something else to hold the paper together)
- Pencil
- Water

How to Video - learnandclimb.com/pages/video-library

Pour 15 ml of water into the beaker.

Pour the water from the beaker into the petri dish.

Remember to use a level spoonful



Using your yellow measuring spoon, add 5 large spoonfuls of urea to the petri dish with water.

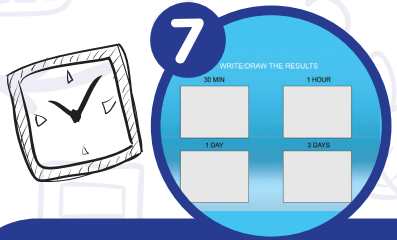
Create a standing litmus paper as follows: 1. Fold the litmus paper in half. 2. Either staple the two ends of the litmus paper together, or attach a paper clip to hold the paper together.

Explanation

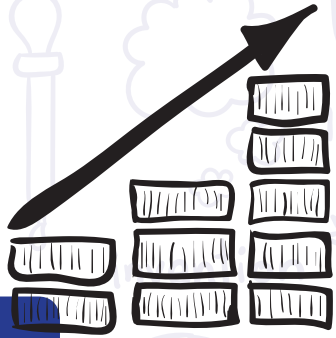
Over some time, the water gets absorbed by the paper, and the urea is left behind and covers the paper. **Only urea crystals are left behind!**

3. Cut off the bottom or side of the litmus paper, making a "floor" so the litmus paper can stand in the petri dish.

Place the litmus paper into the petri dish



Draw or write down the results you observed. Draw four boxes. Write "30 minutes," "1 hour," "1 day," and "3 days" above each box. The boxes should have enough room to describe or draw or the results.



12 The Knowledge of Crystallization

SUPPLIES FROM KIT

- 3 petri dishes
- Yellow measuring spoon
- 3 litmus papers
- Urea
- PVA glue
- Beaker

SUPPLIES FROM HOME

- Dishwashing soap
- Water
- Scissors
- 3 paper clips

Explanation

What did your crystals look like this time? Did the crystals make different shapes? If they did, it could be due to the absorption rates from the different liquids. Absorption is just how a material soaks up liquid. Because different liquids are made up of different elements and compounds, their crystal formation patterns should be one of a kind! Try to make the crystals with different liquids that you find in your house. You will always need to use urea, too.

How to Video - learnandclimb.com/pages/video-library

1

Pour 15 ml of water in the beaker. (You will need to do this three times.)

2

Pour 15 ml of water into each petri dish.

Remember to use a level spoonful

3

4

Using your yellow measuring spoon, add 5 large spoonfuls of urea into each petri dish.

Stir until dissolved.

5

Once the urea is dissolved, add a few drops of PVA glue into petri dish 1.

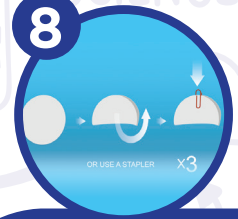
6

Add a few drops of dishwashing soap into petri dish 2.

7

Add a few drops of PVA glue and dishwashing soap into petri dish 3.

8



Create a standing litmus paper as follows: 1. Fold the litmus paper in half. 2. Either staple the two ends of the litmus paper together, or attach a paper clip to hold the paper together.

9

3. Cut off the bottom or side of the litmus paper, making a "floor" so the litmus paper can stand in the petri dish.

10

Put one prepared litmus paper into each petri dish

11

Wait and record. Measure the crystal growth after 30 minutes, one hour, one day, three days. Draw it as best you can!

13 Color the Crystals

SUPPLIES FROM HOME

3 non-permanent color markers
Dishwashing soap
Water
Paper clips
Scissors

SUPPLIES FROM KIT

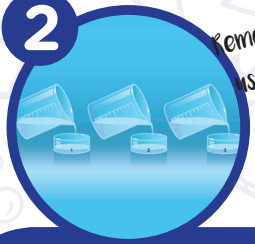
3 petri dishes
Yellow measuring spoon
Litmus paper
Urea
Beaker

How to Video - learnandclimb.com/pages/video-library

1

Pour 15 ml of water into the beaker. (You will need to do this three times.)

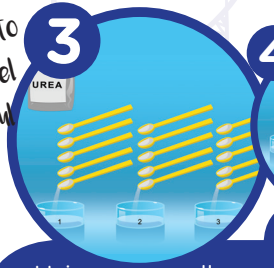
2



Pour 15 ml of water into each petri dish.

Remember to use a level spoonful

3



Using your yellow measuring spoon, add 5 large spoonfuls of urea into each petri dish.

4

Stir until dissolved.

5

Once the urea is dissolved, add a few drops of PVA glue into petri dish 1.

6

Add a few drops of dishwashing soap into petri dish 2.

7

Add a few drops of PVA glue and dishwashing soap into petri dish 3.

8

Create a standing litmus paper as follows: 1. Fold the litmus paper in half. 2. Either staple the two ends of the litmus paper together, or attach a paper clip to hold the paper together.

9

3. Cut off the bottom or side of the litmus paper, making a "floor" so the litmus paper can stand in the petri dish.

10

Color each litmus paper with a different color marker.

11

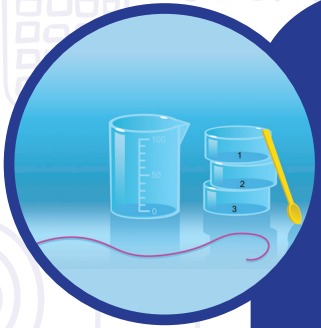
Place one colored litmus paper into each petri dish. Wait one hour, one day, and three days. Did the crystals take on the color the markers? Record Your results.

14 The Kingdom of Crystal Bridge

note!

If you do not have petri dishes available, you can use small plastic cups, too.

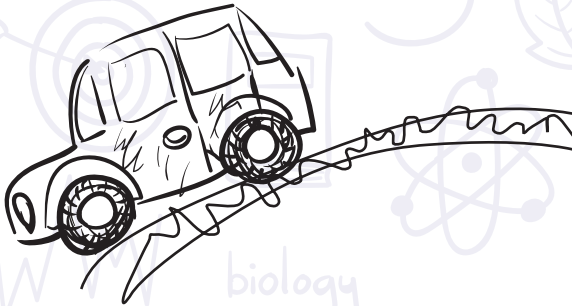
SUPPLIES FROM KIT



- 3 petri dishes
- Yellow measuring spoon
- Purple string
- Beaker

SUPPLIES FROM HOME

- Water
- Sugar (optional)
- Salt

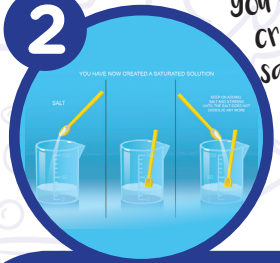


How to Video - learnandclimb.com/pages/video-library

1

Pour 20 ml of water into the beaker.

2



you have now created a saturated solution.

Add a little salt into the beaker with water. Stir until the salt dissolves. Keep on adding salt and stirring until the salt does not dissolve any more.

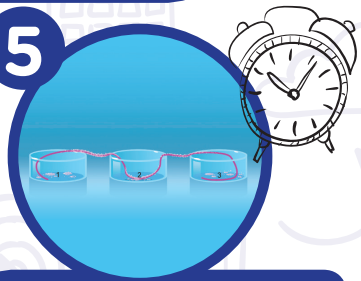
3

Divide the solution in your beaker between petri dish 1 and 3. Leave petri dish 2 empty.

4

Make a bridge with your purple string between the three petri dishes. The purple string should touch or rest in each petri dish.

5



Wait a few days and see what happens.
Try it with sugar too!

Explanation

After waiting for a few days, what happened? Was there a salt bridge? Why did it happen? This time, instead of litmus paper absorbing the water directly, the water just evaporated, or turned from a liquid to a gas. The salt crystals were left behind and made their way across the bridge. The bridge hardened and almost looked like a real bridge! Did yours look like this?

Expand

Try this experiment with other crystalline substances. Start with sugar, which is very similar to salt. Were your results similar? You can even try to make crystal figures or animals! Draw a picture of all of your results!

Volcano Eruptions

FAMOUS VOLCANOES

There are many famous volcanoes scattered throughout the world. There are three main types of volcanoes: Composite (strato) volcanoes, shield volcanoes and dome volcanoes. About 75 percent of the world's volcanoes lie along a special "line" in the Pacific Ocean called the Ring of Fire. Indonesia lies along this line, and it is the most volcanically active country in the entire world. Some famous volcanoes are: Mount Vesuvius, Mount St. Helens, Krakatoa, and Mount Fuji. The largest volcano in the solar system is Olympus Mons. This shield volcano is on not on Earth, but rather on Mars!

Can you name any other famous volcanoes?

STUDYING VOLCANOES

It is important for scientists who study volcanoes, known as volcanologists, to actively study volcanoes. This way, they know when volcanoes are about to erupt and are able to warn people to evacuate or clear the area. They **measure things like temperature of lava, amount of smoke released, rumblings in the ground, and many other factors. They wear heavy suits made from special materials to protect themselves!**

A FORCE OF NATURE

A volcano is a true force of nature out of which gas, lava, rock, dust, and ash erupt. Volcanoes are responsible for some of the most powerful and devastating events in human history. Every day, you walk on the ground. That is the layer of Earth known as the crust. It is made up of huge slabs of rock called plates. These plates are in constant motion across the Earth. They move very slowly, though, about 1 to 4 centimeters per year. The plates move because the mantle, which is the layer of Earth under the crust, is like a giant ocean of magma. Magma is lava before it reaches the surface. Since the magma in the mantle is always moving around, the plates will move on top. Plates may sometimes move under or over one another. Since magma is less dense than solid rock, it is pushed up to the surface. When enough magma builds up and the magma chamber under a volcano gets too full, the volcano will erupt! Under the mantle is the layer of Earth called the core. It is extremely hot, with temperatures as high as 10,000,000° Celsius! It heats the mantle above it and started the process moving. The entire process is part of a theory called plate tectonics.

ERUPTION CONTENTS

Most volcanoes erupt lava. Lava is molten —or melted — rock, so hot that instead of acting like solid rock, it flows like liquid! Volcanoes also eject debris like small rocks and ash, which is made up of volcanic glass, other rocks, and minerals. They can even release gas or smoke like a fire. There are even volcanoes on other planets and moons in our solar system that erupt water and ice!

Why do you think that happens?

15 Load to Explode

SUPPLIES FROM KIT

Volcano base
baking soda
citric acid
Yellow measuring spoon
Beaker

SUPPLIES FROM HOME

Water
Plate

How to Video - learnandclimb.com/pages/video-library

1

Place your Volcano base on a plate.

2

Using your yellow measuring spoon, add 2 large spoonfuls of baking soda to the “crater hole” found in the top of your volcano.

3

Add 1 large spoonful of citric acid to the baking soda in the crater hole and mix well.

4

Fill the beaker with 15ml of water.

5

Pour the water into the crater hole with the citric acid and baking soda.

6

Watch your eruption!

Now let’s try some different ingredients for different eruptions!

16 More Eruptions

SUPPLIES FROM HOME

Water
Dish soap
Plate

SUPPLIES FROM KIT

Volcano base
baking soda
citric acid
Yellow measuring spoon
Beaker

Explanation

You just simulated volcanic layering. Some volcanoes do not erupt in one massive explosion. Instead, they have a series of constant, smaller eruptions. When the magma from these eruptions cools, it hardens into a special type of rock known as igneous rock. Igneous rocks are rocks that are formed from recent volcanic eruptions. You can even sometimes see it in their rocky pores! The layers build up over time and make a special type of volcano called a stratovolcano. Stratovolcanoes are built from layers of lava flow, ash, and igneous rock. An example of a famous stratovolcano is Mt. Etna.

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1

Place your Volcano base on a plate.

2

Using you yellow measuring spoon, add 2 large spoonfuls of baking soda to the “crater hole” found in the top of your volcano.

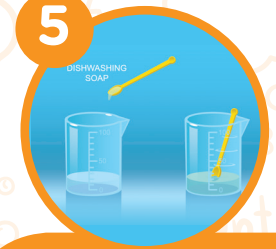
3

Add 1 large spoonfuls of citric acid to the baking soda in the crater hole and mix well

4

Fill the beaker with 15ml of water.

5



Add 1 large spoonful of dishsoap to the beaker and mix until dissolved.

6

Pour the mixture from the beaker into the crater hole with the citric acid and baking soda.

7

Watch your eruption!

What was different this time?

17 Colorful Flow

SUPPLIES FROM KIT

Yellow measuring spoon
Baking soda
Citric acid
Coloring Agent
Beaker

SUPPLIES FROM HOME

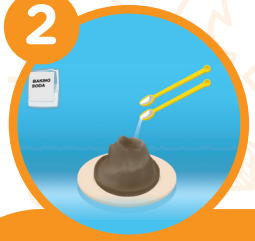
Water
Dish soap
Plate

How to Video - learnandclimb.com/pages/video-library

1

Place your Volcano base on a plate.

2



Using your yellow measuring spoon, add 2 large spoonfuls of baking soda to the “crater hole” found in the top of your volcano.

3

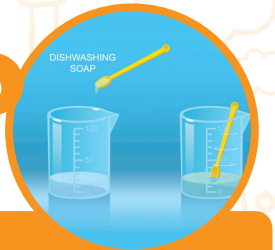
Add 1 large spoonful of citric acid to the baking soda in the crater hole and mix well

4

Pour 15ml water into the beaker

Repeat with more colors.

5



Add 1 large spoonful of dishsoap to the beaker and mix until dissolved.

6

Add a drop or two of coloring agent into the beaker and mix.

7

Pour the mixture from the beaker into the crater hole with the citric acid and baking soda.

8

Watch your colorful eruption!

Do you like the color?

18 Glow with the Flow

SUPPLIES FROM HOME

Water

Dish soap

Plate

SUPPLIES FROM KIT

Volcano Base

Yellow measuring spoon

baking soda

citric acid

Glow in the Dark Powder

Beaker

How to Video - learnandclimb.com/pages/video-library

1

Place your Volcano base on a plate

2

Using your yellow measuring spoon, add 2 large spoonfuls of baking soda to the “crater hole” found in the top of your volcano

3

Add 1 large spoonful of citric acid to the baking soda in the crater hole

4

Add 4-5 squeezes of Glow in the Dark Powder to crater hole

5

Fill the beaker with 15m of water

6

Add 1 large spoonful of dishsoap to the beaker and mix until dissolved.

7

Pour the mixture from the beaker into the crater hole with the citric acid, baking soda and Glow

8

Turn off the lights & Watch your eruption!

19 The Bubbly Eruption

SUPPLIES FROM KIT

- Volcano Base
- Yellow measuring spoon
- Baking soda
- Citric acid
- Purple Sweet Potato Powder

SUPPLIES FROM HOME

- Water
- Dish soap

How to Video - learnandclimb.com/pages/video-library

1

Place your Volcano base on a plate

2

Using your yellow measuring spoon, add 2 large spoonfuls of baking soda to the "crater hole" found in the top of your

3

Add 1 large spoonful of citric acid to the baking soda in the crater hole

4

Add 1 large spoonful of purple sweet potato powder to the crater hole and mix.

5

Fill the beaker with 15ml of water

6

Add 1 large spoonful of dishsoap to the beaker and mix until dissolved.

7

Pour the mixture from the beaker into the crater hole with the citric acid, baking soda and sweet potato powder

8

Watch your eruption!

20 A Truly Explosive Eruption

notes

You might need adult or another person's assistance for this experiment. Be sure to clean up after you are done so the area doesn't become sticky.

SUPPLIES FROM HOME

Mentos

2 liter bottle of carbonated diet cola

2 liter bottle of carbonated cola

How to Video - learnandclimb.com/pages/video-library

1

Put your 2 liter bottle of diet carbonated cola on a surface outdoors.

2

Open the top of your package of Mentos, keeping all the Mentos in the package.

3

Open the cap of the Diet Cola.

4

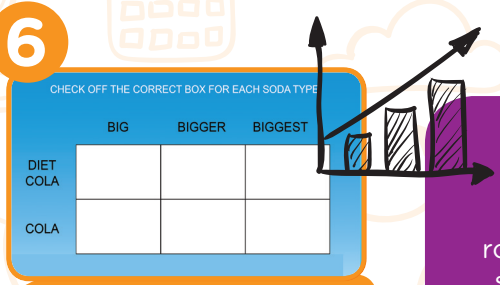
See what happens!

Turn the Mentos package over directly on top of the bottle of soda, but keep the Mentos from falling out of the package by keeping your thumb on the Mentos. When the Mentos are directly on top of the soda, remove your thumb and push the Mentos into the bottle of diet cola.

5

Now try doing the same thing with regular Cola!

6



Use the graph to record which soda type caused what type of eruption.

Explanation

The Mentos and Cola experiment works so well mostly because of the roughness and density of Mentos (it can sink quickly to the bottom, unlike other candies). This way, the cola permeates almost every pore of the Mentos in what is called an activated-site reaction.

21 Different Reactions

SUPPLIES FROM KIT

Beaker

SUPPLIES FROM HOME

Salt

Carbonated cola

Big container

How to Video - learnandclimb.com/pages/video-library

1

Fill the beaker halfway with cola.

2

Get a handful of salt.

3

Pour the salt into the beaker with Cola.

4

See what happens!

Notes

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