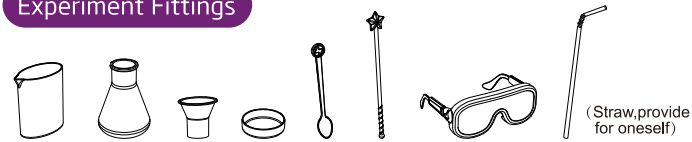
01 Magic Bubbles

Experiment Materials

Detergent, Soft white sugar, Clear water

Experiment Fittings



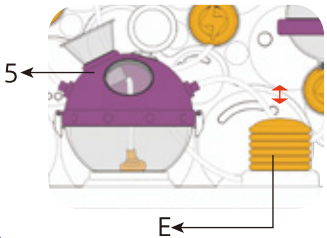
Experiment Procedures

1. Pour 100ml water into the flask with a measuring cup.
2. Pour 25ml of dishwashing liquid into a measuring cup.
3. Pour appropriate amount of soft sugar into the petri dish and add 2 spoons into the measuring cup with the sampling spoon.
4. Pour the water in the flask back into the measuring cup and stir well with a stirring rod until the sugar and detergent are dissolved.
5. Pour the prepared liquid into 5 along the funnel.
6. Repeatedly press E until the bubbles overflow from 5 and observe the bubble world made by yourself.
7. Dip one end of the straw into the bubble water, the other end of the air, start your own bubble creation!

Note: at the end of the experiment, take out the yellow bubbler in 5 and pull out the catheter connecting it.

Experiment Principle

Soft white sugar can increase the viscosity of bubble, make the thin liquid film of bubble is not easy to break, and wrap the air inside tightly.



02 Volcanic Magma

Experiment Materials

Baking soda, White vinegar, Detergent, Red pigment

Experiment Fittings

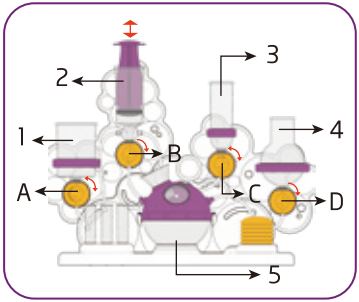
Experiment Procedures

Note: make sure all knobs are closed before the experiment.

1. Using a sampling spoon, take 4 tablespoons of baking soda and pour 5 into a dry funnel.
2. Pour 50ml white vinegar into 1, add 10 drops of red pigment, and stir well with a stirring rod.
3. Pour 30ml white vinegar into 3 , measure 10ml of detergent in a tube and pour into 3. Stir with a stirring rod to dissolve all the dishwashing liquid.
4. Add 100ml white vinegar to 4 in a measuring cup.
5. Open A and inhale the liquid from 1 into 2.
6. Close A and open C, slowly press the liquid in 2 into 3, mix it fully with the solution in 3,
7.Then draw all of the 3 liquid back to 2, immediately close the C(to prevent the solution from flowing back).
8.Open D, and open B at the same time. During the flow from liquid in 4 to liquid in 5, quickly press the liquid in 2 into liquid in 5.
9, observe the magnificent "volcanic magma" emerging from 5!

Experiment Principle

White vinegar is acidic and baking soda is alkaline. When the two are mixed, a chemical reaction occurs that produces a large amount of carbon dioxide gas,this carbon dioxide gas causes a lot of foam in the detergent solution, creating "volcanic magma".



03 Master Of Discoloration

Experiment Materials

Red pigment, Yellow pigment, Blue pigment, Clear water

Experiment Fittings



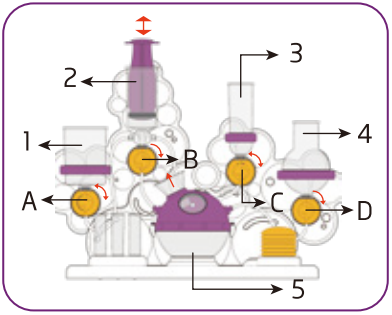
Experiment Principle

Red, yellow and blue are the three primary colors of pigments, which can match any other colors theoretically. Children can compare with each other that who can make the most kinds of color.

Experiment Procedures

Note: all knobs are closed before the start of the experiment.

1. Pour 150ml, 60ml and 150ml of water into 1, 3 and 4 using measuring cups.
2. Red, yellow and blue pigments were selected and added into 1, 3 and 4 in order. Each container was added with 10 drops of pigment of one color and stirred evenly with a stirring rod.
3. Open A and C, inhale the liquid in 1 and 3 into 2, inhale about 50ml, and mix them thoroughly. Observe the color change in 2.
4. Close A and C, open B, and push the liquid from 2 into 5.
5. Turn on D and let the liquid of 4 flow into 5.
6. Remove the funnel and insert the stirring rod into 5 as the liquid in 4 flows into 5, stirring continuously.
7. observe the color changes in 5, together to explore the wonderful color changes!(the order of dripping pigment can be adjusted to observe the phenomenon)



04 Colorful Pearl Rain

Experiment Materials

Edible oil,Red pigment, Yellow pigment, Blue pigment, Clear water

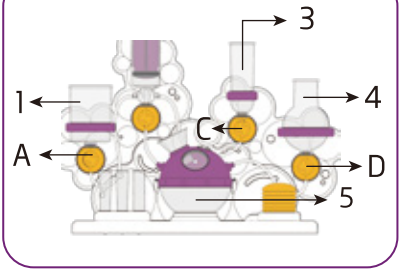
Experiment Fittings

Experiment Procedures

Note: ensure that knob A, C and D are closed before the experiment.

1. Use a measuring cup to take 150ml of edible oil and pour into 5 through the funnel.
2. Use a measuring cup to add 50ml water to 1, 3 and 4 each.
3. Select red, yellow and blue pigments and add them into 1, 3 and 4 randomly. Add 6 drops of pigment of one color into each container and stir them evenly with a stirring rod.
4. Use the dropper to draw the liquid from1,3,4 and drip after drip into 5.
5. Enjoy the wonderful visual experience of the pearl rain!(The floating oil can be collected for other experiments)

Experiment Principle



05 Discolored Iodine

Experiment Materials

Blue pigment, Iodophors, Vitamin C tablets, Clear water

Experiment Fittings

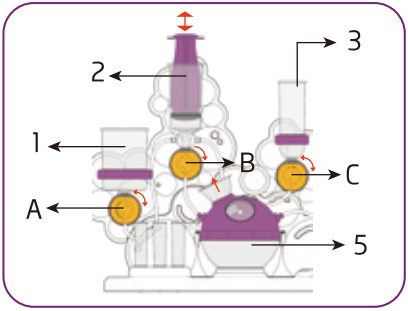
Experiment Procedures

Note: ensure that knob A, B and C are closed before the experiment.

1. Add 100ml water to 1 in a measuring cup and add 30 drops of iodophors. Stir well with a stirring rod.
2. Add 80ml water to 3 in a measuring cup and drop in 4 drops of blue pigment. Stir well with a stirring rod.
3. Open C, inhale all the liquid in 3 into 2, and immediately close C (to prevent solution reflux).
4. Open A, press all the liquid in 2 into 1, so that the liquid is fully mixed in 1, and observe the phenomenon.
5. Inhale about 80ml of the liquid in 1 into 2, immediately close A (to prevent solution reflux), open B, and press the liquid in 2 into 5.
6. Take a vitamin C tablet, put it into 5, take out the funnel, insert the stirring rod into 5, stir evenly, observe the phenomenon.(After vitamin C tablet is used up, take out still can use next time)

Experiment Principle

Iodophor is oxidative and vitamin C is reductive. Redox reaction occurs when they are added to water. The water will change back to its original color when iodophor is completely reacted. At the same time, there are pigments in the solution due to the remaining pigments.



06 Liquid Floor

Experiment Materials

Red pigment, Blue pigment, Detergent, Edible oil, Clean water

Experiment Fittings

Experiment Procedures

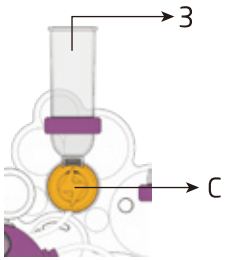
Note: make sure knob C is closed before the experiment

1. Pour 30ml of dishwashing liquid into container 3, add 3 drops of blue pigment, and stir well with a stirring rod.
2. Take 25ml of water from the measuring cup and drop in 3 drops of red pigment. Stir evenly with the stirring rod. Then stick the bottom of the stirring rod to the inner wall of 3 and drain the liquid in the measuring cup into 3 with the help of the stirring rod.
3. Use a measuring cup to drain 25ml of edible oil into 3 using the same method.
4. Then enjoy the wonderful color floors!

Cleaning tip: after the end of the experiment, the liquid in container 3 should be stirred evenly with a stirring rod, and then turn on knob C to drain the liquid in container 3.

Experiment Principle

Different objects have different densities, so the densities of detergent, water and oil are different. Among the three liquids, detergent has the highest density, followed by water, and then oil. The liquid with high density will sink to the bottom, while the liquid with low density will float to the top, thus achieving the effect of stratification.



07 Submarine Spring

Experiment Materials

Effervescent tablet, Blue pigment, Edible oil, Clear water

Experiment Fittings

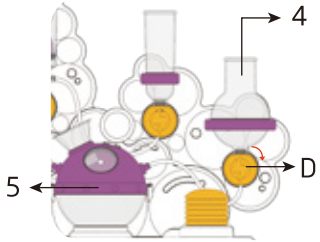
Experiment Procedures

Note: make sure knob D is closed before the experiment.

1. Pour 50ml water into 4 in a measuring cup and add 10 drops of blue pigment. Stir well with a stirring rod.
2. Open D and let water flow from 4 to 5 slowly.
3. After all the liquid in 4 flows into 5, take 125ml edible oil from a dry measuring cup and slowly pour into 5 through a funnel.
4. Cast an effervescent tablet into 5 and observe the spectacular "submarine spring" emerging from 5!

Experiment Principle

Effervescent tablets with water after the rapid release large amounts of carbon dioxide, the carbon dioxide gas carrying the colored water rushed out of the reservoir, reach the top of the reservoir, eventually overflow into the air, and create wonderful sights like submarine spring.

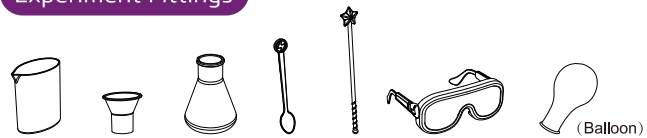


08 Swollen Belly

Experiment Materials

Baking soda, Citric acid, Clean water

Experiment Fittings

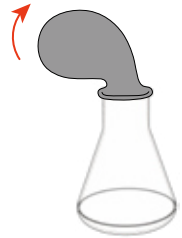


Experiment Procedures

1. Take 150ml of water in a measuring cup, add 1 teaspoon of citric acid to it with a sampling spoon and stir with a stirring rod until completely dissolved, then pour the solution from the measuring cup into the flask.
2. Using a sampling spoon, take 1 teaspoon of baking soda and place it inside the balloon with the help of a funnel.
3. Put the balloon around the opening of the flask and pour the baking soda into the flask.
（Make sure the balloon entangles the container tightly to avoid leaking, otherwise, it will fail.）
4. Observe the belly of balloon which expands gradually.

Experiment Principle

Citric acid is an acidic substance, while baking soda is an alkaline substance. A large amount of carbon dioxide gas will be produced after mixing the two substances, which can make the balloon blow up.



09

The Secret of Starch

Experiment Materials

Starch, Iodophor, Clear water

Experiment Fittings

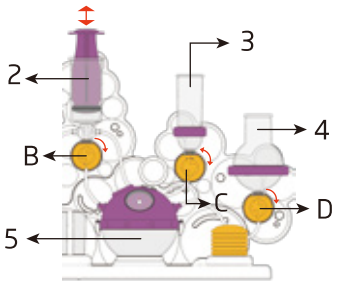
Experiment Procedures

Note: make sure all knobs are closed before the experiment.

1. Pour 150ml of water into 4 in a measuring cup and add 30 drops of iodophor. Stir well with a stirring rod. Open D and let the 4 liquid slowly flow into 5.
2. Pour appropriate amount of starch into the petri dish, take 1 spoon of starch into the measuring cup with a sampling spoon, and pour 25ml of water, then stir well with a stirring rod and pour into 3.
3. After all the solution in 4 flows into 5, open C and inhale the liquid in 3 into 2. close C, open B, and push the liquid from 2 into 5.
4. Remove the funnel,insert the stirring rod into 5, stir evenly and let stand for about 10s.
5. Watch the solution color change and discover the secret of starch!

Experiment Principle

Starch will turn purple-red or blue when it meets iodine. These color reactions enjoy high sensitivity and can be used to identify the content and qualitative of starch, as well as to analyze iodine content. Many foods in our daily life contain starch, such as apples and eggs. Let's look for starch in our life.



10 Colorful Meteor Shower

Experiment Materials

Red pigment, Yellow pigment, Blue pigment, Edible oil, Clean water

Experiment Fittings

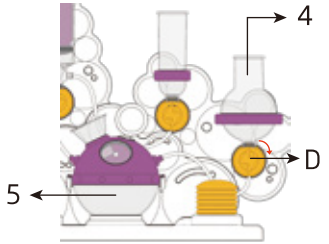
Experiment Procedures

Note: ensure that knob D is closed before the experiment.

1. Open D, take 300ml of water from the measuring cup, and add 4 in two times.
2. Pour 50ml of edible oil into a dry measuring cup and drop in 10 drops of red, yellow and blue pigments. Stir well with a stirring rod. (stirring time is about 15s)
3. After the water in 4 completely flows into 5, slowly add the solution in the measuring cup to 5 along the funnel.
4. After 10 seconds, enjoy the dazzling meteor shower world!

Experiment Principle

The pigment cannot be dissolved in the oil, so when it is added to the oil, it is wrapped in drops of pigment. After the edible oil mixed with pigment is poured into the water, the density of edible oil is less than the density of water, so it will cover the pigment and float on the water surface. After resting for a period of time, the pigment has the highest density and starts to sink. After reaching the water layer, it will dissolve into the water, forming a "meteor shower".



11 Colorful Soil

Experiment Materials

Absorbent Polymer, Red pigment, Yellow pigment, Blue pigment, Clear water

Experiment Fittings

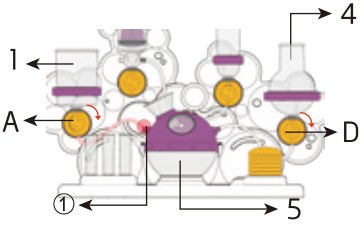
Experiment Procedures

Note: ensure that knob A and D are closed before the experiment.

1. Take 2 teaspoons of absorbent polymer with a sampling spoon and add 5 along the dry funnel.
2. Take 100ml water in a measuring cup and add 5 drops of yellow pigment. Stir well with a stirring rod.
3. Pour the solution in the measuring cup into 5 through the funnel and let stand for about 10s.
4. Add 75ml of water into 1 and 4, add 5 drops of blue pigment into 1 and 5 drops of red pigment into 4, and stir evenly with a stirring rod.
5. Pull out the hose originally inserted in the socket ① and connect the other end of the hose inserted in A to the socket ①.
6. Open A and D, let the red solution and blue solution slowly flow into 5, and then observe the colored soil that slowly appears in 5. (you can use the soil to grow potted plants. Remember to add water regularly to ensure the growth of potted plants.)

Experiment Principle

Absorbent polymer is a kind of high performance material, which can absorb water that is more than 100 times as its own volume. The absorbent polymer can be used as a kind of soil that is rich in water after absorbing, which can supply water to plants.



12

Making Liquid Rainbow

Experiment Materials

Red pigment, Yellow pigment, Blue pigment, White sugar,Warm water

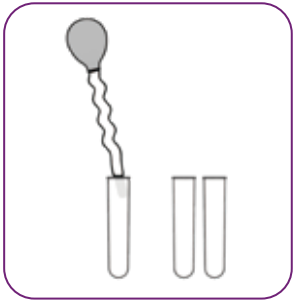
Experiment Fittings

Experiment Procedures

1. Measure 25ml of warm water in a measuring cup and add 3ml of warm water to each of the three test tubes.
2. Select 3 pigments and drop 1 drop of one color into each tube,shake the tube to mix the pigments evenly.
3. Pour the sugar into the petri dish, take 1/4 teaspoon with the sampling spoon and add it into the tube with the blue pigment. Then take half a teaspoon with the sampling spoon and add it into the tube with the red pigment.
4. Draw the blue liquid in the tube with the dropper, and let the solution slowly flow along the inner wall of the tube into the tube with the red pigment.
5. Then the yellow liquid is injected into the tube containing the two colors in the same way.
6. Feel the gorgeous liquid rainbow in front of you!

Experiment Principle

The same amount of water with different amounts of sugar will make different densities of liquid. The more sugar you add, the denser the liquid, the denser the liquid will sink to the bottom, and the less dense the liquid will float to the top, stratifying the solution to form a liquid rainbow.



13 Acid-Base Test

Experiment Materials

Citric acid, Baking soda, PH test paper, Clean water

Experiment Fittings

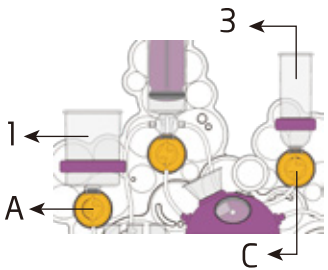
Experiment Principle

PH test paper can be used to detect acidity and alkalinity. It turns red or yellow when it comes to acidity and blue or green when it comes to alkalinity. Let's test the acidity and alkalinity of substances in our daily life together.

Experiment Procedures

Note: make sure knob A and C is closed before the experiment.

1. Measure 25ml of water in a measuring cup, add half a teaspoon of baking soda to it with a sampling spoon, stir well with a stirring rod, then pour the liquid in the measuring cup into 1.
2. Clean the measuring cup and the sampling spoon,measure 25ml of water with the measuring cup, add half teaspoon of citric acid with the sampling spoon, stir well with the stirring rod, then pour the liquid in the measuring cup into 3.
3. Use the dropper to absorb the solution in 1 and 3 respectively (after absorbing one solution, remember to clean it and then absorb another solution), and drop it on both ends of a piece of PH test paper.
4. Observe and compare the color changes of PH test paper.



14 Milk Animation

Experiment Materials

Red pigment, Yellow pigment, Blue pigment, Pure milk, Detergent

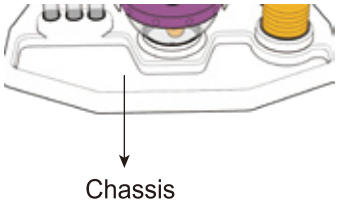
Experiment Fittings

Experiment Procedures

1. Take 100ml of pure milk from a measuring cup and pour it into the experimental chassis.
2. Put 5 drops of red, yellow and blue pigment into the center of the milk.
3. Add 5ml detergent into the test tube, use the dropper to absorb the detergent, and drop into the center of the pigment.
4. Enjoy the spectacular milk animation.

Experiment Principle

Dishwashing liquid contains surfactants that destroy the surface tension of the milk, so that the pigment around the milk will spread and create a beautiful animation.



15 Flower Makeup

Experiment Materials

Red pigment, Yellow pigment, Blue pigment,
Three white flowers, Clear water

Experiment Fittings



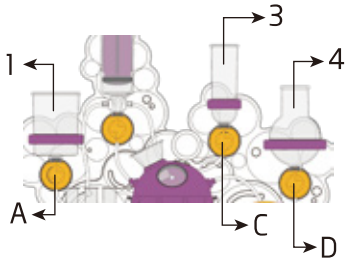
Experiment Procedures

Note: ensure that knob A, C and D are closed before the experiment.

1. Use measuring cups to add 150ml, 75ml and 150ml water respectively to 1, 3 and 4.
2. Randomly select two colors, drop 30 drops of pigment of one color into the containers 1 and 4 each, and stir them evenly with a stirring rod.
3. Select the remaining color, add 15 drops to 3, and stir well with a stirring rod.
4. Insert three white flowers into 1, 3 and 4.
5. Let sit for 1 day and observe the makeup changes of flowers.

Experiment Principle

Plant leaf internal has many tiny "pipe", we called the capillary, infiltrating liquid in the capillary of foliage is hollow, it to the liquid pressure, the liquid rising along the wall, this is the "capillary phenomenon", by capillary action, white flowers can pigment gradually to suck up water, and spread in the context of the petals, cause a color change.



16 Crystals On Eggshells

Experiment Materials

White latex, Potassium alum, Blue pigment, Eggshell, Hot water

Experiment Fittings



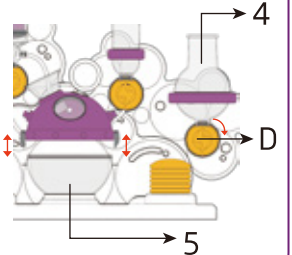

Experiment Procedures

Note: ensure that knob D is closed before the experiment.

1. Coat the inner wall of the egg shell with white latex, apply appropriate amount of potassium alum with a sampling spoon, and then leave the egg shell in a ventilated dry place for several hours until the white latex inside the egg shell is completely dry (this step is the basis for the crystallization of potassium alum).
2. Open the 5 clasp, place the egg shell coated with potassium alum into the lower half of the 5, then cover the upper part of the 5 and close the clasp.
3. Take 150ml hot water (about 90℃) in a measuring cup, drop 20 drops of blue pigment, and stir evenly with a stirring rod.
4. Gradually add about 15 teaspoons of potassium alum into the vector cup with the sampling spoon. While adding potassium alum, keep stirring with the stirring rod until the alum at the bottom of the cup is no longer soluble in water (this step affects the amount of crystallization of potassium alum).
5. Pour the prepared solution into 4, open D and let the solution flow into 5, making sure that all the eggshells are immersed in the solution. (don't move the shell during crystallization)
6. After 24 hours, the shell of the egg will condense into beautiful crystals.

Experiment Principle

The potassium alum on eggshell can be used as a crystallization center, because the saturated solution of which is easy to form crystals. The potassium alum particles in water will continuously combine with potassium alum on eggshell to form crystals, thus forming beautiful crystals.



17 Diffusion Of Pigment

Experiment Materials

Red pigment, Blue pigment, Salt ,Clear water

Experiment Fittings

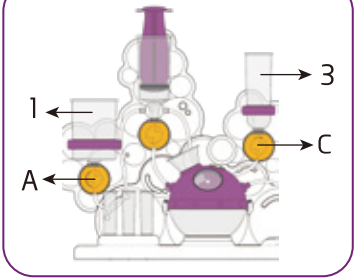
Experiment Procedures

Note: ensure that knob A and C are closed before the experiment.

1. Take 100ml of water in a measuring cup, pour into the flask, add 10 drops of red pigment, and stir well with a stirring rod.
2. Take 100ml of water in a measuring cup and add 5 drops of blue pigment. Pour salt into the petri dish. Add 4 tablespoons of salt into the measuring cup with a sampling spoon.
3. Pour 75ml of the liquid from the flask into 1 and 25ml from the measuring cup into 3.
4. Pour the remaining solution in the flask into 3 slowly along the wall of the container 3 with the dropper.
5. Pour the remaining solution in the measuring cup into 1 slowly along the container wall of 1 using the dropper.
6. Compare the reaction phenomena in 1 and 3.

Experiment Principle

Diffusion phenomenon refers to the phenomenon of material molecules transferring from high concentration region to low concentration region until uniform distribution, mainly due to density difference. The rate of diffusion is proportional to the concentration of the substance.



18 Ice In Magma

Experiment Materials

Red pigment, Edible oil, Small ice(about15*15*15mm), Clear water

Experiment Fittings

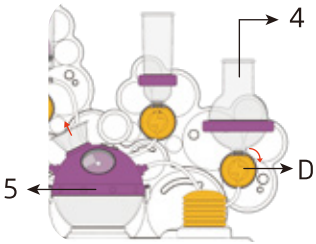
Experiment Procedures

Note: make sure the knob D is closed before the experiment.

1. Measure 150ml water in a measuring cup and pour into 4, add 5 drops of red pigment and stir well with stirring rod, open D and let the liquid in 4 flow into 5.
2. Measure 100ml of cooking oil in a dry measuring cup, then pour into 5 along the funnel.
3. Remove the funnel and place a small piece of ice into 5 from the hole at the top left of 5.
4. Observe the floating and sinking of ice in 5.

Experiment Principle

The density of water is the highest in the three substances, the density of oil is minimal,the density of ice is between oil and water ,so water is at the bottom, oil is at the top, and ice is suspended between water and oil.

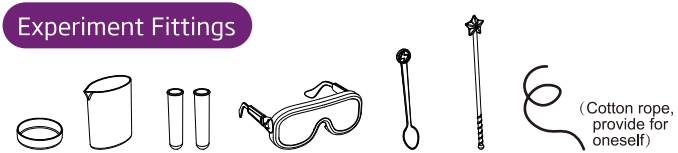


19 Teeth Of Salt

Experiment Materials

Red pigment,Blue pigment, Salt ,Warm water

Experiment Fittings

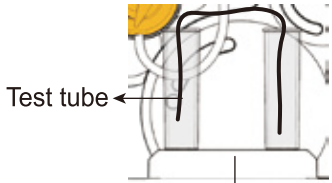


Experiment Procedures

1. Take 50ml of warm water from a measuring cup and add salt to a petri dish. Add 6 tablespoons of salt to the measuring cup with a sampling spoon and stir with a blender to make saturated salt water.(Saturated salt water means adding salt to water until it is no longer soluble.)
2. Pour the saturated salt water into two test tubes, 10ml each.
3. Select red and blue pigments, drop 5 drops of one pigment into each tube, and stir evenly with a stirring rod.
4. Soak 20 cm long white cotton rope in water, and place the soaked white cotton rope in the middle of two test tubes (the two ends of the rope should be soaked in two test tubes respectively).
5. Put it in a ventilated and dry place for 12 hours to observe the effect (the longer the time, the better the effect).

Experiment Principle

Salt water will rise along the cotton rope due to its capillary action. After the water in the cotton rope evaporates (some salt crystals will fall on the chassis), the remaining salt crystals will gather together and are arranged in a special geometry.

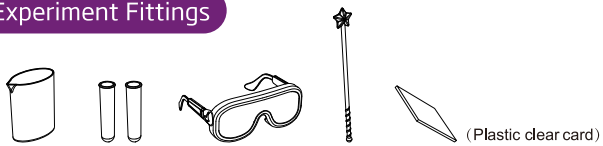


20 Hot and Cold

Experiment Materials

Red pigment, Blue pigment,Cold water ,Hot water

Experiment Fittings



Experiment Procedures

1. Take two test tubes, drop 3 drops of red pigment into one tube and fill it with hot water.
2. Drop 3 drops of blue pigment into another tube and fill with cold water.
3. Cover the hot tube mouth with the plastic transparent card, and quickly buckle it on the cold tube mouth, and make the two tubes completely coincide.
4. Slowly remove the plastic transparent card, and find that the two tubes form a clear red and blue world.
5. Turn the position of the two test tubes upside down and find that the two worlds of red and blue are magically fused together!

Experiment Principle

The water molecules in the hot water have more energy and move faster, and the water molecules can disperse faster, so the hot water is less dense than the cold water, so when they meet, the hot water floats on top of the cold water. And when cold water is on top, the hot and cold water mix together.