



8+

ULTIMATE SCIENCE KIT

STARTER SERIES

BONUS MANUAL



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 supervision. Not suitable for children under 8 years.

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Experiment #1

SOAP ROCKET

5
MINS

EQUIPMENT

- Cup
- Tray
- Spatula
- Measuring Cylinder

MATERIALS FROM KIT

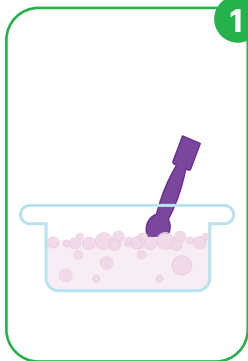
- Blue Color

MATERIALS FROM HOME

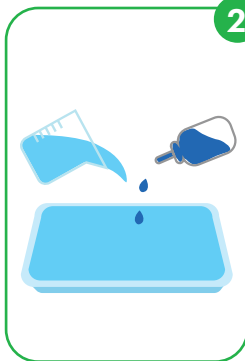
- Water
- Paper
- Liquid Soap/Handwash

INSTRUCTIONS

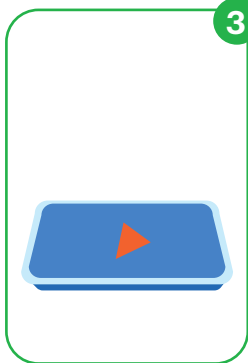
- 1** Fill the cup with 25 mL of water and add a few drops of liquid soap in it. Mix well.



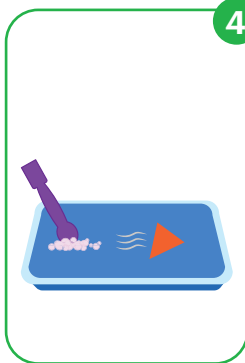
- 2** Fill the tray with water. Then mix 3 drops of blue color.



- 3** Ask an adult to cut out a triangle shaped paper. Place it on top of the water. Let us assume the triangle to be a boat.



- 4** Dip the spatula into the soap solution and insert it right behind the triangle on the water.



DID YOU SEE?

Did you see the paper triangle move forward when you dipped the spatula behind it?

SCIENCE BEHIND THIS

Surface tension is the force that holds water together. When soap is added, it reduces the surface tension behind the boat. Since surface tension is higher in front of the boat, the boat is propelled forward.

Experiment #2

JUMPING RAISINS

5
MINS

EQUIPMENT

- Spatula
- Stirring Stick
- Measuring Cylinder

MATERIALS FROM KIT

- Baking Soda
- Citric Acid

MATERIALS FROM HOME

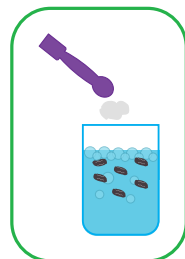
- Water
- Raisins
- Glass Tumbler

INSTRUCTIONS

- 1 Fill 3/4th of glass tumbler with water and add 2 scoops of baking soda and mix well.
- 2
- 3 Add few raisins into the glass tumbler. Add 2 scoops of citric acid and observe.

DID YOU SEE?

After some time, did the raisins go up and down in the water?



SCIENCE BEHIND THIS

The air bubbles made by the chemical reaction stick to the raisins and make its density lighter than water. But when the bubbles pop at the surface, the raisins drop down again.

Experiment #3

MAGIC INK PAINTING

35
MINS

EQUIPMENT

- 2 Cups
- Spatula
- Measuring Cylinder

MATERIALS FROM KIT

- Baking Soda

MATERIALS FROM HOME

- Water
- Turmeric Powder
- Paintbrush
- Cotton Swab
- Blank Sheet Of Paper

INSTRUCTIONS

- 1 Take 2 cups. Add 1 scoop of baking soda to the first cup and 2 scoops of turmeric to the second cup.
- 2 Mix 15 mL of water to both the cups until the mixtures form a thin paste.
- 3 Dip the cotton swab into the baking soda & draw a smiley on the paper. Leave it for 30 minutes.
- 4 Once dry, apply turmeric solution all over the paper using the paintbrush.

DID YOU SEE?

Did the smiley appear when you applied the turmeric solution?



SCIENCE BEHIND THIS

Turmeric contains a compound called curcumin. When curcumin reacts with baking soda, a chemical reaction happens, changing the color to a reddish-brown or orange hue.

Experiment #4

ERODING WAVES

5
MINS

EQUIPMENT

- Cup
- Tray
- Spatula
- Measuring Cylinder

MATERIALS FROM KIT

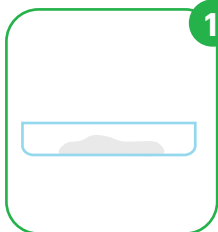
- Colors
- Crystal Powder

MATERIALS FROM HOME

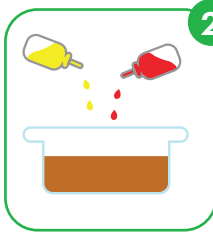
- Salt
- Water

INSTRUCTIONS

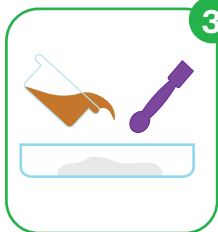
- 1** Add 2 scoops of crystal powder in the tray.



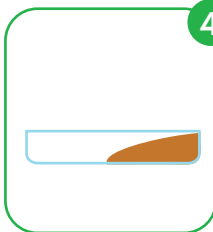
- 2** Pour 50 ml of water in a cup. Add 2 drops of red, 3 drops of yellow, and 1 drop of blue color to form brown solution.



- 3** Pour the solution into the tray and let the crystals develop.



- 4** Once the crystals are ready, stack them on one side of the tray using the spatula.



- 5** Fill a cup with water and add 1 scoop of salt in it. Mix them well to create a salt solution. Then pour this solution into the empty side of the tray.



- 6** Gently tilt the tray from side to side and observe. Make sure that the water doesn't fall out of the tray.



DID YOU SEE?

Did you see the brown crystals transform into brown water when they come in contact with the salt water?

SCIENCE BEHIND THIS

This experiment simulates how increased water levels can erode a beach. Water levels can increase due to weather phenomena like cyclones, tsunamis, etc. When water levels rise, the waves that crash on the beach take more and more sand offshore. This reduces the size of the overall beach.

Experiment #5

NON-FREEZING WATER

24
HRS

EQUIPMENT

- 2 Cups
- Spatula
- Stirring Stick

MATERIALS FROM KIT

- Red Color

MATERIALS FROM HOME

- Salt
- Water

INSTRUCTIONS

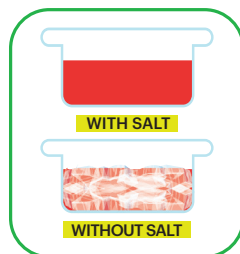
- 1 Take 2 cups and fill them with water.
- 2 Add 2-3 drops of red color in each of them. Then, mix salt in one cup until more salt cannot be dissolved.
- 3 Keep both cups in the deep freezer overnight.
- 4 Bring out the cups and observe.

DID YOU SEE?

When you brought the cups out of the freezer, which of the cups was frozen?

SCIENCE BEHIND THIS

Salt reduces the freezing point of water. This is the reason water with salt takes lower temperatures to freeze. Ocean water is salty and therefore needs a lower temperature to freeze.



Experiment #6

DISAPPEARING COLOR

5
MINS

EQUIPMENT

- Measuring Cylinder

MATERIALS FROM KIT

MATERIALS FROM HOME

- Lemon
- Cotton Swab
- Highlighter Pen
- Page with Text Printed on It

INSTRUCTIONS

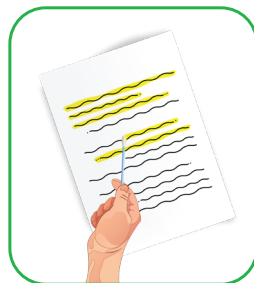
- 1 Take a page with printed text.
- 2 Highlight a portion using the highlighter pen.
- 3 Ask an adult to cut the lemon into half and squeeze it into the measuring cylinder.
- 4 Apply the lemon-dipped cotton swab over the highlighted part.

DID YOU SEE?

Did the highlighted color start vanishing when lemon was applied over it?

SCIENCE BEHIND THIS

The acidic juice from the lemon reacts with the dye in the highlighter ink. This reaction breaks down the ink, making it disappear.



Experiment #7

SALTWATER DESALINATION

3
HRS

EQUIPMENT

- Spatula
- Stirring Stick

MATERIALS FROM KIT

- Yellow Color

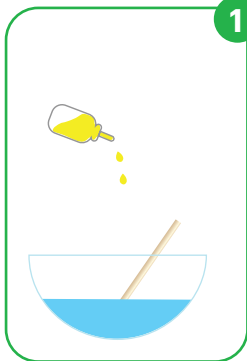
MATERIALS FROM HOME

- Salt
- Large Bowl
- Rubber Band
- Small Container
- Coins
- Water
- Plastic Wrap

INSTRUCTIONS

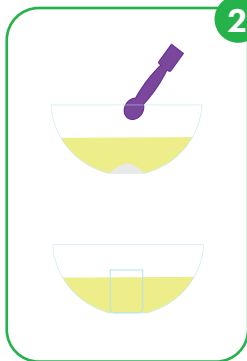
1

Fill half of a large bowl with water. Add 2-3 drops of yellow color and mix well.



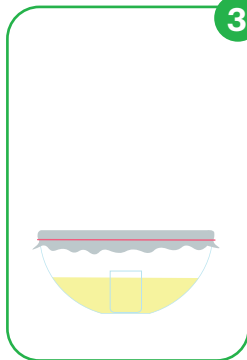
2

Mix salt in the bowl until no more can be dissolved. Then place a small container in the middle of the bowl. Ensure the mouth of the container is above the water level in the bowl.



3

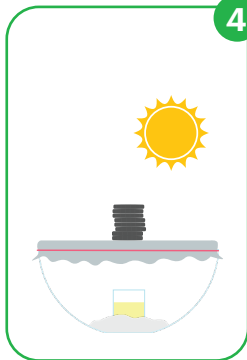
Cover the bowl with plastic wrap. Carefully tie a rubber band around the bowl to hold the plastic wrap.



4

Place a stack of coins on the plastic wrap and put the bowl under the sun.

Come back to the bowl after two hours.



DID YOU SEE?

Taste the water from the small container. Is it salty?

SCIENCE BEHIND THIS

This experiment shows the process of evaporation and condensation. Have you ever noticed that ocean water is salty, but rainwater isn't? This is because ocean water evaporates, leaving the salt behind and forming clouds. Hence, rainwater is free of salt.

Experiment #8 ROCK WEATHERING

5
MINS

EQUIPMENT

- Cup

MATERIALS FROM KIT

MATERIALS FROM HOME

- Salt
- Small Container
- Colored Chalk Pieces

INSTRUCTIONS

- 1 Take a small container with a lid and fill half of it with salt.
- 2 Add some pieces of colored chalk into it.
- 3 Close the lid and give the jar a hard shake for 30 seconds.
- 4 Pour the contents into the cup and observe.

DID YOU SEE?

Did you notice that parts of the chalk have broken off and mixed with the salt?

SCIENCE BEHIND THIS

When the container is shaken, the salt comes in contact with the chalk, breaking it down. Similarly, rocks also break down over time when they come in contact with natural elements such as air and water. This process is called weathering.



Experiment #9 EARTHQUAKE-PROOF BUILDING

5
MINS

EQUIPMENT

MATERIALS FROM KIT

MATERIALS FROM HOME

- Sugar Cubes
- 2 Wooden Blocks
- A Piece Of 10" x 10" Cardboard

INSTRUCTIONS

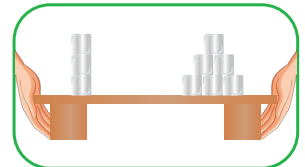
- 1 Place the cardboard on top of the two wooden blocks.
- 2 Take 3 sugar cubes and make a tower by stacking them vertically on one end of the cardboard.
- 3 Create another tower on the cardboard with 9 cubes at the bottom, 4 cubes in the middle and 1 cube on the top to resemble a pyramid.

DID YOU SEE?

When the cardboard was shaken, did you see the tower fall before the pyramid?

SCIENCE BEHIND THIS

The wider base of the pyramid provides greater resistance to the shaking base compared to the narrow tower. This shows how buildings with wider bases can withstand earthquakes better.



Experiment #10

EARTHQUAKE ZONES

10
MINS

EQUIPMENT

MATERIALS FROM KIT

MATERIALS FROM HOME

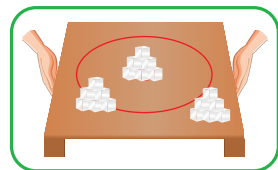
- Sugar Cubes- Pencil/Pen
- 4 Wooden Blocks
- A Piece Of 10" x 10" Cardboard

INSTRUCTIONS

- 1 Mark the middle point of the cardboard with a pen and draw a large circle around it. Then place the cardboard on top of the 4 wooden blocks.
- 2 Make 3 small sugar cube buildings with 3 cubes at the bottom, 2 cubes in the middle and 1 cube on the top.
- 3 Place the first building on the mid-point, the second on the ring, and the third at the edge of the cardboard. Then slowly shake the board.

DID YOU SEE?

Did you see how the buildings were differently affected by the tapping of the cardboard?



SCIENCE BEHIND THIS

The sugar cube buildings fall apart one after another as the tapping continues from the bottom. However, the building at the centre falls first, while the other buildings follow subsequently because the impact of the tapping is the strongest at the centre similar to how an earthquake's impact is the greatest near the epicentre.

Experiment #11

OIL BLOCKAGE

5
MINS

EQUIPMENT

MATERIALS FROM KIT

MATERIALS FROM HOME

- Water
- Milk Strainer
- Glass Tumbler
- Cooking Oil/Baby Oil

INSTRUCTIONS

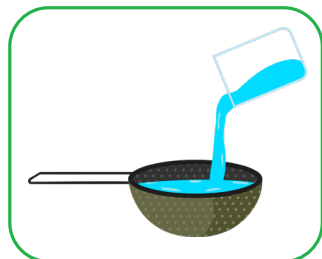
- 1 Take a glass tumbler and fill it with water.
- 2 Take a milk strainer and apply oil on the inner surface of the strainer.
- 3 Now, pour the water into the strainer.

DID YOU SEE?

Did the water pass through the strainer?

SCIENCE BEHIND THIS

When we rub oil on the inside of a milk strainer, it creates a thin layer that repels water. This prevents the water from passing through the tiny holes of the strainer.



Experiment #12

VORTEX TUBE

5
MINS

EQUIPMENT

MATERIALS FROM KIT
- Colors

MATERIALS FROM HOME
- 2 Bottles - Adhesive Tape
- Water

INSTRUCTIONS

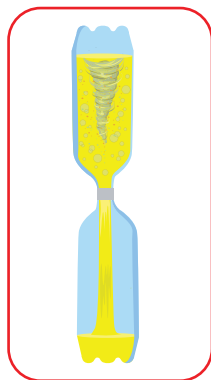
- 1 Fill one bottle with water. Add 3 drops of any color to it.
- 2 Place the empty bottle upside down over the first bottle.
- 3 Align both the openings of the bottles and secure the openings with tape to create the tube.
- 4 Flip the tube and shake it in a circular motion.

DID YOU SEE?

Did you see a spinning whirlpool being formed inside the top bottle as it is being emptied?

SCIENCE BEHIND THIS

This experiment emulates a cyclone. The centripetal force causes the vortex to form inside the bottle at the top as it is being emptied.



Experiment #13

SUBMARINE VOLCANO

10
MINS

EQUIPMENT

MATERIALS FROM KIT
- Red Color

MATERIALS FROM HOME
- Large Mason Jar - Warm Water
- Cold Water
- A Piece of String
- Small Glass Tumbler

INSTRUCTIONS

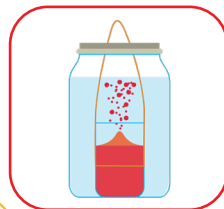
- 1 Fill 3/4th of the large jar with cold water.
- 2 Tie a piece of string around the small glass tumbler to create a top handle.
- 3 Add 4 drops of red color into the tumbler. Then ask an adult to pour the warm water into the glass up to the brim.
- 4 Lift the tumbler with the handle and gently lower it into the jar of cold water.

DID YOU SEE?

Did you see the red solution flow upwards when you lowered the tumbler into the jar?

SCIENCE BEHIND THIS

The warm, red solution in the tumbler, travels upwards instead of mixing with the cold water. This happens because the density of warm water is lower than that of cold water, which prevents the liquids from mixing and also sends the red solution to the top.



Experiment #14

MAKING A SUNDIAL

2
HRS

EQUIPMENT

- Stirring Stick

MATERIALS FROM KIT

MATERIALS FROM HOME

- Pen
- Pushpins
- Paper Plate

INSTRUCTIONS

- 1 On a paper plate write numbers from 1 to 12 as on the clock. Fix the stirring stick in the center of the paper plate.
- 2 Fix this sundial around 2 pm in soil using pushpins. Place it in a way that the shadow is pointing at 2.
- 3 The stirring stick will cast a shadow pointing at 2.
- 4 Keep an eye on the sundial to see the time throughout the day.

DID YOU SEE?

Did the sundial let you know the different times of the day?



SCIENCE BEHIND THIS

The shadow changes as the sun moves across the sky, helping us tell the time by following the shadow's movement on the paper dial.

Experiment #15

SECRET CODE

10
MINS

EQUIPMENT

- Cup

MATERIALS FROM KIT

MATERIALS FROM HOME

- Candle
- Earbud
- Paper Sheet
- Lemon Juice

INSTRUCTIONS

- 1 Take a cup and place it on a flat surface. Then, add some lemon juice in the cup.
- 2 Dip an earbud into the lemon juice and write a word on the sheet of paper. Let the sheet dry completely.
- 3 Ask an adult to light a candle.
- 4 Hold the sheet over the burning candle to warm it for a minute.

DID YOU SEE?

Did you see text appear on the paper once it was heated?



SCIENCE BEHIND THIS

Lemon juice is acidic in nature. The acid remains in the paper even after the lemon juice has dried. The acid undergoes oxidation and turns brown when heat is applied.

Experiment #16

EGGSHELL CHALK

2-4
DAYS

EQUIPMENT

- Cup
- Spatula

MATERIALS FROM KIT

- Colors

MATERIALS FROM HOME

- Warm Water
- Eggshells
- Paper Towel
- All Purpose Flour

INSTRUCTIONS

- 1 Take 6 eggshells and wash them nicely.
- 2 Ask an adult to grind the eggshells to create a fine powder.
- 3 In a cup transfer eggshell powder and add 3 scoops of flour and 2 drops of blue food color to the cup. Mix warm water into it until a paste is formed.
- 4 Cover this mixture with a paper towel after moulding it into a log.
- 5 Let it dry for about 2-4 days before using.

DID YOU SEE?

Were you able to write on a surface with the chalk?



SCIENCE BEHIND THIS

The reaction between the calcium carbonate in the eggshells and water, results in the formation of calcium hydroxide which has properties similar to chalk.

Experiment #17

CHROMATOGRAPHY FLOWER

35
MINS

EQUIPMENT

- Measuring Cylinder

MATERIALS FROM KIT

- Colors

MATERIALS FROM HOME

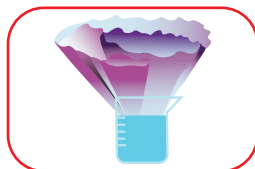
- Water
- Scissors
- Marker Pen
- Paper Napkins

INSTRUCTIONS

- 1 Draw a big circle on a paper napkin and ask an adult to cut it out.
- 2 Make lines around the center of the napkin.
- 3 Fold the circle twice in half to form a cone. Ask an adult to cut the tip.
- 4 In a measuring cylinder, add 5 mL water and place the cone in it. Wait for 30 minutes.

DID YOU SEE?

Did the colors travel and spread, thus making a colorful flower?



SCIENCE BEHIND THIS

The water in the cup moves up the paper due to capillary action. As the water travels, it separates the colors, creating a pattern on the paper.

Experiment #18

FLOATING IN DIFFERENT LIQUIDS

5
MINS

EQUIPMENT

- Measuring Cylinder

MATERIALS FROM KIT

- Colors

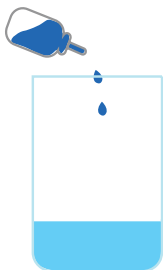
MATERIALS FROM HOME

- Paper
- Honey
- Cooking Oil
- Glass tumbler
- Water
- Grape
- Iron nut

INSTRUCTIONS

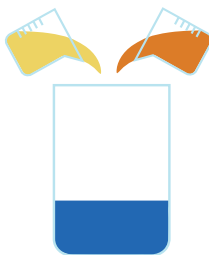
1

Mix 75 mL of water and 5 drops of blue color in a glass tumbler.



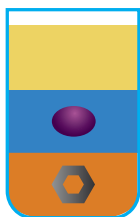
2

Pour 75 mL honey and 75 mL cooking oil into the glass tumbler as well.



3

Drop the iron nut into the glass tumbler, followed by the grape.



4

Lastly add a small piece of paper into the tumbler and observe.



DID YOU SEE?

Did the paper float on the top? Did the grape float in the middle? Did the iron nut sink to the bottom?

SCIENCE BEHIND THIS

Different liquids have different weights for the same volume. This is called density. Honey is more dense than water and so sinks to the bottom of the glass tumbler. Oil is least dense and hence rises to the top. Objects can float or sink in liquids depending on that liquid's density.

Experiment #19

SUGAR CRYSTAL LOLLIPOP

8
DAYS

EQUIPMENT

- Cup
- Spatula

MATERIALS FROM KIT

- Colors

MATERIALS FROM HOME

- Sugar
- Hot Water
- Lollipop Stick
- Heat Proof Bowl

INSTRUCTIONS

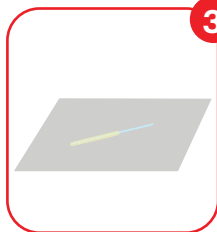
NOTE: This crystal is not to be ingested by anyone.



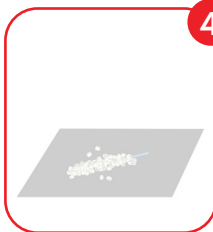
- 1** Ask an adult to add 3 cups of hot water in the bowl. Prepare a saturated solution by mixing sugar with the hot water until more sugar cannot be dissolved.



- 2** Add 6-7 drops of color while preparing the sugar solution. Let the solution cool down for 10 minutes.



- 3** Take the lollipop stick and dip it in the solution. Bring the stick out and let it dry.



- 4** Sprinkle sugar over it as the stick is drying up.



- 5** Once the solution has cooled down, dip the stick back into the bowl.



- 6** Let the stick rest for 8 days and observe.

 This experiment uses hot water. Please perform under adult supervision.

DID YOU SEE?

Did you see the sugar crystals forming around the lollipop stick?

SCIENCE BEHIND THIS

Crystals are a special kind of solid where the molecules fit together in a repeating pattern. This pattern results in crystals having unique shapes.

Experiment #20

CITRIC ACID CRYSTALS

4
DAYS

EQUIPMENT

- Cup
- Spatula

MATERIALS FROM KIT

- Citric Acid

MATERIALS FROM HOME

- Water
- Sauce Pan

INSTRUCTIONS



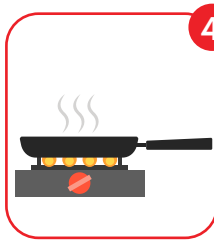
- 1** Fill 3/4th of the cup with water. Mix citric acid with the water until more citric acid cannot be dissolved.



- 2** Put the cup in the freezer for a day. Then check for small crystals in the cup.



- 3** Take a crystal out of the cup. We will refer to the piece as the seed crystal.



- 4** Ask an adult to reheat the rest of the crystals back into liquid.



- 5** Add the seed crystal to the cup once the solution has cooled down. Then put the cup into the freezer for 3-4 days.

DID YOU SEE?

When you checked the cup after 4 days, did you see the seed crystal grow in size?

Experiment #21

SALT CRYSTALS

14
DAYS

EQUIPMENT

- Spatula
- Stirring Stick

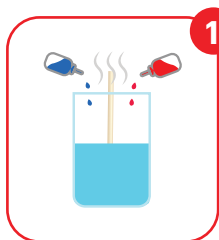
MATERIALS FROM KIT

- Colors

MATERIALS FROM HOME

- Salt
- String
- Pencil
- Hot Water
- Glass Tumbler
- Iron Nail or Iron Screw

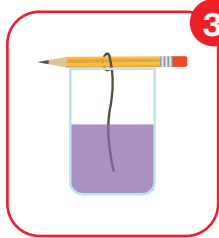
INSTRUCTIONS



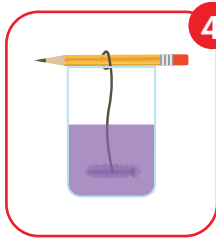
- 1** Ask an adult to fill half of the glass tumbler with hot water. Add 4-5 drops of colors and mix well.



- 2** Mix salt with water until no more salt can be dissolved.



- 3** Take a piece of string and tie one end of the string to a pencil. Ensure that the string is shorter than the tumbler.



- 4** Tie the other end of the string to the iron nail. Dip the string and iron nail into the saltwater solution.



- 5** Let it rest for 2 weeks in a cool and dry place and then observe.

 This experiment uses hot water. Please perform under adult supervision.

DID YOU SEE?

When you checked the string after 14 days, did you see crystals growing on it?