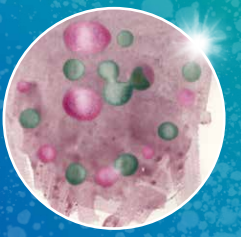
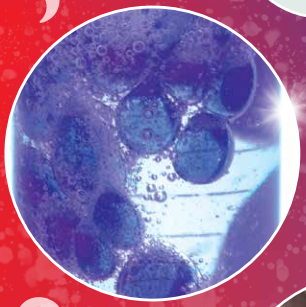
#6250000 • Ages 6 to 96

MAGICAL MIXING

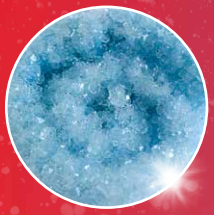
hands on science

Experiments & Observations






FIRST, SOME IMPORTANT INFO:

Read through these instructions before beginning any experiments.

You have enough components to complete the experiments as listed. ***Measure carefully*** so you don't run out of the materials you need. Too much or too little of an ingredient may change the results or cause the experiments to fail. When using your scoops to measure, carefully level them as shown.

The experiments start off easy and then become a little more challenging. Some experiments are quick while other take a little more time.
In some cases, you will need to gather basic items from around your home. These are listed at the beginning of each experiment.

Refer to the helpful YouTube videos while experimenting:
www.youtube/user/JustAddImagination

NOTE TO PARENTS:

Younger children should be supervised while conducting these experiments.

Cover your workspace and wear old clothing.
The components included in this set may stain skin, clothing and other surfaces. If any component spills, clean up immediately.

As you work, use the **mixing container** to catch any spills.
Clean equipment with soap and water and dry thoroughly between experiments.

Dispose of crystals and slime in the trash can.
Do not put down the drain.

Do not seal **test tubes** unless directed by instructions.

⚠ WARNING:

This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

SODIUM TETRABORATE

Not to be used for children under 3 years of age.

CITRIC ACID

WARNING: May cause serious eye irritation.

ADDITIONAL INFORMATION FOR GLUE, OIL, COLORANTS & COMPOUNDS

USE ONLY AS INSTRUCTED.
Do not swallow or inhale.
Do not get in eyes, on skin or clothing.
Keep out of reach of small children.

FIRST AID TREATMENT
If swallowed rinse mouth with water. Consult a physician.
If inhaled, move person into fresh air. Consult a physician.
In case of eye or skin contact, rinse well with water.
If irritation occurs, seek medical advice.

INCLUDED IN THIS KIT:

Other items you will need to gather:

paper towels
microwave
string
paper
water

WHAT DO "STEAM" & "HANDS ON SCIENCE" MEAN?

Our Magical Mixing kit is an introduction to ***STEAM,*** designed to spark an interest in these important skills: ***S***cience, ***T***echnology, ***E***ngineering, ***A***rt and ***M***athematics

While completing these experiments you will learn a little bit of science, measuring, predicting, observing, recording data and creative problem solving.

You will soon discover that the fun of Magical Mixing is hands on science! We encourage you and your child to see, touch and hear each of these sensory experiments.

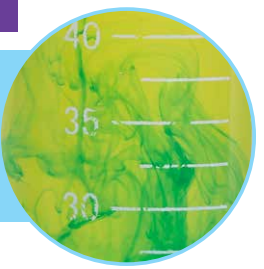
Take note that each experiment has an "observations" box. Instruct your child to write or draw their observations. What interested them? Was anything surprising? Looking back on this "data" may spark more curiosity, imagination and investigation.

JUST ADD IMAGINATION

Use the stickers to add a little touch of magic to your containers! Also, throughout these experiments, we suggest adding glitter, confetti or wiggly eyes. Feel free to add whichever you like or none at all. It's up to you.

COLOR MIXING

Quick & Easy



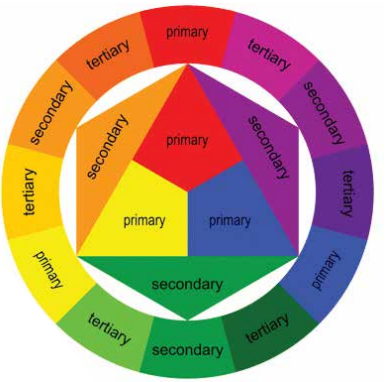
Equipment: 2 Test Tubes, Mixing Wand, Mixing Container
Compounds: 3 Bottles of Colorant, Water
Extra Fun: Glitter

Instructions:
Fill each **test tube** with **water** to the 40ml line.
Put 2 drops of **yellow colorant** in one **test tube**, and 1 drop of **blue colorant** in the other and stir with the **mixing wand**.

Extra Fun! *Add a few sprinkles of Glitter!*

Pour 20ml from each **test tube** into the **mixing container**.
Observe. Now add 2 drops of **red colorant** to the remaining **water** in each **test tube**. Observe.

What's happening:
Artists use color wheels like this one to learn how to mix colors.
Primary colors cannot be created by mixing other colors.
Secondary colors, are created by mixing primary colors together.
Tertiary colors are created by mixing primary and secondary colors together.
By mixing colors, you can create a rainbow of new colors.



Keep thinking...
What might happen if you mixed all three colors together?

Observations:

COLOR FALL

Quick & Easy

Equipment: 2 Test Tubes
Compounds: Oil, Colorant, Water

Instructions

Pour 10ml of oil into one clean **test tube.**
Add 5 drops of **colorant** to the **oil**. You can choose between 1, 2 or 3 different colors – but no more than 5 drops total.
Do ***NOT*** mix!
Fill the other **test tube** with 30ml of **water**.
Slowly pour **colorant/oil** mixture onto the **water**.

What's happening:

As you can see, the oil and water do not mix. The oil floats on top because it is less dense. This means it weighs less than the water. The colorant that was added to the oil has a similar density to water. When the colorant and oil are poured onto the water, the colorant falls through the oil and mixes with the water.

Keep thinking...

Why didn't the drops of colorant mix with the oil?
Describe what happened when you poured the colorant/oil mixture onto the water?

Observations:

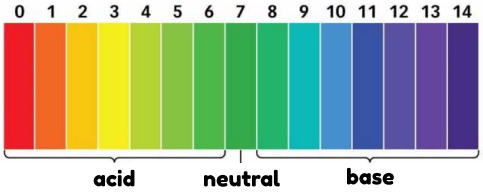
COLOR SHIFT

Quick & Easy

For this experiment you will learn about acids, bases and the pH scale.

What is a pH scale?

Scientists use a pH scale to measure how acidic or basic a liquid is. A pH from 0 to 7 is an ***acid***, with 0 being the strongest; a pH from 7 to 14 is a ***base***, with 14 being the strongest base.



Equipment: 2 Test Tubes, Large Scoop, Mixing Wand
Compounds: Citric Acid, Baking Soda, Red Cabbage Powder, Water

Instructions:

Fill both **test tubes** to the 40ml line with **water**. Add a **large scoop** of **red cabbage powder** to each **test tube**. Mix to dissolve.

Add a **large scoop** of **citric acid** to one **test tube** and mix. Observe.

Add a **large scoop** of **baking soda** to the other **test tube** and mix. Observe.

What's happening:

The red cabbage powder is an ***indicator;*** meaning this substance changes color when it comes in contact with different levels of acids or bases, as measured on the pH scale.

Water has a pH of 7, right in the middle; meaning that it's neutral and will not affect the red cabbage powder and won't make it change color.
Baking Soda, (Sodium Bicarbonate) has a pH of more than 7; meaning that it's a base and causes the red cabbage powder to change into a base color.
Citric Acid has a pH of less than 7; meaning that it's an acid and causes the red cabbage powder to change into an acid color.

Keep thinking...

What color was the water before you put in citric acid? After? What happens if you mix the 2 solutions together? Does it change color?

Observations:

FANTASTIC FIZZ

Quick & Easy

Equipment: 2 Test Tubes, Mixing Container, Large Scoop
Compounds: Citric Acid, Baking Soda, Water
Extra Fun: Colorant, Glitter

Instructions:
Fill both **test tubes** to the 40ml line with **water.**
Add a **large scoop** of **citric acid** to the first **test tube** and a **large scoop** of **baking soda** to the second.

Extra Fun! *Add a different drop of colorant to each test tube.*

Add lids to the **test tubes** and shake them up to dissolve.

Mix the magic: Pour both **test tubes** into the **mixing container**. Observe what happens.

What's happening:
Baking Soda (also known as Sodium Bicarbonate) has a pH level higher than 7, making it a base. When mixed with the Citric Acid (a pH lower than 7) it reacts, which creates Carbon Dioxide gas bubbles. When the bubbles escape from the water, it becomes fizzy.

Keep thinking...
Explain what happened to the colors using your color wheel. The Color Shift experiment also used the pH scale. How were the experiments different?

COLOR SHIFT Observations:	FANTASTIC FIZZ Observations:

MAGIC BUBBLES

Quick & Easy

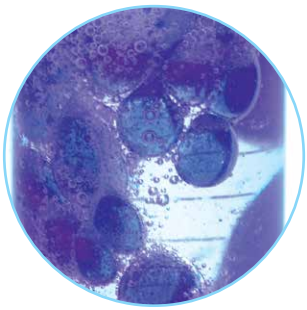
Equipment: 1 Test Tube, Large Scoop
Compounds: Oil, Water, Colorant, Citric Acid, Baking Soda
Extra Fun: Confetti

Instructions:
Place the **test tube** inside the **mixing container** to collect spills. Add 25ml of **water**, 2 drops of **colorant** and a **large scoop** of **baking soda**, then mix.

Extra Fun! *Add Confetti*

Slowly add 20ml of **oil** (it should reach the 45ml line)
Add a **large scoop** of **citric acid** to the **oil/water** mixture and observe!

What's happening?
The oil is only attracted to oil, and water is only attracted to water, so they don't mix!
When the citric acid and baking soda mixture is added, a reaction occurs with the water creating CO_2 gas (Carbon Dioxide); just like in the Fantastic Fizz experiment.
The escaping gas creates bubbles.
Since the oil and water won't mix, it creates an interesting effect just like a lava lamp!



Keep thinking...
Describe how this was different than Fantastic Fizz.
Did you hear any sounds when the mixture was created?

Observations:

SOLID OR LIQUID

Quick & Easy | INFINITE PLAY

Equipment: Mixing Container, 1 Test Tube, Mixing Wand
Compounds: Corn Starch, Water
Extra Fun: Confetti, Colorant

Instructions:
Fill your **test tube** to the 30ml line with **water** and pour into your **mixing container.**

Extra Fun! *Add 3 drops of colorant and a sprinkle of confetti*

Add in ***ALL*** the **corn starch** and mix.

For extra play, use the **large scoop** or your hands to test this interesting substance.

What's happening:
Scientists call this mixture a "Non-Newtonian Fluid," which means it's not a liquid or solid, but something in between. When you mix quickly, the particles are pressed together forming a solid; when you mix slowly, the particles flow like a liquid.

Note: To clean up any messes, wait until the mixture is dry then brush or wash it out.

Observations:

SENSORY PUTTY

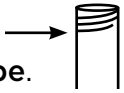
Moderate | INFINITE PLAY

Equipment: 1 Test Tube, Mixing Container, Pipette, Mixing Wand, Small Scoop
Compounds: Sodium Tetraborate, Glue, Water
Extra Fun: Colorant, Wiggly Eyes

Instructions:
Remove cap & stopper from the **glue**, and empty the whole bottle into the **mixing container**.

Extra Fun! *Add 3 drops of colorant & wiggly eyes*

Fill a **test tube** to just below the threads with **water**.
Add 1 **small scoop** of **sodium tetraborate** to the **test tube**.
Hold **test tube** firmly while mixing until dissolved.



Fill a **pipette** with the **sodium tetraborate/water** mixture, empty into the **mixing container** and mix. Repeat. ***Note: you will not use all the water.*** Keep adding **pipettes** of **the mixture** and mixing until you achieve a sticky putty texture. (Usually by the time your **mixture** level drops to around the 35ml mark)

What's happening:
You've created another Non-Newtonian fluid! Sometimes your putty acts like a solid and sometimes it acts like a liquid. When the glue is mixed with the diluted sodium tetraborate, ***Polymers*** are formed. Like molecules, polymers are the tiny parts of a substance. Polymers like to stick together. Similar to a net, polymers hold other substances together. When combined, they form a unique texture.

NOTE TO PARENTS: Putty will stick to fabrics, fibers and other surfaces. Place putty in the mixing container when not in use.
Save this putty for the next experiment.
To dispose of your putty, place it in the garbage; **Do not put down the drain.** Clean messes immediately.

Keep thinking...
Isn't it interesting that adding more water made it thicker? Describe how it felt in your hands. ***Store in the mixing container for the Bouncing Slime experiment.***

Observations:

BOUNCING SLIME

Moderate | INFINITE PLAY

Equipment: 1 Test Tube, Mixing Container, Pipette, Mixing Wand, Small Scoop
Compounds: Sensory Putty (from previous experiment), Sodium Tetraborate, Water

Instructions:
Fill a **test tube** with 25ml of **water**. Add 2 **small scoops** of **sodium tetraborate** to the **test tube** and mix until dissolved.

Fill a **pipette** with the **sodium tetraborate** mixture, squeeze into the **container** with the **sensory putty** and mix with your hands. Repeat until you achieve a firm, springy texture.

What's happening:
By adding more sodium tetraborate to the putty, the polymers form a tighter net. This change in solution makes the polymers behave differently.

NOTE TO PARENTS: Slime will stick to fabrics and other surfaces. Bounce your slime only on clean contained areas. Store your slime safely inside the mixing container when not in use. To discard, place it in the trash; **Do not put down the drain**.

Keep thinking...
What makes this slime experiment different from the putty experiment? Compare your Bouncing Slime polymer to the Sensory Putty polymer.

SENSORY PUTTY Observations:	BOUNCING SLIME Observations:

SQUISHY CRYSTALS

Easy + INFINITE PLAY

Equipment: Mixing Container, 1 Test Tube, Large Scoop
Compounds: Cross-Linked Polyacrylamide Crystals, Water
Extra Fun: Colorant, Glitter Or Confetti

Instructions:
Add a **large scoop** of **crystals** and 80ml of **water** to the **mixing container.**

Extra Fun! *Add 3 drops of colorant and glitter or confetti.*

Wait a few hours and observe.

What's happening:
The dry crystals are tightly packed polymers. (remember our slime polymers?) The dry polymer net acts like a sponge, soaking up all the water. Adding water to the crystals gives it a squishy texture.

Keep thinking...
Describe what the crystals felt like.
When you mixed in water did they make a sound?
Try placing them on a plate and let them dry out. What do you think will happen when you add more water?

Observations:

SPARKLING CRYSTALS

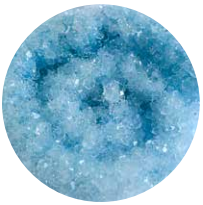
Moderate +

Equipment: Measuring Cup, Microwave, Chenille Stem, Mixing Wand, Large Scoop, Paper Towel, String
Compounds: Sodium Tetraborate

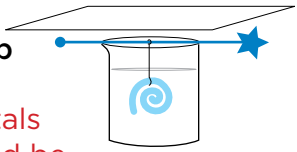
Warning:
This project requires the use of a microwave and hot water. Adult supervision required

Instructions:

Take your **chenille stem** and bend it into a spiral shape. Make sure it fits inside the **measuring cup** without touching the sides. Tie one end of the **string** around the end of your **chenille stem**. Tie the other end around the **mixing wand** and set aside.



Put 40ml of **water** in the **measuring cup**, and heat in the **microwave** for around 30 seconds, until hot (microwave times may vary). Add 5 **large scoops** of **sodium tetraborate** to the hot **water**. Mix until it is ***mostly*** dissolved.
Lower the **chenille stem** into the **measuring cup** as shown. Cover with a few **paper towels** and leave overnight. **IMPORTANT!** In order for crystals to grow, the solution must cool down slowly and be left undisturbed – do not bump or shake the **measuring cup**.



What's happening:

As the mixture cools, the sodium tetraborate particles slowly start to organize. These particles attach themselves to the hairs of the chenille stem forming crystals.

Keep thinking...

Were your crystals all the same shape and size?
Did you know you can make crystals using sugar and salt?

Observations:

MAGIC PAPER

Easy +

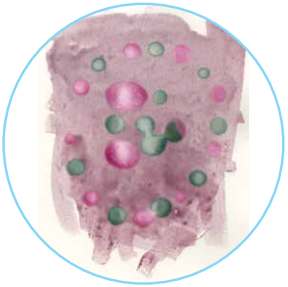
Equipment: 2 Pipettes, 2 Test Tubes, Large Scoop, Small Scoop, Mixing Wand, Paper
Compounds: Baking Soda, Citric Acid, Red Cabbage Powder, Water

Instructions

Take a **large scoop** of **red cabbage powder** and put it in the middle of the **paper.** Fill a **pipette** with **water** to the 2.5ml mark. Drop it onto the **paper** to dissolve the **powder**.
Spread the mixture across the **paper**, using the **pipette**, and allow to dry. ***Pro-Tip: Use a hairdryer to speed up drying time!***
Note that when red cabbage powder gets wet there may be a distinct odor, which is normal.

Fill each **test tube** with 15ml of **water.** In one **test tube** add a **small scoop** of **baking soda**, and in the other add a **small scoop** of **citric acid.** Mix each **test tube** with the **mixing wand** until dissolved. With a **pipette**, carefully add droplets of each mixture onto the **paper**. Wait a few moments, and observe.

When dry, save and display.



What's happening:

Just like the Color Shift experiment, the red cabbage powder is an indicator and changes color to show pH level.

Keep thinking...

What happens when you put a drop of citric acid mixture on top of the baking soda mixture? What color do you think the paper will turn? Do you remember what color represents an acid? A base?

Observations:

My Favorite Experiments & Why:

More Observations:

We hope your child enjoyed these introductory experiments! Depending on the age and ability of your child, they may be ready for more information and greater scientific challenges. Many science museums, schools and organizations host STEAM activities for children. You can also find age-appropriate books on STEAM at your local library or book store.

www.CreativityforKids.com

YouTube

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