78 scientific experiments instructions

(1). Color matching

Materials for the experiment: pigment, measuring cup, stirring rod and clear water.

1. Take 3 measuring Cups and fill them with 100ml clear water, add 5-10 drops of red, yellow, and blue pigments to each of them and stir them well.

2. Take another 4 measuring cups and fill the first three cups with 50ml clear water.

3. Take the measuring cups with red water and yellow water and pour them into the first cup of clear water (for about 10ml respectively) and then pour the red and blue water into the second cup of clear water and later pour the yellow water and blue water into the third cup of clear water, and finally pour the red, yellow, and blue water into the fourth empty measuring cup (for about 20ml respectively). Now. kids, please observe the change of color.

Scientific principle: The red, yellow, and blue colors are three primary colors, and based on the Trichromatic Theory, any other color can be produced by them. Now, kids, let's compete and confirm who can produce more colors!

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(2). Color change

Materials for the experiment: pigment, measuring cups (3), paper towel (8 pieces self-provided), clear water, stirring rod.

1. Pour 60 ml clear water into3 measuring cups, drop different colors of pigments into it, and stir them well.

2. Place an empty measuring cup between two measuring cups with pigment water.

(3) Fold the paper towel twice, place one end of paper into pigment water and the other end into the empty cup. and observe the change of empty cup after 2h.

Scientific principle: see "vegetable color change" for this principle.

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(3). Rainbow fountain

Materials for the experiment: baking soda, citric acid, pigment. sampling spoon, liquid detergent (self-provided), bottle, clear water, funnel

1. Put 3/4 water and three teaspoons of citric acid (stir them well), squeeze liquid detergent for 10 times, and drop 10 drops of red pigment in the bottle

2. Pour 3 teaspoons of baking soda into the bottle (at a time) quickly with the funnel, and the fountain runs a steady flow.

Scientific principle: the baking soda can react with the citric acid to produce a large amount of carbon dioxide gas, and then this gas will dissolve the liquid detergent in the bottle to produce a mass of foam to form the color fountain.

(4). Artificial snow

Materials for the experiment: water-absorbent resin, measuring cup, sampling spoon, clear water.

1. Pour a small teaspoon of resin powder into the measuring cup and add 20ml water to it.

2. Turn the measuring cup upside down after 5s, and then the water disappears. If the measuring cup is replaced with non-transparent cup, there will be a magic effect.

3. The colored snow can be produced by adding the pigment to the clear water and pouring it into the measuring cup with resin powder.

Scientific principle: the white powder is a water-absorbent resin with the maximum absorption and can absorb more than 100 times of water larger than its volume. Now, kids, you can verify its absorption ability. The material in baby diapers belongs to this water-absorbent resin. Both the colored snow and the rainbow pot plants can be produced, and adding a layer of compost at the bottom of the pot is more beneficial to the plant growth.

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5. Suspended Egg

Materials for the experiment: raw egg (self-provided), long glass (self-provided), clear water, pigment, salt (self-provided), measuring cup, stirring rod.

1. Fill the glass with 150ml clear water, and then place the egg into the glass. The egg will sink into the glass bottom. So how to make the egg float?

2. Measure 100ml clear water and 50ml salt with the measuring cup, and then put them into the glass, and later stir it until the salt dissolution, and finally, place the egg into the glass.

3. Put 60ml clear water into the measuring cup, drop 3 drops of pigment into it, and then stir them well.

4. Pour the pigment water along the stirring rod into the saltwater cup slowly, and then the egg will be suspended in the middle of the cup.

Scientific principle: The egg has the higher density than that of clear water, so the egg will sink into the glass bottom. However, the salt water will have the higher density than that of egg after the salt is added to the clear water to prepare the salt water with relatively high concentration, so the egg will stay between clear water and salt water.

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(6). Pigment diffusion

Materials for the experiment: transparent glass (2), sampling spoon, clear water, pigment, salt (self-provided)

1. Add 30ml salt to the glass, and then fill the glass with clear water, and later stir it well for 30s standing.

2. Fill another glass with clear water.

3. Drop 3 drops of pigment into two glasses respectively and observe the pigment diffusion in them to find the difference.

Scientific principle: The diffusion refers to a phenomenon where the substance transfers from high-density area to low-density area until the uniform distribution. As the pigment has the higher density than that of water, the pigment will diffuse toward the water with the lower density quickly when dropped into the clear water. However, the salt water has the higher density than that of pigment, so we can see that the pigment is suspended on the salt water and diffuse slowly after a time.

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(7). Direction loss

Materials for the experiment: I transparent glass (self-provided), paper (self-provided), color pen (self- provided), water.

1. Draw and write different patterns and words with different color pens.

2. Fill the glass with clear water, place the patterns drawn vertically and then put it about 10mm behind the glass.

3. Observe the difference between the pattern seen from the glass and the original pattern.

Scientific principle: as the light travels in two different substances at different speeds, the direction of propagation changes at the junction of two media and this refers to the light refraction. When the light enters the water from the air, the propagation medium changes, so the light is refracted. Moreover, after the glass is filled with water, the cylindrical water column is equivalent to a convex lens, so the pattern seen by us is a reversed one in a certain distance.

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(8). Straw control

Materials for the experiment: mineral water bottle with lid (self-provided), straw, sweater (self-provided) (or hair or other wool fabrics)

1. Rub the straw back and forth with the sweater self-provided for about 20 times.

2. Place the straw flat on the mineral water bottle with the lid covered.

3. Place the palms of both hands at the left and right sides of straw respectively (the distance of palms from the straw is about 5cm, and do not touch the straw).

4. Move both hands slowly, and the straw will turn with hands as if controlled.

Scientific principle: when the straw is rubbed with the sweater, the additional negative charge will be given to the straw. As the hands without static electricity is near to the straw with static electricity, the object without static electricity will attract the charge with opposite polarity to that carried by the charged object since the opposites attract, the "electrostatic adsorption" will be presented.

(9). Water flow turning with balloon

Materials for the experiment: disposable cup (self-provided), balloon, sweater (self-provided), pin (self-provided), water

1. Prick a hole at the bottom edge of the plastic cup with the pin.

2. Blow up the balloon and tie the opening of the balloon and rub the balloon back and forth with sweater for about 20 times.

3. Fill the plastic cup with water and put it up to form the water column at the hole.

4. Keep the rubbed balloon part close to the water column, and the water flow will turn its direction.

Notes: the disposable cup can be replaced with the tap, and make sure that the water flow should be slow. Meanwhile, the sweater can also be replaced with your hair or other fabrics that can easily generate the static electricity.

Scientific principle: as the balloon is rubbed with the sweater, the additional negative charge will be given to the balloon. Then, the small water column has the neutral charge, so when the balloon with negative charge is close to it, the water column with neutral charge will attract the charge with opposite polarity to that carried by the balloon. Since the opposites attract, the light small column will change its direction for the balloon.

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(10). Sucking ping -pong ball by water

Materials for the experiment: transparent bottle, ping-pong ball and water

1. Place the ping-pong ball at the mouth of the bottle, hold the ping pong ball with your hand, turn the bottle upside down, loose the hand holding the ping-pong ball and the ball falls.

2. Fill the bottle with water (it's better to make the water just spill). Place the ping- pong ball on the mouth of the bottle, hold it with your hand and turn the bottle upside down.

3. Loose the hand holding the ping pong ball, and you will find that the ping -pong ball is sucked.

Scientific principle: this is because of the atmosphere pressure effect. As the bottle is filled with the water, its pressure is lower than external pressure, so the atmosphere makes the ping-pong ball sucked on the mouth of the bottle.

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(11). "Treacherous" bottle

Materials for the experiment: plastic bottle, pin (self - provided), pigment, water.

1. Pour the water into the plastic bottle (a small amount of pigment can be added for observation).

2. Keep the bottle tightly closed to ensure no leakage from the plastic bottle.

3. Punch several small holes on the body of bottle near the bottom of the plastic bottle with the pin.

4. The bottle with holes does not leak as the bottle is kept tightly closed.

5. Open the cap, and the water is jetted out from the small holes.

Scientific principle: for the surface tension of water, the small holes are covered with a layer of thin water film to hold the water Moreover, since the atmospheric pressure make inside the bottle whose cap is tightened is less than that outside the bottle, the external atmospheric pressure will support the water at the small holes to make it not flow out. When the body of bottle is pressed with a great force or after the cap is uncovered, the air pressure in the bottle rises, so that the water film at the small holes is broken to cause water flow out from these holes.

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(12). Rubber band crossing

Materials for the experiment: rubber band (self-provided), mobile phone (self-provided)

1. Place the rubber band on the hand.

2. Hold it with these two fingers, and make it entangle your five fingers after such holding.

(3) Then, keep the mobile phone e close to the finger, and loosen the thumb at the same time, and then, the rubber band will jump on the phone.

Scientific principle: this is a wisdom performance art skillfully combined with different fields of visual communication, psychology, chemistry, mathematics, optics, and physical performance under the use of tools. With the characteristics of people's curiosity and thirst for knowledge grasped, the incredible and unpredictable false appearance is generated to make people difficultly know its secret and then to realize the seemingly real artistic effect.

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(13). Crossing A4 paper

Materials for the experiment: A4 paper (self-provided), ruler (self-provided), scissor (self-provided), pen (self-provided),

stretch it, and make it come from the part of the

1. Mark the one side of paper every lcm with a ruler after folding A4 paper and mark the other side every 2cm.

(2) Cut A4 paper at 2cm interval mark. Do not cut off it. Then, cut the paper at the other 1cm interval mark. Also pay attention to the cut-off.

(3) Cut the folded part at 2cm interval part. This A4 paper is cut into a large circle for easy crossing for an adult.

Scientific principle: we follow the bending cutting to make the perimeter of paper larger, and each cutting on the paper will become a part of the perimeter of A4 paper. An extra part of the circle will be given for each cutting. After the folded part is cut, a piece of paper will become a closed circle, so the smaller the marking.

Interval is, the more the number of times of cutting has and the larger the perimeter of A4 paper is and the greater the paper ring becomes.

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(14). Rainbow Ferris wheel

Materials for the experiment: rainbow candy, plate (self-provided), water

1. Take out about 10-12 pieces of rainbow candy. and place them in the plate at different colors to form a circle.

2. Pour 30ml normal temperature water into the center of the plate gently to make the water surface elevation consistent with the middle position of rainbow candy.

3. Observe the diffusion situation of pigment of rainbow candy.

Scientific principle: after water contacts rainbow candy, the pigment will dissolve in water, and diffuse towards any areas with low density without planned direction as the water density is increased. As the pigment of a piece of rainbow candy meets that of another piece of rainbow candy, these two kinds of colors will diffuse towards the area with the lower density in the center of the plate for the similar densities to finally form the shape of rainbow Ferris wheel.

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(15). Liquid layering

Materials for the experiment: pigment, measuring cups (3), dropper, liquid detergent (self-provided), edible oil (self-provided), water.

1. Pour 30ml liquid detergent. 30ml clear water and 30ml oil into 3 measuring cups.

2. Add 10 drops of pigment into the liquid detergent and stir it well and add 5 drops of pigment into the clean water and stir it well. These two pigments should have different colors.

3. Inject the clear water and oil into the measuring cups containing the liquid detergent with the dropper successively, and the beautiful liquid layering will appear finally.

Scientific principle: there are different densities for the liquid detergent, the clear water and the oil, among these three kinds of liquid, the liquid detergent has, the largest density, followed by the clear water, and the oil has the smallest density. The liquid with the larger density will sink to the bottom for heavy weight, while that with the smaller density will float for light weight to realize the layering effect.

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(16). Bursting the balloon with lemon

Materials for the experiment: lemon or orange (self-provided), fruit knife (self-provided), balloon

1. First blow up the balloon and tie its opening, Cut a small piece of lemon peel with a fruit knife. (lemon can be replaced with orange)

2. Press the lemon peel against the balloon; make the juice from the lemon peel on the balloon, and the balloon will burst.

Scientific principle: there is a layer of oil gland containing the organic solvent "limonene" (which can dissolve the rubber on the balloon surface) on the surface of lemon peel (orange peel), so the balloon will burst easily.

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(17). Volcanic eruption

Materials for the experiment: effervescent tablet, pigment, edible oil (self-provided), transparent bottle, clear water

1. Add 1/5 clear water, 3/5 edible oil and 5-10 drops of pigment to the bottle.

2. Pour half a piece of effervescent tablet into the bottle, and the beautiful "volcanic magma" emerges from the bottom little by little

Scientific principle: as the effervescent tablet meets the water, there will be a large amount of carbon dioxide gas produced rapidly, and when the sufficient carbon dioxide gas is accumulated, the carbon dioxide gas will rush out from the oil-water layer with the colored water to the top of the oil and finally to run over the air, so that the spectacular view like the volcanic eruption appears.

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(18). Self-willed candle

Materials for the experiment: 1 piece of candle cardboard (self-provided), glass cup (self-provided)

1. Take a piece of cardboard and place it vertically on one side of the candle after lighting the candle, and blow to the cardboard from the same side. The candle will not be blown out no matter how forcefully you blow it.

2. Relight the candle, place the glass on one side of the candle, blow to the glass from the same side, and the candle is blown out easily.

Scientific principle: as the air flow meets the plane barrier, the air flow will move towards the left and right sides along the plane barrier respectively and the second meeting is impossible on the other side of the barrier, so the candle cannot be blown out. As the air flow meets the cylinder, the air flow will be divided into two flows to run along the edge of the cylinder to the other side of the cylinder and then to form an air flow for movement in the same direction. Therefore, if there is appropriate air strength, the candle on the other side can be blown out even though a barrier is met.

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(19). Milk meeting the citric acid

Materials for the experiment: milk (self-provided), citric acid, cup (self-provided), stirring spoon

1. Pour the milk into the glass, and then add the citric acid to the milk.

2. Observe it after stirring and taking out the stirring spoon, and you will find the particles.

Scientific principle: the protein denaturation will occur to produce the white precipitate after the protein in milk is mixed with the acid in citric acid.

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(20). Air gun

Materials for the experiment: gun barrel (self-provided), balloon, rubber band (self-provided), plate (self-provided), candle, scissor

1. Cover the gun barrel with the balloon, fix it with rubber band, light the candle and place it in the plate.

2. Point the barrel opening at the candle, pull the balloon back, and the candle will be blown out after loosening hand.

Scientific principle: after you loosen hand, the balloon will quickly restore, and the air will be squeezed out from the gun barrel to form air flow to make the flame of the candle out.

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(21). Milk animation

Materials for the experiment: pigment, dropper, pure milk (self-provided), liquid detergent (self-provided), white plate (self-provided)

1. Pour the pure milk into the plate (the milk should not pass the plate bottom).

2. Add 5-10 drops of pigment (monochrome or multicolor) to the milk.

3. Absorb the liquid detergent with the dropper, and drop it into the center of the pigment, and then there will be wonderful milk animation on the plate.

Scientific principle: the liquid detergent contains surfactant which can destroy the surface tension of liquid, and the disturbed milk will turn over and move with the pigment to form the beautiful patterns.

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(22). Vegetable color change

Materials for the experiment: pigment, measuring cups (3), celery cabbage (self-provided), clear water.

1. Fill three measuring cups with 50ml clear water respectively and add three different colors of pigments (10-20 drops) into them respectively.

2. Break off three pieces of celery cabbage and insert their roots to three cups off pigment water.

3. Observe the change of cabbage leaves one day later.

Notes: besides cabbage, flowers with branches can also be Used for this experiment.

Scientific principle: the leaves/tissue have many small "capillaries", and water will be adsorbed in these capillaries. Since the difference between cohesion and adhesion, the water can slowly transport the pigment water to the leaves/empty cup. This refers to the ‘’capillary phenomenon". There are many Common capillary phenomena in the life, including: brick absorbing water and towel absorbing sweat.

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(23). Blowing balloon by bottle

Materials for the experiment: baking soda, citric acid, sampling spoon, funnel, balloon, bottle, clear water

1. Fill the bottle with 3/4 water and two teaspoons of citric acid and add two teaspoons of baking soda a to the balloon with the funnel.

2. Cover the bottle mouth with the balloon and pour the baking soda in the balloon to the bottle, and then the balloon will be blown up slowly.

Scientistic principle: the alkaline baking soda and the acidic citric acid will react with each other (acid-based chemical reaction) to produce a large amount of carbon dioxide gas. The more the carbon dioxide is accumulated, the bigger the balloon will be blown up.

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(24). Cartesian diver exploration

Materials for the experiment: plastic bottle with lid, straw (paper packing), paper clip (self-provided), scissor (self-provided), measuring cup, clear water.

1. Take the straw and remove the paper and cut it to be 5cm long.

2. Fold it to be a V shape from the middle position and insert two heads of paper clip to two sides of straw opening, and then fix them. Use another paper clip for the counterweight.

3. Fill the plastic bottle with water to the bottle neck. Place the prepared Cartesian diver, and then tighten the cap.

4. Press the bottle body with both hands. and the Cartesian diver will float up and down.

Scientific principle: this was found by Descartes (1596-1650), a French scientist. Based on the Pascal's Law, when the air is compressed, the pressure will be transmitted to the water, and the water will be pressed to the straw to compress the air in the pipe. Then, as the volume of displacement remains unchanged and the gravity is greater than the buoyancy, there will be sinking. When you let your hands off, the air pressure will make the water discharged from the pipe. As the gravity is less than the buoyancy, there will be floating.

(25). Straw Hercules

Materials for the experiment: Transparent bottle, straw, water

1. Put the straw into the bottle and try to lift the bottle but failed. Let's change the shape of the straw. Fold the straw in the middle and try again!

2. Put the straw into the bottle, put one end of the straw against the bottle wall and lift the bottle gently. The bottle is lifted by the straw!

Scientific principle: The stability principle of triangle is used in the experiment. After the bent straw is put into the bottle, the straw returns to its original shape. Since the bent part of the straw is longer than the diameter of the bottle, the bent part is stuck at the narrow mouth of the bottle, forming a triangle. Therefore. The straw can lift the bottle up like a bracket.

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(26). Naughty Spitball

Materials for the experiment: Transparent bottle, 1 piece of tissue (self-provided)

1. Knead the tissue into two balls, one large and one small.

2. Place the bottle flat on the table, and then put the small ball at the mouth of the glass bottle.

3. Blow on the ball at the mouth of the bottle and observe the movement of the ball.

4. Put the large ball at the bottle mouth, blow air into the bottle mouth, and observe the movement of the ball.

Scientific principle: The bottle is "filled" with air, and if you add a little more air inside, the air will overflow. Airflow cannot enter the bottle. The low-pressure area is formed at the bottle mouth. According to the Bernoulli's effect, the pressure will be lower with faster gas velocity. The pressure of the airflow blown by the straw is lower than that of the still air in the bottle. Therefore, the spitball is pushed out by the air inside the bottle instead of being blown into the bottle.

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(27). Bearing water with coin

Materials for the experiment: 1 coin (self-provided), pigment, measuring cup, dropper water.

1. Add 20 ml of water to the measuring cup and add two drops of pigment.

2. Use a dropper to absorb the pigment water and drop it onto the surface of the coin continuously.

3. The drops on the coin will get bigger and wobbly.

4. If you continue to drip water on the coin, the drops will burst and overflow.

Scientific principle: The coin can hold so much water because of the tension of water. The different densities inside and outside the molecules on the liquid surface result in different forces, resulting in a force toward the inside. That's why the water is held back from spilling out.

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(28). Ping-pong ball suspended in the air

Materials for the experiment: Hair dryer (self-provided), ping-pong ball

1. Turn the hair dryer on with the head up.

2. Put the ping-pong ball in the vent and release your hand. At this time, you can see the ping-pong ball floating in the air.

3. Tilt the hair dryer from side to side, the ping-pong ball will follow the tilt without falling.

4. In addition to ping-pong ball, there are many other things that can be suspended, such as foam ball and bottle bottoms cut from previous experiments. Let ‘s try what else can float!

Scientific principle: The Bernoulli's effect is used in the experiment. The pressure will be lower with faster fluid velocity. The air velocity around the ping-pong ball is fast. The pressure is low, which makes it difficult for the ping-pong ball to move from side to side. The upward force of the hair dryer offsets the ball's own gravity, So the ping-pong ball is suspended in the air!

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(29). Egg diving

Materials for the experiment: the egg (self-provided) (boiled egg can avoid the risk of breaking, cup (self-provided), transparent glue (self-provided), 2 pieces of paper skin (self-provided can be cut from the express box), clear water.

1. Pour clear water into the cup and place a piece of paper skin in the center over the cup.

2. Take another piece of paper skin and connect the two ends with transparent glue to make a paper tube.

3. Stand the paper tube upright in the center of the paper skin and place the egg on the top of the paper tube (the egg and the cup are on the same vertical line).

4. Push the paper away quickly with your hand and observe the situation of egg.

Scientific principle: The Newton's first law is used in the experiment. Newton said that objects in motion want to remain motion, and stationary objects want to

remain at rest unless an external force is applied to them, therefore, what the egg wants to do is "stay here" after the paper skin is removed instantly, the egg loses its support and falls into the cup under the action of gravity.

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(30). Water blowing cross the air

Materials for the experiment: 2 glasses (self-provided), pigment, 1 transparent card (self-provided), 1 straw, 1 plate.

1. Fill two of the glasses with water, and then add 3-5 drops of pigment into one of the glasses.

2. Place the cup without pigment on the plate, cover the cup with pigment with the transparent card, and put the colored cup upside down on top of the cup without pigment.

3. Pull the transparent card out slowly, use the straw to blow into the seam. You can see bubbles in the cup above and water flowing into the plate.

Scientific principle: As the joint of glasses is wetted by water, the joint is covered with a layer of "water film" under the action of surface tension. Under the action of atmospheric pressure, the water in the upside-down glass will not flow down. If you blow into the seam of glasses, the airflow will pierce the "water film" and enter, the glass to form bubbles that float to the top of water in the upside-down glass. Since the bubbles occupy a certain volume, part of the excess water is squeezed out from the glass and flows along the seam to the bottom glass. When you stop and outside the seam is rebalanced and the water stops flowing out.

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(31). Tea water discoloration

Materials for the experiment: Tray (self-provided), 2 measuring cups, baking soda, citric acid, tea leaves (self-provided, black tea is better), sampling spoon, stirring rod, boiling water.

1. Place the measuring cup on a tray, brew 40 ml of strong tea water and remove the tea leaves.

2. Add half a spoon of baking soda to the tea water, stir it slowly and observe it. The tea water will darken.

3. Add half a spoon of citric acid to the tea water, stir it slowly and observe it. The color of tea water will become shallow.

Scientific principle: The baking soda can dissolve trivalent iron salt formed by oxidation. The tea water contains tannic acid. The two combine to produce black iron tannate, which darkens the tea water. Citric acid has reducibility. Citric acid can reduce the iron in iron tannate to divalent iron, so that the black of iron tannate is completely faded. The color of tea water becomes lighter.

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(32). Straw solo

Materials for the experiment: Elbow straw (self-provided) (the straw on the back of the milk box), glass (self-provided), scissor (self-provided)

1. Cut a slit about three-quarters deep in one-third part of the straw.

2. Bend the straw to a certain angle at the cut of the straw, as close as possible to a right angle.

3. Fill a glass with clear water. Insert one end near the cut of the straw into the water and blow hard from the other end. Change the depth of the straw inserted into the water while blowing. Pay attention to the changes in the sound.

Scientistic principle: When the blown airflow passes through the cut of straw the airflow hits the inner wall of the lower end of the straw to generate a vortex that resonates and makes a sound. The level of sound is related to the size of the resonance cavity. When the straw is raised, the resonance cavity gets bigger and the sound gets lowers when the straw is depressed, the resonance cavity gets smaller, and the sound gets higher. Therefore, the sound changes with the depth of the straw inserted into the water.

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(33). Trapped ice cube

Materials for the experiment: Glass (self-provided), pigment, edible oil (self-provided), water, ice cube (self-provided), stirring rod.

1. Pour half a cup of clear water into the glass and add 2 drops of pigment into the water, stir it well.

2. Pour about 80ml of edible oil into the glass, drop an ice cube into the glass gently and observe the position of the ice cube.

3. Try to push the ice cube into the bottom of the water with a straw and observe the position of the ice cube.

Scientific principle: Among the water, oil and ice, water has the highest density, and oil has the lowest density. The density of ice cube is between of that oil and water. Therefore, water is at the bottom of the glass, oil is at the top, and the ice cube is suspended between the water and the peanut oil.

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(34). Spraying lemon juice on flame

Materials for the experiment: Lemon or orange (self-provided), fruit knife (self-provided), candle, lighter

1. Cut a small piece of lemon peel from a fresh lemon.

2. Light a candle Place the lemon peel close to the candle flame, squeeze the lemon, peel with your fingers to make the juice squeezed out of the lemon peel squirt into the flame, and observe the candle flame (lemon can be replaced by orange).

Scientific principle: Lemon peel (orange peel) contains natural essential oils and other combustible organic matter. When squeezing the lemon peel (orange peel) against the candle flame, the essential oil is also squeezed out. When the essential oil meets the candle flame, it catches fire and emits a bright and flickering flame with a crackling sound.

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(35). Rotating bottle with water

Materials for the experiment: Mineral water bottle (self-provided), pin (self-provided), cotton thread (self-provided), funnel, pigment, water

1. Prick a hole in each direction around the bottom position close to the bottle body to make the holes in the same direction.

2. Tie the cotton thread to the bottle mouth. Add a few drops of pigment into the coke bottle and fill it with water.

3. Hold the cotton thread to lift the coke bottle. The bottle will rotate in the opposite direction of the water flow.

Scientific principle: Because the holes are deflected in the same direction, the water flows out and is affected by the recoil force, which pushes the bottle to rotate.

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(36). Color pearl rain

Materials for the experiment: Transparent bottle, measuring cup, pigment, dropper, clear water, edible oil (self-provided)

1. Pour 20ml of edible oil into a measuring cup, add five drops of yellow, red, and blue pigments respectively, and stir it well.

2. Pour about 150ml of water into a transparent cup.

3. Pour all the edible oil mixed with pigments into the bottle and let it stand for about ten seconds. There will be a fantastic rainbow rain in the bottle.

Scientific principle: When the edible, oil mixed with pigments is poured into water, the edible oil will be coated with the pigments and float to the surface since the density of the oil Is lower than that of the water. After standing for a period of time, due to the maximum density of the pigment, the pigment begins to sink into the water and dissolve with the water, thus forming a dreamy rainbow rain.

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(37). Non-Newtonian fluid

Materials for the experiment: 2 measuring cups, starch (self-provided), pigment, stirring rod, sampling spoon, water.

1. Spoon 15 grams of starch into a measuring cup and add a few drops of pigment into the measuring cup with water.

2. Add the prepared pigment water to the measuring cup containing the starch and add the pigment water while stirring.

3. If you add too much pigment water, you can add some starch appropriately, then the non-Newtonian fluid is finished. What are the characteristics of non-Newtonian fluids? If the water becomes less after a while, add some pigment water.

Scientific principle: The non-Newtonian fluid is one that does, not satisfy Newton's experimental laws of viscosity, When the shear force acting on the fluid changes, its viscosity changes (the viscosity of the Newtonian fluid does not change), It exists in our lives widely. Most bio-fluids belong to the hon-Newtonian fluids currently defined, such as blood and other body fluids, as well as "semi-fluids" such as cytoplasm.

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(38). Mobile phone stylus

Materials for the experiment: Glass rod, measuring cup, double-sided tape (self-provided), tissue (self-provided), touch-screen mobile phone (self-provided), clear water

1. Touch the screen with a glass rod to see if it responds.

2. Wrap half of the glass rod with tissue and use double-sided tape to glue the joint firmly

3. Pour water on it with a measuring cup to soak the tissue (just soak)

4. Hold the wet part of the tissue and touch the screen. The phone will be controlled, and you can write on the screen.

Scientific principle: Mobile phones are not "smart" enough to only recognize fingers. The finger is conductive. The touch of your finger will cause the capacitance under the screen to change, so that the mobile phone can know where you are touching. The glass rod is non-conducting It can be conductive when it is wrapped with soaked tissue. The same principle applies to household appliances that cannot be plugged directly into a socket after being wet. Be sure to pay attention to electricity safety.

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(39). Magic color-changing

Materials for the experiment: Color-changing flower, measuring cups (3), vinegar (self-provided), washing powder (self-provided), boiling water, clear water, stirring rod.

1. Put color-changing flowers in a measuring cup (a pack of color-changing flowers can be used 2 to 3 times), pour 80 ml of warm water, and stir it well.

2. Pour 80 ml of vinegar or citric acid into a measuring cup, pour a small amount of washing powder or baking soda and 80ml of water into another measuring cup, and stir it well.

(3) Pour the color-changing flower solution into vinegar and washing powder liquid respectively. The color will change obviously.

Scientific principle: The color-changing flower used in the experiment contains anthocyanin, which is a natural acid-base indicator. Anthocyanin turns red when encountering acidic substances, and blue or green when encountering alkaline substances.

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(40). Isolated firefighting

Materials for the experiment: baking soda, white vinegar (self-provided), measuring cup, sampling spoon and candle

1. Light the candle.

2. Pour 40 ml of white vinegar into the measuring cup and add l teaspoon of baking soda to produce a lot of bubbles.

3. Pick up the measuring cup after 5 to 10 seconds and tilt it towards the center of the candle, and the candle will go out.

Scientific principle: carbon dioxide produced by baking soda and vinegar is a noncombustible substance, and it is heavier than air, so it will stay at the bottom of the cup temporarily after reaction. Because carbon dioxide can insulate combustible materials from air, carbon dioxide is poured into the flame, and the fire will be extinguished due to isolation of oxygen.

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(41). Turning water into ice

Materials for the experiment: sodium acetate crystal (1 bag), dropper, bowl (self-provided) and self-sealing bag

1. Take a bag of sodium acetate supersaturated solution, cut the opening of the bag with scissors, and put several white sodium acetate crystals into bag to form the spectacle of turning water into ice. Sodium acetate supersaturated solution becomes sodium acetate crystal. Pour sodium acetate crystal into self-sealing plastic bag and seal it.

2. Reuse method: for sodium acetate supersaturated solution (2 self-made bags), take a bowl and pour boiling water (must be water boiled just now) into it. Put the bag containing sodium acetate crystal into boiling water (the opening of the bag must be sealed, otherwise it will be invalid if water enters) and stir gently to make each part of the bag contact with the boiling water to prevent crystal residue. After all the crystals melt, take them out for cooling. The cooling methods include natural cooling or accelerated cooling in cooling water. It must be cooled to room temperature or lower than normal temperature before use, otherwise the experimental effect will not be good.

Scientific principle: the supersaturated sodium acetate solution at room temperature is in a very unstable state. If some crystals are added, the state will lose balance. Too much solute will freeze as quickly as water freezes, and ice will release heat, so it is also called hot ice.

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(42). Making colored eggs

Materials for the experiment: raw egg (self-provided), pigment, white vinegar (self-provided), and glass (self-provided).

1. Wash the eggs clean and put them into a glass. Pour in white vinegar. The egg should be fully submerged in the white vinegar. (observe the phenomenon in the glass).

2. Add 8 to 10 drops of green pigment and stir well.

3. The eggs shell disappears after 24 hours, and the eggs will become larger in size and the eggs become lovely colored egg (the effect will be better when the egg is washed clean and then soaked in vinegar and pigment water for 24 hours).

Scientific principle: the main component of eggshell is calcium carbonate, which is alkaline. It can dissolve with vinegar (acid) and produce a lot of carbon dioxide gas. As a result, that there is a layer of translucent film on the outer layer of the egg after the eggshell is dissolved, the colored vinegar enters the egg through the translucent film, and the egg is consequently stretched and discolored.

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(43). Magic water bag

Materials for the experiment: fresh keeping bag (self-provided), water, and pencil (self-provided).

1. Put a small amount of water into the bag and tie the bag tightly.

2. Have sharpened pencil penetrate the water bag (Wow! Magic phenomenon appears: the water bag is not leaking.)

Scientific principle: the surface of pencil is regular and smooth, and the fresh-keeping bag is elastic. After the pencil thorn passes through the bag, the bag can in fact tightly wrap the pencil, so the bag can still be sealed.

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(44). Needle balloon

Materials for the experiment: balloon and pin (self-provided)

1. Blow up the balloon (be careful not to blow too much) and locate the thickest position at the bottom of the balloon.

2. Carefully insert the needle into the bottom of the balloon, and the balloon will not burst.

3. Pull out the pin, and the balloon will also not burst. Insert the pin back, the balloon will stop getting smaller.

Scientific principle: the color of the middle part will gradually become lighter in the process of blowing the balloon, because the rubber molecules are stretched out, and many rubber molecules are gathered at the bottom of the balloon, so the color is darker. The rubber molecules act as a buffer when a fine needle is gently inserted into the bottom of the balloon, so there is no explosion. Think about it: it is possible to make use of this experimental principle to make a balloon sugar gourd with a pointed smooth stick.

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(45). Balloon Hercules

Materials for the experiment: (self-provided) wide mouth glass bottle (yogurt bottle), balloon, paper towel (self-provided), and lighter (self-provided).

1. Blow up the balloon.

2. Tear off a piece of tissue to make a long strip and light it.

3. After a few seconds, when the tissue burns vigorously, throw the tissue into the dry bottle (you can directly drop the match, if any, into the bottle).

4. Quickly block the bottle with a balloon to keep air out.

5. After a while, the balloon will be lifted, and the glass bottle will also be surprisingly lifted.

Scientific principle: When the burning tissue is thrown into the bottle whose mouth is blocked by balloon, the burning tissue will consume all the oxygen inside the bottle, resulting in lower pressure inside the bottle than that outside, where the air pressure outside is like an invisible hand pushing the balloon into the bottle.

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(46). Pop can acrobatics

Materials for the experiment: 1 bottle of pop can drink (self-provided), and water.

1. Put the can filled with drink on the tabletop and the can cannot be placed obliquely.

2. Try to put the empty can on the tabletop obliquely and the empty can cannot be placed obliquely.

3. Fill the empty can with about a quarter of the can of water.

4. Then try to put the can on the table, and the can will be successfully placed obliquely on the table.

Scientific principle: because the center of gravity of pop cans filled with drinks and empty cans are high, and it is difficult to be in the same vertical line with the point of force, it is difficult for us to tilt them on the tabletop. When we put a quarter of water into the can, the center of gravity of the whole can and the point of force can be in the same vertical line, and at this time the gravity is low, so we can easily tilt it on the tabletop. In fact, to keep the object in a relatively stable state, the key is to find the center of gravity. When the center of gravity and the point of force are in the same vertical line, the object will keep balance in the vertical direction. However, it's worth mentioning to the children that the center of gravity is not the center of the object, and a lot of objects do not have the center of gravity on the object at all.

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47. Thinning can

Materials for the experiment: empty can (self-provided), boiling water, cold water, basin (for holding cold water), and dishcloth (self-provided)

1. Pour the boiling water into the empty can to almost full.

2. After about 10 seconds, wrap the can with dishcloth and pour out the boiling water.

3. Then quickly put the can upside down in a basin filled with cold water (ice water works better), and the can will be flattened.

Scientific principle: the steam formed by boiling water drives away part of the air in the can, and the remaining air inside is heated. When the top of the can is sealed by water in the upside-down position, the internal water vapor condenses into water droplets and the hot air cools and shrinks. As the bottle mouth is sealed by water, the air pressure inside the can decreases, at this time, the external atmospheric pressure is greater than the internal pressure of the can. Due to the difference between the internal and external pressure, the can is compressed by air and becomes shrunken.

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(48). Dancing snake

Materials for the experiment: hair root, paper cup (self-provided), and scissors (self-provided)

1. Cut a semicircular opening just enough to place your mouth along the side of the cup with scissors.

2. Take the hair root and wind it into the shape of a small snake and erect a section in the middle.

3. Put the paper cup upside down on the table, press the cup tightly, and put the Little Snake on the bottom of the cup.

4. Place your mouth at the semicircular opening and make a long woooo sound and the little snake will spin with joy.

Scientific principle: Sound is transmitted to the paper cup, and the cup vibrates. The vibration at the bottom of the cup drives the hair root. The hair root is fine, and the hair is elastic, so it can rotate regularly.

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(49). Suspended needle

Materials for the experiment: basin (self-provided), tissue paper (self-provided), sewing needle (self-provided) and water.

1. Put the needle directly into the water, and the needle will sink to the bottom immediately.

2. Tear a small piece of tissue paper and put it on the water. Then put the needle on the tissue.

3. After a while, the tissue paper will sink to the bottom of the water, while the sewing needle will still be floating on the water.

Scientific principle: directly put the needle on the water surface, the needle will destroy the surface tension of the water and sink to the bottom of the water. First, put the tissue paper on the water surface, and put the needle on the tissue paper. And in the process of the tissue paper sinking slowly, the water molecules have time to form tension again. The surface tension of water is like a transparent film, holding the sewing needle on the water surface!

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(50). Diving ping-pong ball

Materials for the experiment: glass (self-provided), ping-pong ball, basin (self- provided) and water

1.Direct try and push the ping-pong ball into the deep-water area with force, which will fail!

2.Mug gourd style: use a glass to buckle the ping-pong ball, and then forced down, the ping-pong ball will successfully dive into the water in the end!

Scientific principle: when we press a ping-pong ball directly with our hands because the buoyancy of the water is far greater than the gravity of the ping-pong ball, the ping-pong ball will be lifted and float on the water surface. When the ping-pong is pressed with an empty glass, the air in the cup pushes the water away. If there is no water in the glass, the ping-pong ball will naturally be pressed to the bottom of the water.

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(51). Rice lift with chopsticks

Materials for the experiment: rice, funnel, chopstick, and plastic bottles.

1. Pour rice into the bottle with the help of a funnel and fill it to the mouth of the bottle.

2. Then insert the chopstick into the rice as deep as possible, vertically as far as possible, shake the bottle and compact the rice.

3. The bottle of rice will be successfully lifted by a chopstick (if step 2 is correct and still the bottle can't be lift, it means that the rice is not pressed firmly, and please repeat step 2)

Scientific principle: the principle of static friction is applied in this experiment. When the chopstick is inserted into the rice static friction is penetrated between the surface of the chopsticks and the rice, and there is also static friction between the rice and the bottle wall. The compacted rice exerts great pressure on the chopsticks and the wall of the bottle. This pressure makes the static friction force even larger, so we can easily lift the whole bottle of rice with a chopstick.

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(52). Simple water purification device

Materials for the experiment: 2 measuring cups, paper towel, and muddy water

1.Fill a glass of muddy water in a measuring cup.

2. Fold the paper towel into a strip, put one end into the empty cup and one end into the mud water. Observe the phenomenon every half an hour.

3. Two hours later, only half a cup of muddy water was left, and half a cup of clear water was obtained from the empty measuring cup.

Scientific principle: there are many small Pipes inside the paper towel where water is absorbed on the inner wall of these small pipes, Due to the difference of cohesion and adsorption force, water can be slowly transported to the empty cup. The sediment and other substances cannot be adsorbed, so the sediment and water can be separated into clean water. This is called Capillarity.

(53). Color changing apple

Materials for the experiment: citric acid, measuring cup, apple, sampling spoon, plate, fruit knife, and water.

1. Measure and take 20 ml of water in a measuring cup, add half a teaspoon of citric acid, stir well, and pour into the plate.

2. Cut the apple in half, and quickly put half of the apple into the plate with the section downward. After half an hour, observe the discoloration of the two halves of the apple.

Scientific principle: phenolic substances in apples are oxidized to phenolic oxides after encountering oxygen, resulting in black section of apples. However citric acid inhibited the activity of phenol oxidase, and vitamin C in lemon had a strong reducibility, which slowed down the oxidation process of apple. So, it is beneficial to eat more foods with high contents of vitamin.

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(54). Water surface tension test

Materials for the experiment: plate, measuring cup, beaker, pigment, dropper, and clear water.

1. Drop a few drops of pigment into the measuring cup, fill the measuring cup with water, and place the measuring cup in the center of the 7-inch disc.

2. Add water from the beaker to the measuring cup, and how much water do you think will overflow?

Scientific principle: the seemingly overflowing water can actually be dropped with a lot of new drops because of the surface tension of water. A liquid like water has the force to make the surface as small as possible to form an arc. And the force is called surface tension.

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(55). Bottle able to swallow balloon

Materials for the experiment: paper cup, bottle, beaker, balloon

1. Take a paper cup containing the warm water below 75 C (the temperature shall not be above 75 C, otherwise the bottle will be very hot and deformed), put on the bottle cap and wait for three minutes to make the bottle be heated sufficiently.

2. Pour the hot water out, cover the balloon around the bottle neck frequently, put the bottle into the cold water in the beaker, and then the balloon will be sucked into the bottle.

Scientific principle: the air inside the bottle expands after being heated, and the total volume of air is invariant after pushing the balloon. The air volume decreases with the fall of temperature and causes the air pressure inside the bottle below the atmospheric pressure outside, consequently the balloon will be squashed in the bottle by the outer atmospheric pressure.

(56). Testing the starch in food

Materials for the experiment: plate, iodine, food

1. Take a small patch as the experimental material on the 7-inch round plate, then drip the iodine onto the experimental material, and observe that the experimental material will urn blue or red violet, as those becoming blue or red violet is likely to contain the starch.

Scientific principle: the starch will turn red violet or blue if getting in touch with the iodine.

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(57). Pinching the balloon at certain distance

Materials for the experiment: balloon, mineral water bottle, pin, scissor

1. Drill a small hole where nears to the bottle with pin and enlarge the small hole a little bit more with scissor.

2. Pack the balloon into the bottle and put the balloon opening around the bottle neck.

3. Blow the balloon up, and block off the small hole at bottle bottom with your finger. At the time, it can be found that the balloon will not diminish unless you release your finger.

Scientific principle: this experiment utilizes the atmospheric pressure. When the small hole is blocked off, the bottle is sealed. At the time, the atmospheric pressure outside will press the balloon into the bottle and make the balloon not be diminished. After releasing the finger. the bottle is connected with the outside and the atmospheric pressures inside and outside the bottle are the same, so that the balloon can be diminished.

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(58). Rainbow

Materials for the experiment: pigment, measuring cups (*3), dropper, sampling spoon, white sugar, clear water, warm water

hot water (80 C around), a basin of cold water

1. Take 3 measuring cups respectively number as A, B and C, respectively pour into 20ml warm water, and drip into 3-5 pigment of different colors.

2. Add 2, 4 and 6 spoons of white sugar into three measuring cups (the sugar in Cup C may not be dissolved completely as it is added excessively, which Is not a problem).

3. Take 3ml Solution C with dropper, press the dropper gently, make the solution flow into the test tube slowly along the inner wall of test tube, then inject 3ml solution B in the same way, finally inject 3ml Solution A, and the beautiful rainbow appears. The children can make attempt to get the rainbow of more color layers.

Scientific principle: because different volume of sugars is added into the same volume of water, the different solutions may have different densities. The water containing more sugar is of higher density, and the solution of high density will sink to the bottom. while the solution of low density will locate at the upper layer, thus resulting in the beautiful liquid rainbow. If you feel it is too easy to get a 3-layer rainbow, you also can challenge and get a rainbow of more color layers!

Ps: the rainbow made by the editor can be kept for one week without color mixture, and how about yours?

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(59). Water-absorbing candle

Materials for the experiment: pigment, candle, measuring cup, plate, clear water

1. Pour the clear water into the plate (it is ready if the water submerges the plate bottom), drip into 3 drips of pigment and mix evenly.

2. Put the candle in the center of plate and ignite, put the measuring cup upside down over the candle, and after a while, the water gets into the cup.

Scientific principle: when the cup is put upside down over the candle, the air inside the cup is heated and will be expanded with part there of overflowed outside the cup according to the principle of heat expansion and cold contraction. Over several seconds, the oxygen inside the cup is exhausted, the candle extinguishes, and the temperature inside the cup lowers down, causing the air inside the cup shrinks and the air pressure drops. In the meantime, the carbon dioxide produced from combustion dissolving in the water also causes the fall of air pressure inside the cup. Consequently. the air temperature outside the cup is higher than that inside the cup, thereupon the water outside the cup is squashed into the cup by the atmospheric pressure.

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(60). Water drips and forms the "iceberg"

Materials for the experiment: supersaturated sodium acetate solution, sodium acetate crystals (1 bag), dropper, zip-lock bag

1. Take one supersaturated sodium acetate solution, cut open the bag opening with scissor, take the solution with dropper (the dropper must be the one without touching the sodium acetate crystals, and shall be cleaned with boiled water if being used), drip on the crystal Slowing, and then the electrifying effect of ′′the iceberg is formed from water drips" After the experiment, pack the small iceberg into the plastic zip-l0ck bag.

2. Refer to Step 2 of turning water into ice.

Scientific principle: please refer to the "turning water into ice" for the principle.

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(61). No-worded paper

Materials for the experiment: A4 paper, swab, baking soda, color-changing flower, measuring cup, tissue, clear water

1. Add 10ml clear water and half- spoon of baking soda into one measuring cup and mix evenly.

2. Write the words that you want on the white paper with the cotton stained with baking soda water, put the paper at a ventilated

place and dry by the air after writing, and the handwriting disappears.

3. Take a piece of tissue, fold into rectangle. dip in the color-changing flower solution well-soaked with boiled water and smear on the dried paper, and the handwriting reappears. After drying of the white paper, the handwriting changes to light green.

Scientific principle: after smearing the baking soda solution on the white paper and drying, the handwriting will disappear as the baking soda solution is colorless. When smearing the flower solution on the dried paper, the handwriting reappears. According to the scientific principle of "magic color change" the handwriting will turn to light green after drying.

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(62). Non-miscible hot and cold water

Materials for the experiment: 2 pieces of paperboard, food coloring, 4 measuring cups, cold water, hot water

1. Fill the 3 cups on the left with cold water, ill the 1 cup on the right with hot water, add two drops of pigment into the 2 cups on the left, and add another color of pigment in the cups on the right, mix them well.

2. Cover the cup of cold-water r with pigment on the left with a piece of paperboard, then turn the cup upside down.

3. Place the covered cup upside down on the cup of cold water with another color, and make the rim completely overlap.

4. Remove the paperboard in the middle slowly, it was found that the water with pigment and transparent water were mixed slowly.

5. Then cover the other cup of cold water with pigment on the left with a piece of paperboard and turn the cup upside down.

6. Place the covered cup upside down on the cup of hot water with another color, and make the rim completely overlap. Remove the paperboard in the middle slowly it was found that the water with pigment and transparent water did not mix.

Scientific principle: Due to the motion of molecules, the two cups of cold water are mixed slowly. The high temperature of hot water leads to more violent molecular motion and lower density, so the hot water floats on top of the cold water. Therefore, when the hot water is on, the two cups of water are not mixed.

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(63). Quick ping-pong ball recovery

Materials for the experiment: Hot water, ping-pong ball, measuring cup

1. Find a ping-pong ball with a flat side

2. Put the flattened ping-pong ball into the cup

3. Pour some hot water into the cup

4. Take out the ping-pong ball. The ping-pong ball has been recovered to its original condition.

Scientific principle: When the flattened ping-pong ball is poured with hot water, the ping-pong ball will return to its round shape. It is because the hot water will increase the temperature of the ping-pong ball. The air will expand after heating. The expanded hot air in the ping-pong ball will squeeze the ball, putting a relatively large pressure inside the ping-pong ball and forcing the ball back to its original spherical shape. If we poke a hole in the flattened ping-pong ball, this method will not work! Because the air in the ping-pong ball will escape through the hole after being heated and expanded, making the pressure inside and outside the ball the same, and the ping-pong ball will not return to its original state.

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(64). Flow controlled ping-pong ball

Materials for the experiment: Water, basin, ping-pong ball

1. Put the ping-pong ball in the empty basin.

2. Pour the water on the ping-pong ball. It was found that the ping-pong ball was controlled by the flow.

Scientific principle: According to Bernoulli's Principle, the pressure will be lower with faster flow rate, and vice versa. When the ping-pong ball in the water flow deviates from the center of the water flow and moves in other directions, due to water velocity under the ping-pong ball's rolling direction is slow with strong pressure, the water velocity above the ping-pong ball's rolling direction is fast with small pressure, an upward pressure difference is generated to push the ping-pong ball up horizontally. Similarly, no matter how far the ping-pong ball deviates from the center of the flow, it will return to the center of the flow due to Bernoulli's Principle.

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(65). Resurrected caterpillar

Materials for the experiment: Paper-wrapped straw, crayon, pencil, dropper, water

1. Tear off both ends of the straw wrapper

2. Shrink both ends of the straw paper toward the middle as tight as possible. Pull the straw paper away from the straw, the white caterpillar is ready.

3. Use a dropper to drop the water on the caterpillar little by little. The caterpillar moved as if it was resurrected.

4. To make colored caterpillars, just paint the straw wrapper with crayons, draw the eyes and mouth with a pencil, and repeat the above steps.

Scientific principle: The paper contains many tiny plant fibers. Under capillary action, the paper will absorb water. Water has surface tension, and that tension stretches the caterpillar slowly.

(66). Disappeared flower

Materials for the experiment: White paper, scissor, plastic bag, watercolor pen, deep cup, water

1. Cut white paper into pieces slightly smaller than plastic bag, and draw beautiful flowers on the paper

2. Put the paper with flowers in the plastic bag.

3. Insert the bag straight into the water. The flower was disappeared miraculously.

Scientific principle: Light travels in a straight line. When the light passes through the water from the air, the way it travels changes, so it can confuse our eyes like bending down, Therefore, if the angle is night, the object placed in tie water will appear to be invisible. Science in life: When looking at small fish in the lake, their real position is slightly lower than what We see because of the refraction of light!

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(67). Toothpick speedboat

Materials for the experiment: Toothpick, detergent, a basin of water

1. Prepare a basin of water.

2. Take a toothpick, dip the thick end of the toothpick with a little detergent, and then gently put the toothpick into the basin gently. The toothpick rushed out like a speedboat.

Scientific principle: The detergent contains surfactants and is easily soluble in water. Therefore, the toothpick stained with detergent can be moved on the surface of the water.

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(68). Inverted water

Materials for the experiment: Glass, paper

1. Fill the glass with cold water, making sure it is slightly above the rim.

2. Cover the rim with a piece of white water and let the water soak the paper to avoid gaps between the rim and the paper.

3. Press the paper lightly with one hand, hold the glass with the other hand. and turn the glass upside down to observe the condition of the paper.

Scientific principle: The surface tension of the water makes the paper and the rim closed completely and forms a certain upward pull on the paper. At this time, the pressure inside the glass is less than that of the outside, the atmospheric pressure and the tension of water form a resultant force, which offsets the gravity of the water in the glass and the gravity of the paper itself. The paper is balanced in force, so the water will naturally be blocked in the glass without leaking.

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(69). Water lows uphill

Materials for the experiment: 3 measuring cups, elbow straw, pigment, water

1. Place one measuring cup upside down on the table and place another measuring cup on top of the upside-down measuring cup, drop 3 drops of pigment into the cup and pour 100 ml of water. Take another measuring cup and place it on the table.

2. Fill the straw with water (you can use the straw to drink water to fill the straw with water), block the shorter end with your index finger, put the straw into the measuring cup with water slowly, and put the longer end into another measuring box with your other hand.

3. Release the index finger on the straw and press the straw to keep it from sticking out of the water. The water flowed through the higher end of the straw into another measuring cup.

Scientific principle: ln the experiment, the liquid at the highest point in the straw moved towards the lower end under the action of gravity, which generated negative pressure inside the n-shaped straw, causing the liquid at the higher end to be sucked into the highest point, the liquid to flow into the lower measuring cup continuously until the bottom of the straw is level with the liquid level in the high measuring cup. This phenomenon is called siphoning.

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(70). Self-made bubble water

Materials for the experiment: measuring cup, stirring rod, sugar, detergent (self-provided), water and straw

1. Measure and take 40 ml water, 20 ml sugar, and 20 ml detergent through the measuring cup.

2. Pour water into sugar and stir well. Pour the well stirred sugar water into the detergent and stir it again. Then the bubble water will be finished.

3. Take a straw, put one end into the bubble water, and blow from the other end, where plenty of bubbles will show up (why not try more ways to play it).

Scientific principle: bubbles are formed by the surface tension of water. Generally, the attraction between water molecules is stronger than that between water molecules and air. These water molecules seem to be stuck together. However, if water molecules are excessively adhered together, bubbles will not be formed easily. Detergent and sugar break this kind of surface tension of water, reducing it to only one-third of the normal surface tension, which is exactly the best tension needed to blow bubbles.

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(71). Straw suction paper scraps

Materials for the experiment: straw, paper towel, and sweater

1. Take a paper towel, tear it into pieces and sprinkle it on the table.

2. Put the straw into the sweater and rub it back and forth for about 20 times and observe the phenomenon of the scraps of paper near the tabletop.

Scientific principle: when the sweater rubs the straw, it adds an extra negative charge to the straw. When the straw with static electricity approaches the paper towel without static electricity, the objects without static electricity will gather the charges with opposite polarity with the charges carried by the charged objects. As the opposite charges attract each other, the phenomenon of Electrostatic Adsorption will appear.

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(72). Crystal dried jellyfish silk

Materials for the experiment: measuring cup, stirring rod, pigment, and syringe

1. Refer to the Step 1 and step 2 of making water spirit for Step 1 and step 2.

2. Pour appropriate amount of solution from the sodium alginate bowl into the measuring cup, drop a few drops of pigment into the measuring cup, and stir well.

3. Draw the color solution with a syringe and squeeze into the calcium lactate solution. Let it stand for 5 minutes and you will be able to pull out the colored crystal jellyfish silk.

Scientific principle: sodium alginate is a safe and harmless substance extracted from seaweed. Sodium alginate will rapidly exchange ions in calcium lactate to form gel.

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(73). Experiencing Bernoulli's Principle

Materials for the experiment: straw, double-sided tape, A4 paper, and scissors

1. Cut a 3 x 20cm long piece of paper and adhere a piece of double-sided adhesive tape on one end of the paper.

2. Take off the paper cover from the straw, gently concave the paper strip and stick it to one end of the straw.

3. Blow from the straw with great strength, and the paper will not go down, but float up and down.

Scientific principle: in a fluid system, such as air flow, the faster the fluid is, the smaller the pressure generated by the fluid, this is the Bernoulli’s Principle put forward by Daniel Bernoulli, the father of fluid mechanics in 1726. When the air flows rapidly out of the straw, the pressure at the end of the straw becomes smaller, and the paper below will move upward.

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(74). Incombustible paper cup

Materials for the experiment: plate, paper cup, candle, beaker, lighter, and water

1. Pour appropriate amount of water into the 18cm plate, light the candle and put it in the center of the basin.

2. Pour about 200ml water into the paper cup and heat the paper cup on the candle flame. The paper cup will not be ignited by the fire.

Scientific principle: paper cup that can boil water is a kind of physical phenomenon. There is heat transfer between them. The boiling point of water is 100 C under standard atmospheric pressure, while the ignition point of paper is above 100 C. When the water is being boiled continuously absorbs heat from the paper cup. The temperature of the water will not rise again even if the water is boiled. It will only evaporate in the form of steam, so that the temperature of the paper cannot reach its ignition point.

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(75). Permanent drying paper

Materials for the experiment: plate, beaker, measuring cup, paper towel, and water

1. Place the paper towel in the bottom of the measuring cup, so that the paper towel is fixed at the bottom of the measuring cup.

2. Fill the beaker with water and put it in the center of the 18cm plate. Place the measuring cup upside down and vertically into the beaker containing water. Take out the measuring cup. It will be found that the tissue in the water is still dry.

Scientific principle: there is air in the cup. When the cup is placed upside down into the water, the air will block the water from entering the bottom of the cup, so the paper towel will not get wet by water.

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(76). Unmovable ball

Materials for the experiment: ping-pong ball, and funnel

1. Put the funnel mouth perpendicular to the chest and put the ping-pong ball in the funnel. Due to the gravity, the ping-pong ball will fall.

2. Put the ping-pong ball against the funnel mouth, do not let go of your hand.

3. Blow from the funnel mouth with great strength and remove your hand. The ping-pong ball will rotate in the funnel until blowing is stopped.

Scientific principle: when the ping-pong ball is close to the funnel hole and air is blown to the funnel, the air flows through the gap between the ping-pong ball and the tunnel wall. The air flow velocity in the gap is very fast, and its pressure is very small. And the atmospheric pressure in the air is much higher than that, so the ping-pong ball will not fall when blowing into the funnel.

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(77). Perforated paper capturing water

Materials for the experiment: glass, paper, rubber band, clear water, and toothpick

We all have heard ''Drawing Water with a Sieve''. How can a sieve with holes capture water? It must have leaked out sooner than you think. But in today's experiment, we can capture a glass of water with a piece of paper full of holes.

1. Take a piece of paper and use a toothpick to make numerous holes in the paper.

2. Fill the cup with water, cover the cup with paper and fix it with rubber band.

3. Hold the mouth of the cup with your hand, turn the cup upside down and let go of your hand. The water will not leak out.

4. Then use a toothpick to poke in, but the water will still stay captured.

Scientific principle: In the first place, the air pressure is high enough to hold the gravity of water at the mouth of the bottle, so the water will not leak out. The surface of water is like a layer of elastic skin. The molecules on this layer of skin are attracted by the layer of molecules under the water. They wrap up the water and they don't let the water run freely. So even if the toothpick is stuck in, the water in the bottle will not pour out.

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(78). Moonlight in lotus pond

Materials for the experiment: white paper, colored pen, scissors, plate, and water

1. Cut the A4 paper into several small pieces of paper. and use different color pens to draw the shape of flowers on the paper and color them.

2. Cut along the outline of the flower.

3. Fold the petals one by one to the middle.

4. Pour water into the plate, gently place the paper flowers folded just now on the water, and paper flowers in the water will slowly bloom.

Scientific principle: paper contains much of plant fiber. When water permeates into the paper fiber, the fiber will expand, so that the paper will open along the fold, forming the effect like blooming.