EXPERIMENT MANUAL

KIDS FIRST

SCIENCE KIT

THAMES & KOSMOS

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KIT CONTENTS

Good to know!

If you are missing any parts, please contact Thames & Kosmos technical support.

What's inside your experiment kit:

Materials not included in the kit are marked with this symbol + in the You Will Need sections on the experiment pages.

Checklist:

✓	No.	Description	Quantity	Part No.
○	1	Lab station base	1	728167
○	2	Column	2	721965
○	3	Large test tube	2	717119
○	4	Test tube lid	2	721968
○	5	Large pipette	1	717122
○	6	Small pipette	1	714772
○	7	Blue alginate powder	4	776245
○	8	Tweezers	1	722974

✓	No.	Description	Quantity	Part No.
○	9	Red dye tablet	1	724269
○	10	Yellow dye tablet	1	724842
○	11	Blue dye tablet	1	724267
○	12	Spatula	1	722970
○	13	Set of googly eyes	1	721975
		Lab station accessories set:		728168
○	14	Column base	2	
○	15	Test tube holder	2	
○	16	Sticker sheet	1	728166

YOU WILL ALSO NEED:

Water, vegetable oil, shower gel, salt, sugar cubes, grapes, sparkling water, paper, plastic wrap, pen, scissors, ruler, plastic garbage bag, paper towels

TABLE OF CONTENTS

TIP

YOU CAN FIND ADDITIONAL INFORMATION IN THE "CHECK IT OUT" SECTIONS ON PAGES 16, 22, AND 28

Dear Scientists,

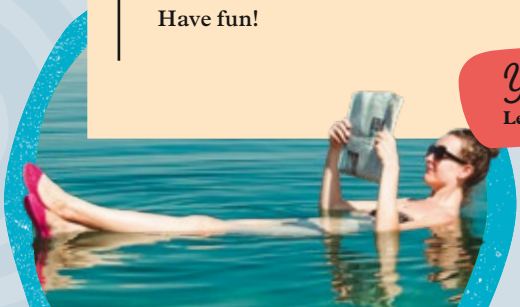
Are you excited to get started with your lab station? Do you want to experiment with different substances and learn how to use laboratory tools like a real scientist? Super! You can do all these things and more with the experiments in this kit.

Have an adult help you by getting everything you need ready for each experiment. Go through the individual experiment steps and read the information in the boxes together! Then you can get started experimenting.

First things first: it's time to set up your lab station!

Have fun!

Yay!
Let's go!



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SAFETY INFORMATION

WARNING!

Not suitable for children under 3 years. Choking hazard — small parts may be swallowed or inhaled.

Read the instructions on this page, as well as pages 3 and 4, together with the child conducting the experiments, follow them, and keep them available for reference. Always accompany your child and supervise them while they carry out the experiments.

Keep the packaging and instructions as they contain important information.

Safety information for handling materials:

Red, yellow, and blue dye tablets

Blue alginate powder
Ingredients: E421, sodium alginate (E401), table salt, blue dye

→ Do not consume. Do not inhale the powder.

→ Only perform experiments that are included in this manual.

→ Do not allow materials to come into contact with eyes or mouth.

→ Thoroughly wash hands after experimenting.

→ In case of contact with eyes, rinse with plenty of water and keep open if necessary.

→ If swallowed, rinse mouth with water and drink fresh water. Do not induce vomiting. If in doubt, seek medical attention immediately and take a packet (with visible label) with you.

→ Keep experimental materials locked away and out of reach of small children and animals.

Packets should be cut open at the top with scissors so that the writing remains legible. Never use your teeth to open them. Wear old clothes as the experiment materials (e.g., alginate and color solutions) can cause stains.

Disposal: Dispose of empty packets and other solid waste in the household trash. Dispose of solutions by pouring them down the drain after the experiments and rinse well. Do not dispose of cooking oil in the toilet or sink. Instructions for disposal are given in each experiment section.

Cleaning: Clean the lab station and the lab material with water and a cloth between experiments. Dried alginate can be easily removed by soaking it in water. Then dry everything off with paper towels.

Dear parents and supervising adults,

Children want to explore, understand, and create new things. They want to try things and do it by themselves. They want to gain knowledge! They can do all of this with Thames & Kosmos experiment kits. With every single experiment, they grow smarter and more knowledgeable.

Supervise your child while they experiment, support them, and help them. Read the instructions together before starting each experiment, and follow the safety instructions and all the steps of the experiment.

Please ensure that all parts of this kit are kept safely out of reach of young children and pets.

Only carry out the experiments described in this manual. Children can experiment independently with this set under adult supervision. The set, the powder packets, the finished alginate figure, dye tablets, and other experimental materials (such as soap) should be kept out of the reach of small children and animals.

With this experiment kit, your child can carry out their first simple experiments. Because children's abilities can vary greatly, even within the same age group, you should carefully select the experiments that are suitable and safe for your child. This manual will allow you to evaluate which experiments are likely suitable for your child.

If experiments or experimental steps are marked with this symbol, support is particularly important at this point. Ideally, however, a supervising adult should be present during all experiments and help if necessary.

The alginate, dye tablets, and some household materials can cause stains on clothing. Therefore, old clothes should be worn when experimenting and tablecloths or carpets should be removed from the experiment area. For the lab station, look for a solid, stable table with a sturdy, easy-to-clean surface.

The area around the experiments should be well lit, free of any obstructions, and away from food storage. Have paper towels on hand in case anything falls over or spills.

Have fun!

General rules for safe experimenting

All experiments described in this manual can be carried out safely if you follow these instructions:

→ Read these instructions before use, follow them and keep them for reference.

→ Only carry out the experiments described in this instruction manual. Also follow the instructions given during the experiments.

→ Keep small children and animals away from the experimental area.

→ Store this experiment kit out of the reach of small children.

→ Wear old, sturdy clothing when experimenting.

→ Clean all equipment after use. Also clean your lab station and work table.

→ Wash your hands after completing the experiments.

→ Do not use any equipment which has not been supplied with the set or recommended in the instructions for use.

→ Cool water from the tap is required for many experiments. Use a plastic cup or measuring cup to pour water into your lab vessels.

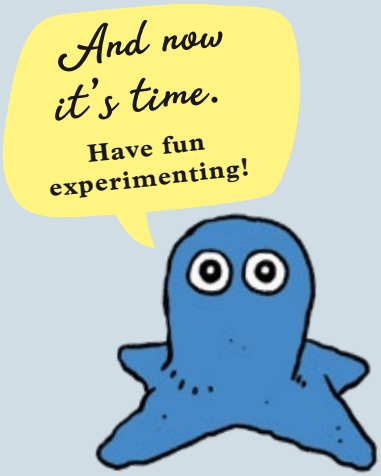
→ Do not eat or drink in the experimental area. Even if food (e.g. grapes, sugar cubes, or salt) is used in the experiments, it must never be eaten and colored solutions must not be drunk.

→ Do not allow alginate powder or mixed alginate to come into contact with the eyes or mouth.

→ Always work slowly and carefully. Avoid creating dust with the powder and splashing or spilling liquids.

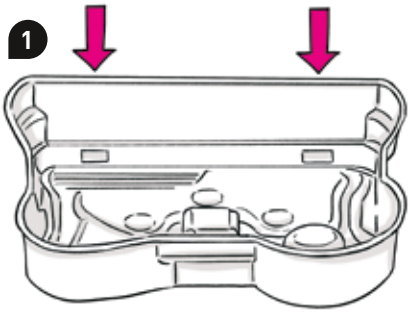
→ Gather any additionally-required materials before beginning experiments.

→ If food items are used in an experiment, only gather the amount you need. Do not return any leftover food items from the experiment area to the original packaging.



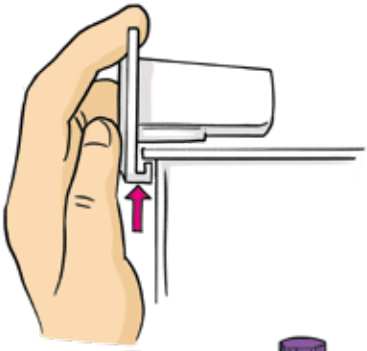
ASSEMBLING YOUR LAB STATION

1



Turn the lab station base over. The arrows here point to the places where the column bases should hook onto the rim of the lab station base in step 2.

2



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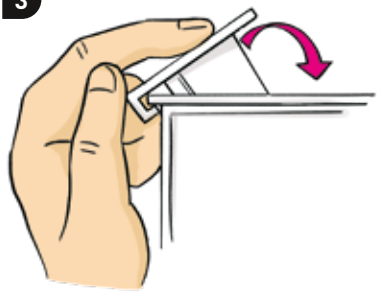

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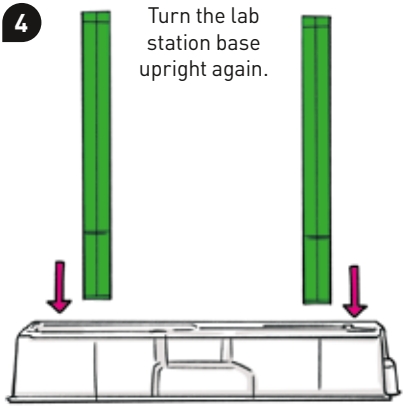
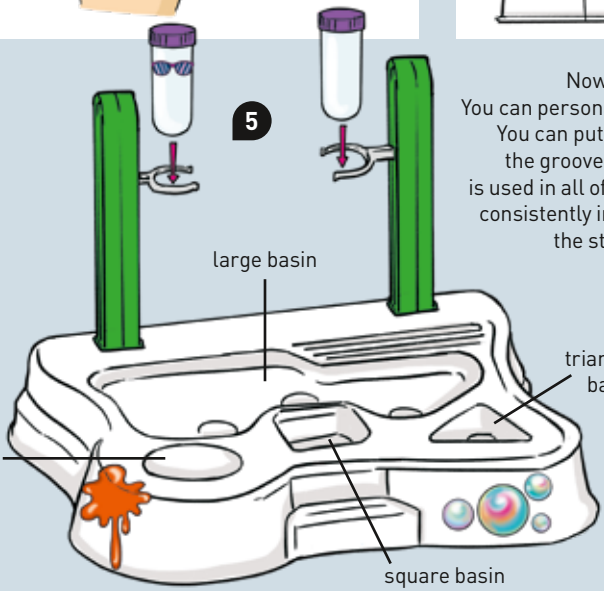
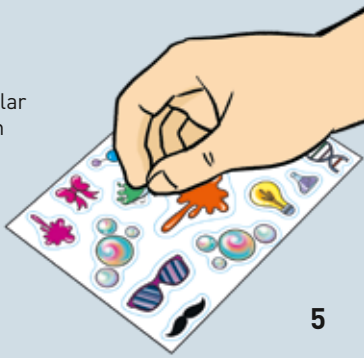


Turn the lab station base upright again.

5



Now mount the test tubes.
You can personalize the station with the stickers! You can put used pipettes and spatulas in the grooved areas. Since the lab station is used in all of the experiments, it is not shown consistently in the "you will need" sections at the start of each experiment.



PIPETTE AND SPATULA

1

Hold the pipette in front of your hand and squeeze the bulb (the wide end). What do you feel?

2

Squeeze the bulb and put the tip under water.

3

Gently release your fingers. The water is sucked into the pipette.

4

If you squeeze the bulb with your fingers, the water will drip out again. Try to let out just one drop at a time.

Your spatula has grooves on one side so you can always grip it well, even with wet fingers.

Pourable, sculptable INFLATABLE

It's funny how different liquids can be! You can build mountains out of some and make soap bubbles out of others. What's going on there? You can sculpt them too, but only if you mix something in first ...

EXPERIMENT 1

LAB ASSISTANT BLOBERT

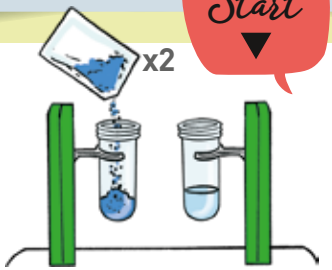
YOU WILL NEED:

Alginate

+ Water
+ Scissors

Start

1



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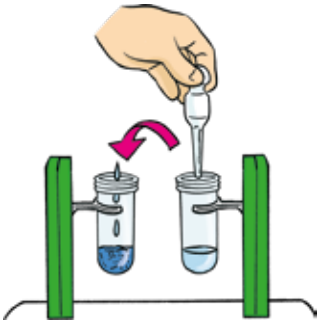
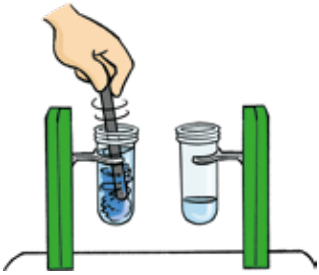


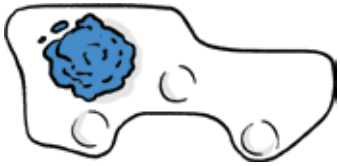
Add a pipette of water to the alginate

3



Stir with the spatula until everything combines into a sticky mass.

4

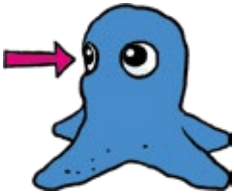


Empty the mixture onto the large basin of your station and knead it until it can be easily shaped.

5

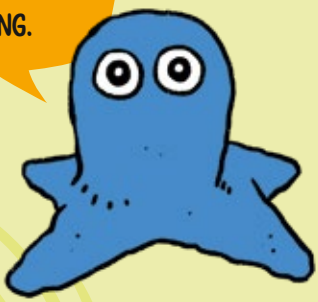
Form a long body with four tentacles.

6



Press the eyes into the mixture until they no longer stick out.

HELLO, I'M BLOBERT, YOUR LAB ASSISTANT. YOU CAN ALWAYS PLACE ME ON THE STATION WHEN YOU ARE EXPERIMENTING.



EXPERIMENT 2

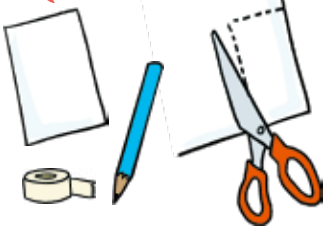
BLOBERT SHRINKS

YOU WILL NEED:

- Paper
- Tape
- Pen
- Scissors
- Ruler

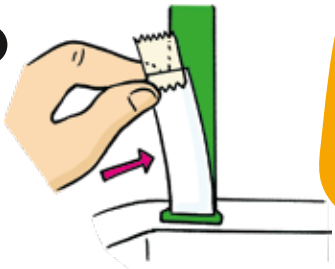
Start

1



Cut a strip of paper that is about as wide as one of the green columns.

2



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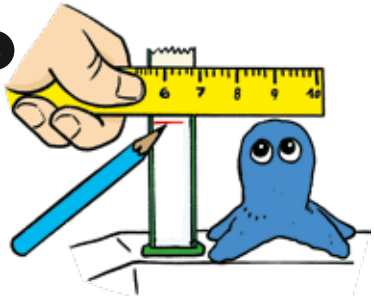
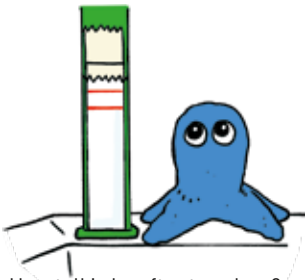


Mark how tall Blobert is right after he's formed.

4



How tall is he after two days?

YOU DON'T HAVE TO WAIT TWO DAYS TO CONTINUE ON TO THE REST OF THE EXPERIMENTS. JUST TRY TO REMEMBER TO MEASURE ME AFTER A COUPLE OF DAYS.

WHAT'S HAPPENING?

When you formed Blobert, you added a lot of water to the alginate. The alginate soaked up the water and that's why it looked like a lot of material. But over time, the water evaporates and only the alginate remains. That's why Blobert gets smaller and firmer.

EXPERIMENT 3

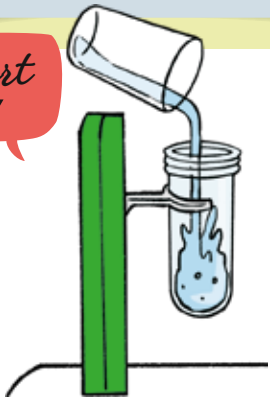
SWIMMING CARPET

YOU WILL NEED:

- Water
- Scissors
- Tape

Start

1



Fill the test tube most of the way with water.

2

1/2

Pour half a packet of alginate as evenly as possible over the water. Use tape to seal the packet with the leftover alginate.

3

Press very slowly.

Tap the surface with your fingertip. **See how far you can dip your finger in without getting it wet. Save the contents of the test tube for the next experiment.**

WHAT'S HAPPENING?

The alginate powder **gels**. That means it absorbs water and forms a substance called a **gel** that lies on top of the water like a carpet.
You could already see this with Blobert. If you press down on it with your finger, you only touch the gel layer and not the water.

PREPARATION FOR EXPERIMENTS 4 – 6

LIQUID FACTORY

YOU WILL NEED:

- Alginate-water mixture from experiment 3
- Water
- Shower gel
- Scissors

1

Take the test tube from experiment 3. If you no longer have the liquid from experiment 3, add half a packet of alginate to a nearly-full test tube of water. Screw the cap on tightly and shake it well.

2

Pour the alginate mixture from the test tube into the triangular basin. Make sure the alginate is fully mixed with the water. Place the test tube in the holder on your lab station.

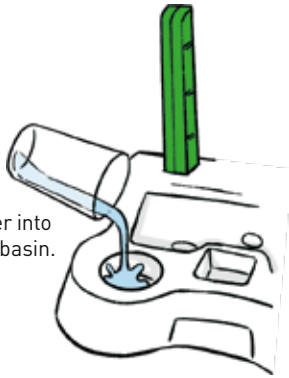
3

Fill the square basin with water and some shower gel.

4

Stir to mix it up.

5



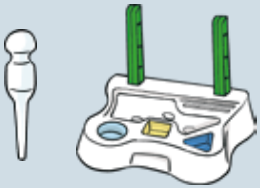
Pour water into the round basin.

Continue to next page.

EXPERIMENT 4

TRAVELING WATER

YOU WILL NEED:

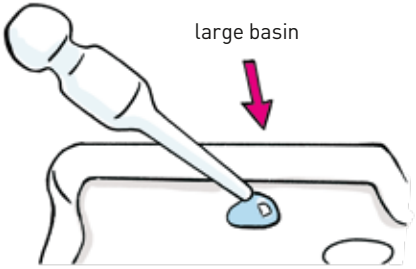


+ The liquids you prepared in the liquid factory

Start

1

2



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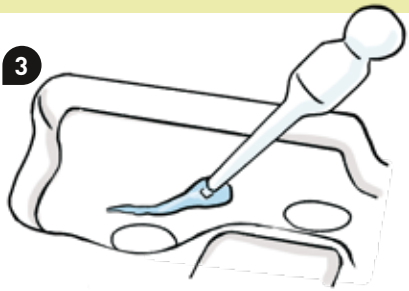


Put the tip of the pipette in the water drop and move it slowly around the station.

4

Try to pull the drop into a curved shape.

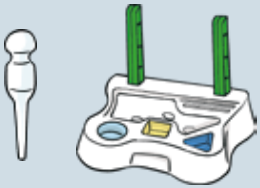
WHAT'S HAPPENING?

The surface of water has a special property called **surface tension** that holds water droplets together. You can imagine it like a type of skin. Water also consists of many tiny **molecules** that attract each other and stick together inside the water droplet. This is called **cohesion.** This is what allows the water droplet to be pulled across smooth surfaces.

EXPERIMENT 5

BUBBLES VS. MOUNTAINS

YOU WILL NEED:



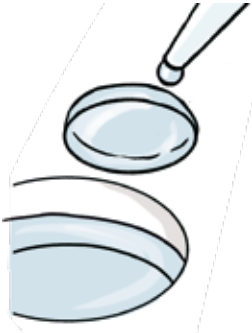
+ The liquids you prepared in the liquid factory

Start

1

Put the pipette in the water and squeeze it. This blows air bubbles into the water.

2

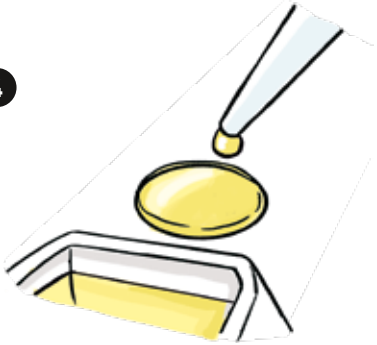


Build a small mound of water by using the pipette to slowly add drops of water to the small indentation in the large basin that's closest to the round basin.

3

Blow bubbles into the soapy water with the pipette.

4



Slowly add drops of soapy water to the small indentation in the large basin that's closest to the square basin.

RINSE THE PIPETTE WITH WATER BEFORE MOVING ON TO THE NEXT STEPS. OTHERWISE, EVERYTHING WILL GET SOAPY.

Blow bubbles into the alginate mixture with the pipette.

Build an alginate mixture mound in the indentation closest to the triangular basin.

IT'S GETTING TENSE:

BUBBLES FORM IN THE PURE WATER AND THEN QUICKLY BURST AGAIN. YOU CAN ALSO MAKE SMALL MOUNDS WITH THE WATER.

YOU CAN MAKE BIG BUBBLES WITH THE SOAPY WATER, BUT YOU CAN'T BUILD MOUNDS.

THE BIGGEST MOUNDS CAN BE BUILT WITH THE ALGINATE MIXTURE. BUT WHEN YOU BLOW INTO THE ALGINATE MIXTURE WITH THE PIPETTE, BUBBLES DON'T FORM, EVEN FOR A SHORT TIME.

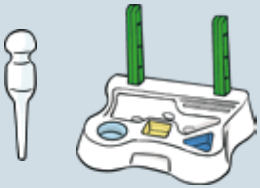
WHAT'S HAPPENING?

You've probably already noticed this: The better you can make bubbles in a liquid, the harder it is to build mounds out of it.
This has to do with the **surface tension** and the **cohesion** of the liquid. With soapy water, the bubbles work so well because the surface tension is low. This means that the "skin" of the soapy water is relatively soft, so it can expand into a bubble. But because it is so soft, it also breaks quickly if you try to build a mound out of soapy water. With water, it is exactly the opposite. Alginate has even more surface tension, so it builds great mounds but won't form bubbles at all.

EXPERIMENT 6

FUN WITH BUBBLES

YOU WILL NEED:

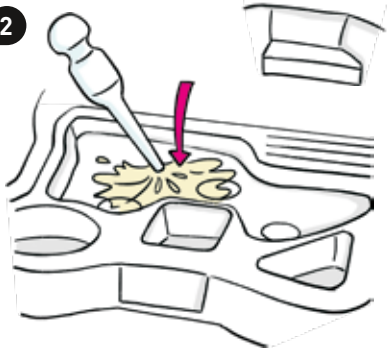


+ The liquids you prepared in the liquid factory

Start

1

2

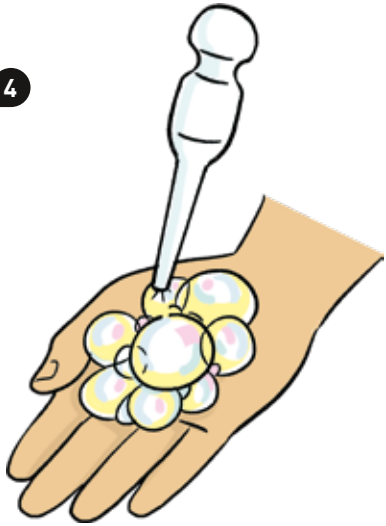


Use the pipette to make a soapy water puddle in the large basin.

3

Blow air into the puddle with the pipette. Choose one bubble and blow more air into it with the pipette. You will have to repeatedly remove the pipette from the bubble before releasing the bulb to get more air.

4

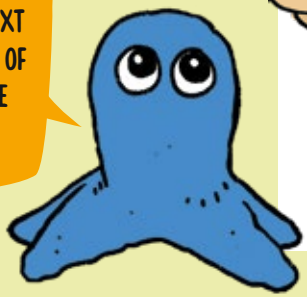


You can try the same thing on your hand as well if you add a little bit of soapy water to your palm with the pipette.

5

What happens if you turn your hand upside down? Make sure you hold your hand over the large basin when you do this.

DO SOME MORE TESTS! CAN YOU BLOW BUBBLES NEXT TO EACH OTHER, ON TOP OF EACH OTHER, OR INSIDE EACH OTHER?



CHECK IT OUT

HIDDEN WATER

Like Blobert, a lot of things that look relatively solid actually contain a lot of water. Bread is about 40% water, and cucumbers are about 97% water!

Walking on water

Some small creatures use surface tension to walk on water. They have to be light enough that they don't break through the surface. They also have to have waterproof skin or hair. One example is the **water strider.** If they tried to walk on soapy water, they would fall right in.

Not as similar AS THEY SEEM

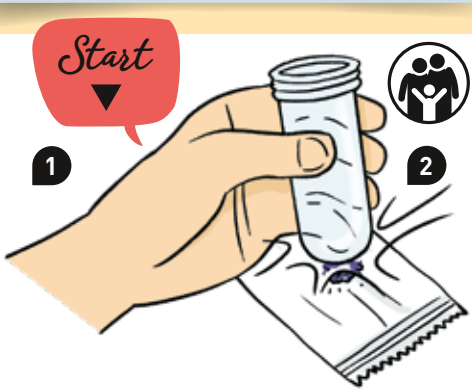
Oil and water may look similar at first glance, but they actually behave very differently. And that can be used to create lots of cool effects.

EXPERIMENT 7

CHOOSEY COLORS

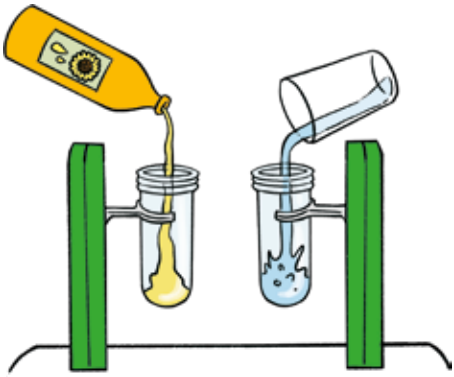
YOU WILL NEED:

+ Water
+ Vegetable oil
+ Scissors



Break the purple-looking dye tablet into smaller pieces while it's still in its packaging. You will use it to create a red dye later.

3

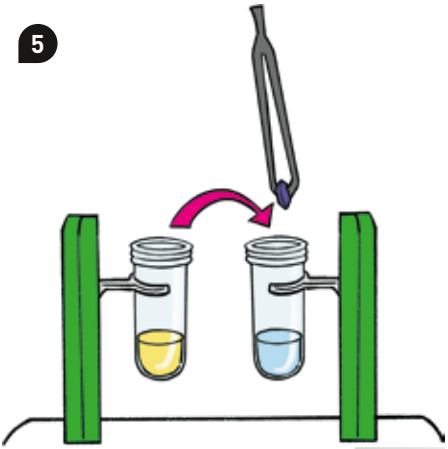


Pour some oil into one test tube and some water into the other one.

4

Add a piece of the dye tablet to the oil.

5



Keep the oil and water for experiments 8 and 9.

WHAT'S HAPPENING?

The dye isn't **soluble** in oil, which means it doesn't dissolve in oil, so nothing happens. In water, though, it dissolves quickly and spreads evenly throughout the water. Generally, the rule is: Everything that dissolves well in water dissolves badly in oil, and vice versa.

EXPERIMENT 8

COLORFUL JELLYFISH

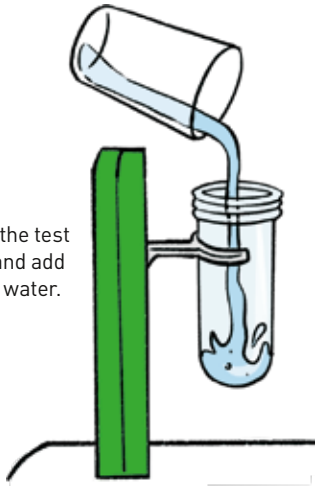
YOU WILL NEED:

- Water
- Vegetable oil and red dye solution from experiment 7
- Salt
- Scissors

1

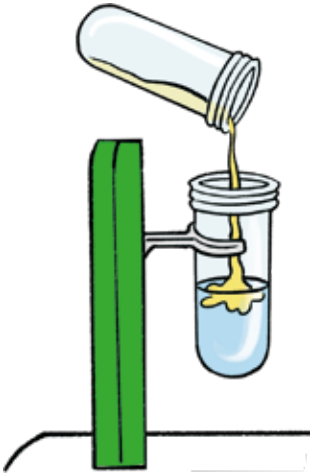
Pour the red dye solution from experiment 7 into the round basin.

2



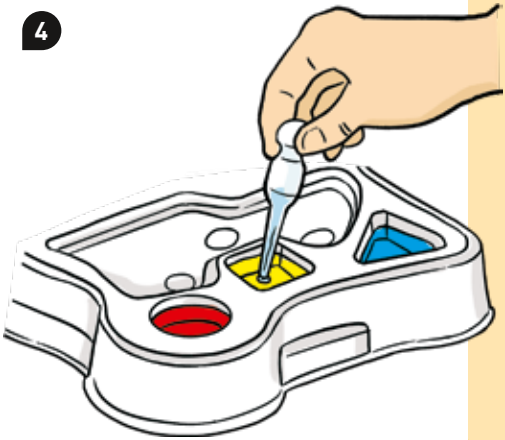
Clean the test tube and add fresh water.

3

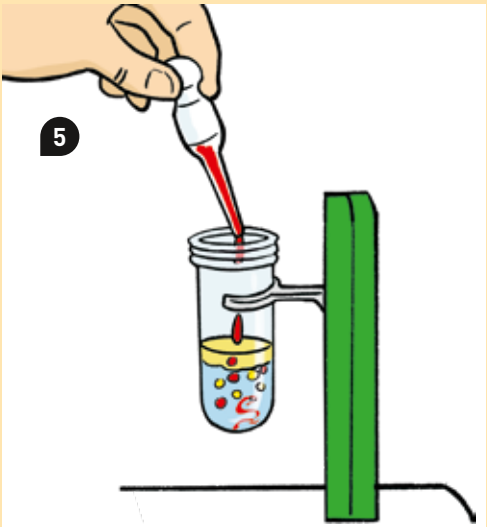


Pour the oil from experiment 4 into the water.

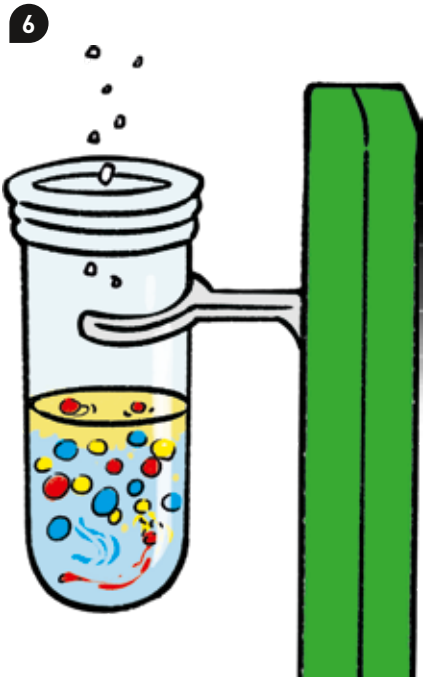
4



Put a piece of the yellow dye tablet into the square basin and a piece of the blue dye tablet into the triangle basin. Add some water to each of them.



Add small drops of each color into the oil.



Sprinkle a pinch of salt into the mixture.
Try to target the beads of color
Keep the mixture for the next experiment.

WHAT'S HAPPENING?

Oil and water are so different that they do not mix. The colored water pearls retain their spherical shape in the oil layer. Only when they reach the water do they mix with it.
The salt makes the water pearls heavier and ensures that they sink to the bottom more quickly.

EXPERIMENT 9

OiL SHAKE

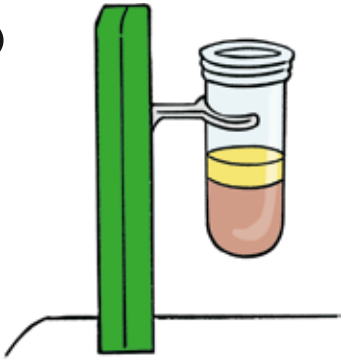
YOU WiLL NEED:

+ Test tube with mixture from experiment 8

1

Screw the lid tightly onto the test tube with the oil and water on it and shake it well.

2



Put it back into the test tube holder and observe what happens.

3

The oil should not be poured down the drain because it could contaminate the waste water or damage the pipes. Pour the oil into a bag, tie it up, and put it in the trash. Have an adult help you.

WHAT'S HAPPENING?

1 milliliter of oil weighs less than 1 milliliter of water. In scientific terms, oil has a lower **density** than water.
That's why the oil floats on top of the water. Even if you mix it by shaking, the oil rises to the top again. That's also why your colored water beads sank through the oil layer in experiment 8.

Milk and cream

Oil is fat. Much like your mixture in experiment 9, milk is also a mixture of fat and water. If raw milk is left to settle, the fat rises to the top and can be scooped off as cream.

Chili and garlic-oil!

The colors in your dye tablets dissolved in water but not in oil. That can also happen the other way around: lots of flavors dissolve in oil but not in water. For example, if you leave chilies, garlic, or herbs in oil for a few days, they'll release their flavor into the water. That doesn't work with water.

Grapes AND RAINBOWS

Grapes are delicious! But these grapes aren't for eating. We need them for science.

EXPERIMENT 10

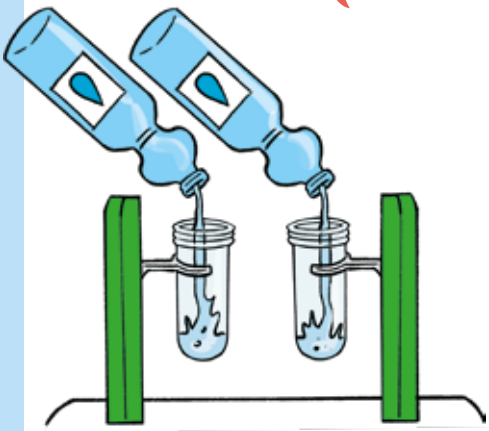
DANCING GRAPES

YOU WILL NEED:

+ Sparkling water
+ Grapes

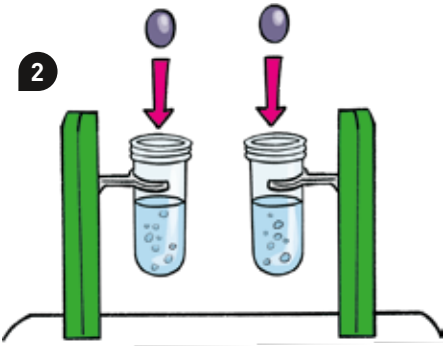
Start

1



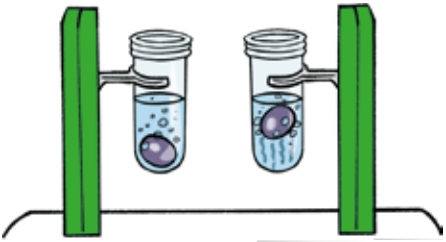
Pour sparkling water into both test tubes.

2



Add a grape to each test tube.

3



Observe what happens.

WHAT'S HAPPENING?

At first, the grapes don't float, but the water contains small bubbles of carbon dioxide that are constantly rising because they're lighter than the water. These gas bubbles collect on the skin of the grapes. At some point, there are so many that the gas bubbles pull the grapes to the surface. When they reach the top, the bubbles burst and the grapes sink again. Then the process repeats, making the grapes dance up and down.

EXPERIMENT 11

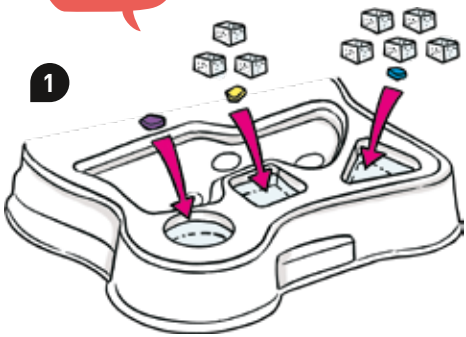
RAINBOW IN A TEST TUBE

YOU WILL NEED:

+ Water
+ Sugar cubes

Start

1



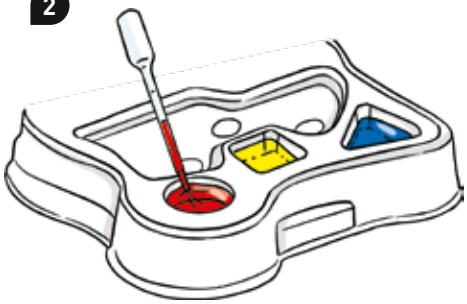
Fill each of the small basins with water. Add the following to each of them and mix well:

In the round basin:
• Piece of the red dye tablet (it looks purple)

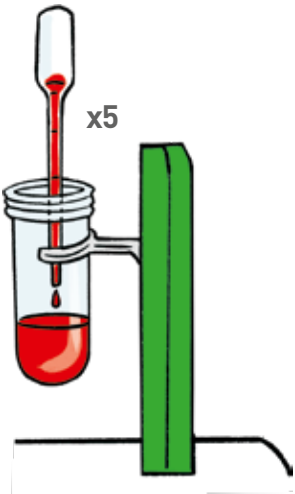
In the square basin:
• Piece of the yellow dye tablet
• 3 sugar cubes

In the triangular basin:
• Piece of the blue dye tablet
• 5 sugar cubes

2



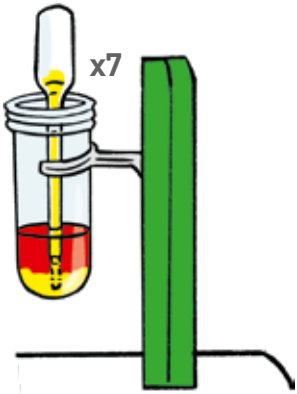
3



Add five full pipettes of the sugar-free red water to the test tube.

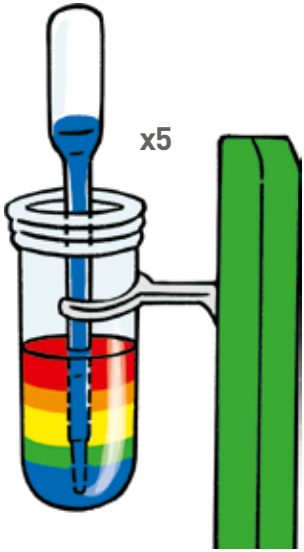
THIS IS A BIT TRICKY. IF YOU ADD THE COLORS TOO FAST OR SHAKE THE TUBE, THEY'LL ALL MIX. BUT AS LONG AS YOU HAVE MORE DYE, YOU CAN TRY AGAIN.

4



Fill the pipette with yellow sugar water and dip it almost all the way into the test tube, at the bottom of the red liquid. Make sure the tip doesn't touch the bottom of the tube. Then, slowly and carefully squeeze the yellow water into the test tube. Repeat until you've used all of the yellow sugar water you prepared. That's about seven full pipettes.

5



Last, repeat step 4 with the blue sugar water. You should use about five full pipettes.

WHAT'S HAPPENING?

You already know that liquids with higher density sink to the bottom. The more sugar you dissolve in the water, the denser it becomes.

Because the red, yellow, and blue liquids have different densities, they layer on top of each other.

However, because they're all mostly made of water, and the densities are only a little bit different, the liquids mix together where they touch. Between red and yellow, an orange layer forms, and between yellow and blue, a green layer forms.

EXPERIMENT 12

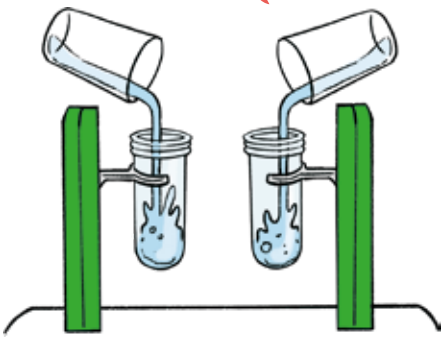
FLOATING GRAPES

YOU WILL NEED:

- Water
- Grapes
- Sugar cubes

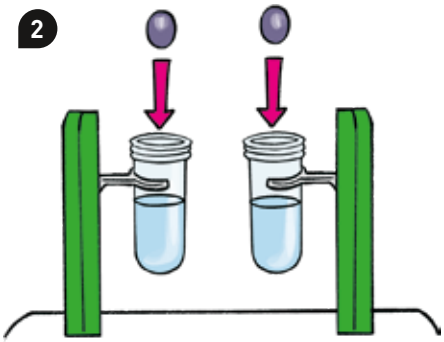
Start

1



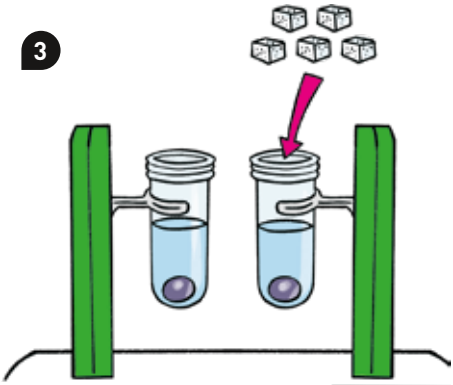
Add water to each test tube.

2



Add a grape to each test tube.

3



Add five sugar cubes to one of the test tubes, and stir until they dissolve.

WHAT'S HAPPENING?

The grapes sink because they're denser than the water. One of the reasons they're dense is because they have sugar in them.

Adding five sugar cubes makes the water denser than the grape. Then the grape starts to float.

THAT WAS COOL! EXPERIMENTING WITH YOU IS SO MUCH FUN.

Dead Sea

Sugar isn't the only thing that can make water heavier. It also works with salt. You may have heard of the Dead Sea. It's a very salty lake that contains so much salt that a lot more than grapes can float on it. Even humans can easily float on the surface of the water.

COLORFUL DRINKS

Have you ever seen a multi-colored drink? They use the exact same trick with density that you used to make a rainbow. For example, if you mix a colored fruit juice with water and then add a syrup of a different color, the syrup will sink to the bottom and stay there until you stir. Syrup contains a lot of dissolved sugar, so it is heavier.

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