

01

FREEZE

滴水成冰

Get ready for an icy surprise!

准备好感受炫酷的结冰魔法吧！

HOW TO DO IT:

怎么玩？

1. Add some sodium acetate into the zip-lock bag. Seal it tightly in case the water entering later.

取适量醋酸钠晶体于自封袋中，封好口以防后面水浴加热时进水干扰实验。



2. Prepare a cup of hot water(80-100°C/176-212°F). Soak the zip-lock bag into the water to let the sodium acetate fully dissolved. Then put the solution aside to cool it for a while.

准备一杯热水，水温在80-100°C之间均可，将自封袋放入热水中，使晶体充分泡在热水中，完全溶解后得到醋酸钠溶液，静置片刻。



3. Put some sodium acetate on the surface, drop some sodium acetate solution on it. What happen? Ice form instantly! The more you drip, the “ICEBERG” magically occur! 在一个干净的平面上放一些醋酸钠晶体，然后用滴管滴取适量醋酸钠溶液于醋酸钠晶体上，这时候会发生什么呢？晶莹的“小冰块”瞬间就出现了！如果你持续滴加溶液的话，又会发生什么呢？“小冰山”就会神奇地出现了哦。



4. Use another dropper to drop some sodium acetate into the rest solution. Watch as the **LIQUID** magically transform to **ICE!**

用另一支干净的滴管蘸取醋酸钠晶体，放入剩余的醋酸钠溶液中，溶液又会魔法般地“变身”回固体状。



WHY IT WORKS

魔法小原理

Ordinary water freezes at (0°C/32°F). Under a certain temperature and pressure, when the solute concentration in the solution has exceeded the solubility of the solute under the condition, but the solute still does not precipitation, which is called supersaturation.

The sodium acetate solution is a supersaturation solution. It is unstable, so crystallization of solute in supersaturated solutions can be caused by the addition of a small solute crystal to the solution.

普通水在0°C/32°F的情况下结冰，在一定的温度和压力下，当溶液中的溶质浓度已经超过溶质溶解度条件下，但溶质仍然不析出，称为过饱和，而实验中的醋酸钠溶液是过饱和溶液，且是不稳定的，所以在过饱和溶液中加入一小块溶质晶体就会导致溶质结晶。



02

CHEMICAL

奇妙化学

Fun project to make a terrific science to feel the Amazing Chemistry Magic!

一个通过炫酷的科学感受神奇的化学魔法的奇趣小实验！

HOW TO DO IT:

怎么玩？

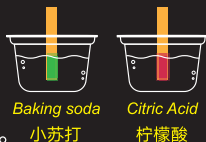
1. Mix the citric acid and baking soda with water to make 2 solution.

将柠檬酸、小苏打分别用不同的杯子溶解好，制备成2份溶液。



2. Respectively dip the 2 solution onto the PH test paper, it magically shows different colors.

分别蘸取适量柠檬酸、小苏打溶液于PH试纸上，试纸会显示出不同颜色。



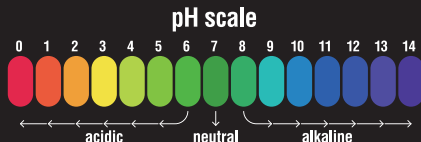
4. Respectively pour some purple cabbage solution into the 2 solution. You'll find the citric acid solution would turn red while the baking soda solution is changed to blue.

将紫甘蓝粉分别倒入柠檬酸溶液、小苏打溶液中，柠檬酸溶液会变红而小苏打溶液变蓝。



3. Match the scale to confirm the PH value of citric acid and baking soda.

分别蘸取适量柠檬酸、小苏打溶液于PH试纸上，试纸会显示出不同颜色。



5. Mix the citric acid solution into the baking soda solution. **Fizzing!**

最后将柠檬酸溶液倒入小苏打溶液中，感受神奇的化学魔法带来的沸腾！



WHAT IS PH?

什么是PH?

The pH measures how acidic or basic (alkaline) a substance is. It ranges from 0 to 14, with 7 being neutral. Substances with a pH less than 7 are acidic, and those greater are alkaline. The cabbage is a great natural indicator. It contains anthocyanin which is a water-soluble pigment. Amazing color-changing would occur when mixed with an acid or a base.

pH值用来衡量物质的酸碱性，取值范围为0~14，7为中性值，pH值小于7的物质为酸性物质，而大于7的物质为碱性物质。紫甘蓝是一个很好的天然指标，它含有花青素，是一种水溶性色素。当与酸或碱混合时，就会发生神奇的变色现象。

03

BLOW

吹泡泡

Make Amazing Bubbles!

自制奇妙泡泡！

HOW TO DO IT:

怎么玩？

Before you get started, make sure you've got a grown-up to help you with this experiment.

在你开始之前，确保在这个实验中有一个大人在旁边协助你。

1. Wear the gloves.

先戴上手套。

2. Add 20ml dishwashing liquid, 60ml warm water and 1 spoon of sugar into the cup.

在杯子中加入20ml洗手液，60ml温水和1勺糖。



3. Gently stir the mixture until well mixed.

使用搅拌棒轻轻搅拌均匀。



4. Use the straw to dip the mixture and blow bubbles.

用吸管蘸取溶液，吹泡泡。

5. Bubbles can magically bounce on your gloves!

试着用手接住，泡泡没破，而且还能弹起来。



6. Share one of the gloves with your friends and battle for the bubbles bounce times!

找一个小伙伴一人戴一只手套，看谁的泡泡弹得次数多！



* Some required from home.

*此实验中有的材料需自备。

The wonderful bubbles you create are simply air that is trapped inside the liquid. The surface area of a liquid, like water, has certain "surface tension". Surface tension makes the surface of the liquid behave like a stretchy, rubber sheet.

你制作的奇妙泡泡是被困在液体中的空气。液体的表面积，如水，有一定的表面张力，而表面张力会使液体表面表现得像一块有弹性的橡胶板。



04

COLORS

颜色实验

Explore the world of colors!

探索奇妙的颜色世界！

HOW TO DO IT:

怎么玩？

Activity 1 Color Mixing

实验一：奇妙混色

1. Add 3 colors of powder and just enough water into 3 cups, stir to make 3 solution.



准备3个杯子，加入3种色粉和适量的水，搅拌制备成3种颜色的溶液。

2. Drop some blue solution and yellow solution into the test tube, what happen?

取一支干净的试管，倒入一些蓝色溶液和黄色溶液，会发生什么？



3. Continue to try other
2 solution combination
scheme, what's going on?

继续尝试其他的颜色组合，又会发生什么变化呢？

Activity II Crawling Colors

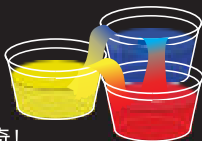
实验二：会“爬行”的颜色！

1. Use 3 tissues to connect the 3 solution as the picture show.

如图所示，在3种溶液之间放置3张纸巾。

2. Wait patiently and watch the colors magically crawl!

静待几分钟，纸巾上出现了3种颜色以外的颜色，好神奇！



Activity III Liquid Rainbow

实验三：液体彩虹

1. Mix sugar to each cup as follows:

在3杯颜色溶液按照如下比例分别加入糖

yellow solution	- 1 spoon of sugar
red solution	- 2 spoons of sugar
blue solution	- 3 spoons of sugar

黄色溶液- 1勺糖
红色溶液- 2勺糖
蓝色溶液- 3勺糖

2. Clean the test tube. Gently drop some of each colored sugar solution into the test tube in the order of blue, red and yellow.

清洗试管。沿着试管边缘依次加入适量蓝色溶液，红色溶液和黄色溶液。



3. The liquid rainbow done!

Pretty cool, right?

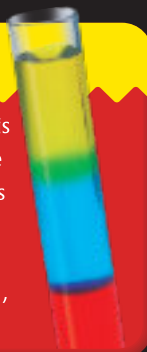
超级炫酷的液体彩虹就大功告成了！

COLOR SCIENCE

魔法小原理

The color layers remained separated because their density was different. Sugar water is slightly different than other types of density experiments because if shaken, the entire mixture will combine. But if added in careful layers, the differing density of the liquids will keep the colors separated and unicorn-friendly.

三种颜色出现的分层现象是因为它们的密度不同。糖水与其他类型的密度实验略有不同，因为如果摇动，整个混合物会结合在一起。但如果缓慢地分层添加，不同密度的液体将保持颜色分离，从而做出彩虹效果的液体。



05

FROZEN

奇趣人造雪

Learn about the science of snow in a fun and exciting way!

通过奇妙有趣的小实验学习与了解关于雪的科学小知识！

HOW TO DO IT:

怎么玩？

1. Add snow powder into the cup and pour some water.

往杯子里加入雪粉，
并倒入适量水。



2. The powder magically expand into snow form!
静置，让雪粉慢慢地
膨胀成雪状！

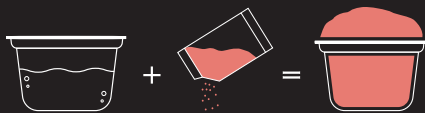
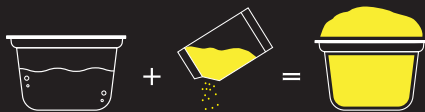


3. Just use the snow to pinch
a snowman!
制雪完成后，尝试用雪
捏一个雪人吧！



4. Repeat step 1-2 to make colored snow
with the colored powder.

重复步骤1-2，用彩色雪粉制作彩色
雪。



WHAT'S GOING ON?

魔法小原理

Instant-snow is a polymer that soaks up water using the process of osmosis. When water comes in contact with the Insta-Snow it moves from outside the polymer to the inside and causes it to swell.

实验中用到的雪粉是一种聚合物，它通过渗透作用吸收水分，所以当雪粉与接触时，它会从聚合物外部移动到聚合物内部，并导致聚合物膨胀形状我们所看到的雪。



06

VOLCANO

火山实验

Feel like a real volcanologist watching Volcanoes erupt up close!

宛如真正的火山研究学家一样近距离感受火山喷发的力量！

HOW TO DO IT:

怎么玩？

1. Place the test tube on the test tube stand. Fill it with some water.

将试管放在试管架上，并加入适量水。



2. Dump the fizzy piece into the test tube. Watch the volcano ERUPT!

将一颗泡腾片放入试管中，感受火山爆发！



3. Clean the tube and add some water.

清洗干净试管并加入适量水。



4. Add some oil and wait a while for the water and oil to stratify.

加入少许油，稍等片刻让水和油分层。



5. Dump the fizzy piece into the test tube. Watch the volcano POP underwater!

将一颗泡腾片放入试管中，感受激烈的海底火山！



* The oil required from home. *本实验中的油需要自备。

Explosive Fact 火山爆发小知识：

Large volcanic eruptions can send ash into the air, over 17 mi. (30 km) above Earth's surface.

极大规模的火山爆发可以将火山灰喷到离地球表面17英里(30公里)以上的空中。



WHY DO VOLCANOES ERUPT?

火山为什么会爆发？

The Earth's crust is made up of huge slabs called plates, which fit together like a jigsaw puzzle. These plates sometimes move. The friction causes earthquakes and volcanic eruptions near the edges of the plates. The theory that explains this process is called plate tectonics.

地壳是由巨大的板块组成的，这些板块像拼图一样拼合在一起。然而这些板块有时会移动。这就会导致板块边缘附近的地震和火山爆发。解释这一过程的理论被称为板块构造。



Explore the super COOL science!

探索超级炫酷的沙子科学!

HOW TO DO IT:

怎么玩?

Activity I 实验一

1. Use the the 3 colorful sand to make a sand-pile with a hole on the top.
用三种彩色的沙子做沙堆，顶部留一个小洞。



2. Drop some water onto the hole.

往洞里倒一些水。



3. What magic occur? The sand magically "hold" the water!
接下来会发生? 沙子神奇地“托住”了水!

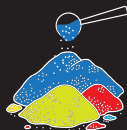


Activity II 实验二

1. Fill the cup with just enough water.
往杯子加入适量的水。
2. Add some of the 3 colorful sand.
加入一些彩沙。
3. The wonderful sand flow occur!
奇妙的沙流出现了!



4. Then try to spoon out some sand and feel it, it is still dry!
然后试着用勺子舀出一些沙子，用手感受一下，在水里浸泡过的沙子还是干的!



WHY IT WORKS

魔法小原理

The Magic Sand consist of colored sand that has been coated with trimethylsilanol. This is a water-repellent that seals any pits in the sand and prevents water from sticking to it. If you look closely, you'll see the sand forms cylindrical structures in the water, as the water forms the lowest surface area structure that it can around the grains. This is the coating and the "magic" properties of water.

实验中的魔法沙子由涂有三甲基硅醇（一种防水剂成分）的彩色沙组成，可以密封沙子中的任何凹坑，防止水附着在沙子上。如果你仔细观察，你会发现沙子在水中形成圆柱形结构，因为水在沙子周围形成了最小的表面积结构，这就是水的涂层和神奇特性。



08 CRYSTAL 奇妙的水晶种植

Let's Get Growing! Name something that isn't alive but that can magically grow!

开种吧！水晶本身是没有生命的物体，但是通过魔法小实验也是可以“种”出来的！

HOW TO DO IT:

怎么玩？

1. Fold and twist the pipe cleaner into the shapes you like.

将毛条折叠弯曲成你喜欢的形状。



2. Add 50g crystal powder and 120ml hot water(70-80°C/158-176°F). Stir it until the powder can't dissolve any more. Use the cord to tie the pipe cleaner to the craft stick.

在生长杯中加入50g晶粉和120ml热水(70-80°C/158-176°F)，使用搅拌棒搅拌至粉末不能再溶解为止，然后用绳子把毛条绑在手工木棒上。



3. Soak the pipe cleaner into the solution.

Over the next 2-6 hrs
crystals will start to form.

Check on it regularly.

将毛条轻轻放入溶液中

“种植”，在接下来的2-6小时内，晶体将会开始形成，小小水晶学家们可以定期检查生长情况。



4. When the pipe cleaner are

covered with enough

crystals, remove them from the solution.

Wipe the water with clean towel or tissue.

当毛条被足够多的晶体覆盖时，即可将其从溶液中取出，并用干净的毛巾或纸巾擦干水，水晶就“种植”完成啦！



CRYSTAL COUNTDOWN

TIME UNTIL

VISIBLE CHANGES: 1 HOUR

FINAL RESULTS: 2-6 HOURS

水晶生长倒计时

晶体第一次析出约需要：1小时

水晶种植完成约需要：2-6小时

**The growing cup required from home.*

*生长杯需要自备。

**The crystals under the solution can also be dissolved in hot water(70-80°C/158-176°F) for reuse.*

*种植完成后溶液底部的晶体可以溶解在热水(70-80°C/158-176°F)中再次使用。

WHAT'S THE "MAGIC" IN YOUR CRYSTAL POWDER?

晶粉魔法小知识

Your crystal powder is made of the chemical aluminum potassium sulfate, also called alum for short. Alum is mined from mineral deposits found in the earth. Along with crystal-making it has lots of uses, including purifying water. It's also used in pickle recipes to keep things crunchy and as an ingredient in deodorants.

实验中的晶粉是由化学物质硫酸铝钾制成的，也简称明矾。

明矾是从地下的矿藏中开采出来的。除了晶体制造，它还有很多用途，包括净化水。它也被用于腌黄瓜的食谱中，以保持食物的松脆，并作为除臭剂的成分。

