

The Spark

Magazine



PUZZLES, QUIZZES, OUTDOOR LEARNING

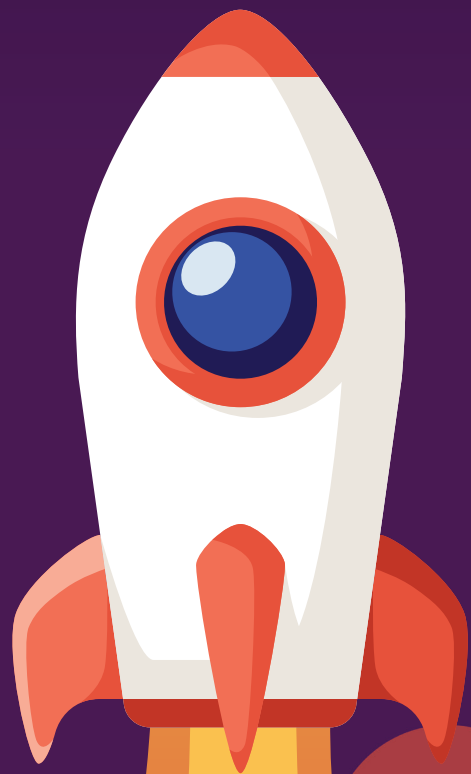
ISSUE
No3



**GROW
YOUR OWN
STALACTITES!**

**MAKE A
WIND POWERED CAR
AND A SUNDIAL**

**MEET A
SPACE STATION
FLIGHT CONTROLLER**



With support from the Inspiring Science Fund
provided by BEIS, UKRI and Wellcome

GLASGOW
**SCIENCE
CENTRE!**

Inside

This issue

WELCOME

Welcome to the third edition of The Spark! Every issue will have exciting experiments for you to try at home, fascinating facts to ponder over, and puzzles and quizzes to challenge your family. This week we're making wind-powered cars, sundials, and growing our own tiny icicle-like cave formations - stalactites. Plus, we find out what it's like to be in mission control for the International Space Station!

You can watch the videos that go along with some of the experiments this week on the Glasgow Science Centre Facebook page or YouTube channel.

Best wishes,
Glasgow Science Centre



PLANET PUZZLE

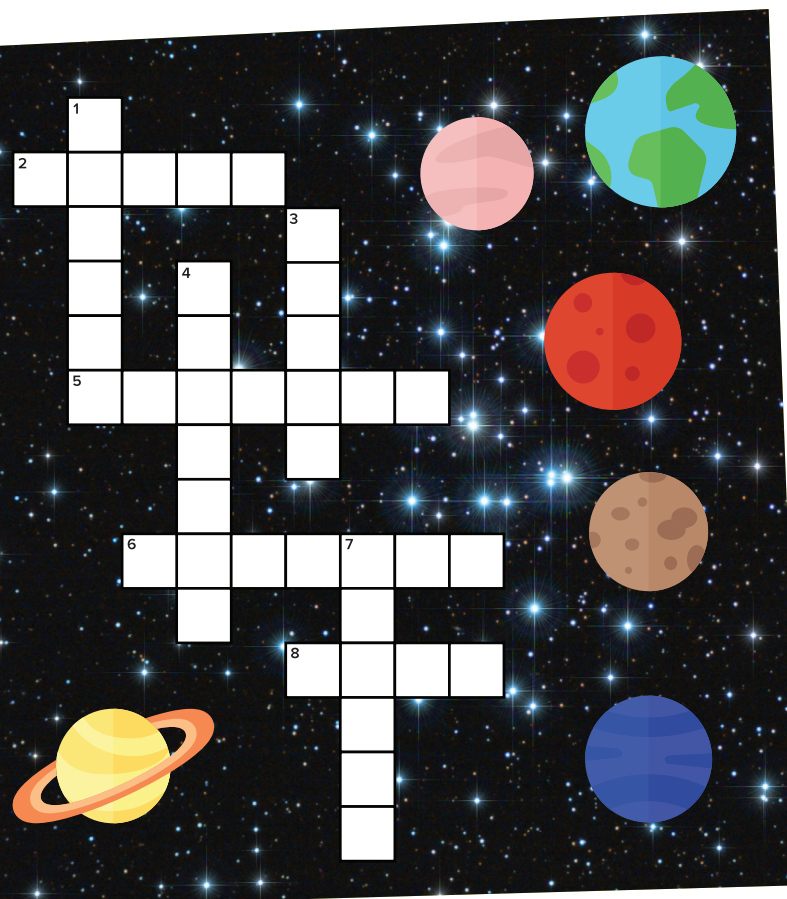
Use our fun facts to fill in the names of the 8 planets in our solar system

Across

- 2 I am the only planet in our solar system where we know life exists. (5)
- 5 I am the furthest planet in our solar system from the sun. (7)
- 6 I am the closest planet to our sun. (7)
- 8 I am called 'the red planet' because I have rust on my surface. (4)

Down

- 1 I am famous for my rings, made from millions of chunks of ice, dust and rocks (6)
- 3 I am the hottest planet in our solar system. (5)
- 4 I am the biggest planet in our solar system. (7)
- 7 I am the coldest planet in our solar system. (6)



SHARE YOUR PICS WITH US



If you try any of our activities this week, please show us how they turned out! Send your favourite pictures to CLDteam@gsc.org.uk or share with us [@TheBothyGSC](https://twitter.com/TheBothyGSC) on Twitter. We'll print a selection of your pictures in the magazine.

Share [@TheBothyGSC](https://twitter.com/TheBothyGSC)
email to CLDteam@gsc.org.uk



DID YOU KNOW?

As well as the eight planets in our solar system, scientists have discovered over 4,000 exoplanets.



These are planets that orbit stars
outside our solar system.

FAMILY QUIZ

All questions linked to activities in this issue

QUESTIONS

Answers on back page

- Q1. Which formation grows from the ceiling of a cave?
a) Stalactite b) Stalagmite
- Q2. In 2019 Scotland generated twice as much electricity as it needed from which energy source? a) Nuclear power b) Solar power c) Tidal power d) Wind power
- Q3. What were the first devices known to be used to measure time?
- Q4. How long can it take a limestone stalactite to grow just 10 cm? a) 10 years b) 100 years c) 1,000 years d) 10,000 years
- Q5. How many atoms does a molecule of oxygen have?
a) One b) Two c) Three d) Four
- Q6. True or False. Wind power has been used to make flour?
- Q7. How long does it take the International Space Station to complete one orbit of Earth?
- Q8. What are stalactites made of?
- Q9. When did the first crew arrive on the International Space Station?
- Q10. Which planet has the fastest winds in the solar system?

HINT

You may find some answers throughout this magazine or in our [#GSCAtHome](https://twitter.com/GSCAtHome) videos.

I'M A... FLIGHT CONTROLLER FOR THE INTERNATIONAL SPACE STATION

Meet Andrea Boyd, who talks to Astronauts in space!

"I work in Mission Control and connect the Astronauts on orbit with all the scientists and engineers in the flight control team on the ground in Europe, USA, Russia and Japan. It's a big collaboration and we all support and cheer for each other. Star Trek was my biggest inspiration since age 10 and I still enjoy it! I learned the word engineer and thought if I became one then I could work with the space industry. (This worked!) I wanted to make things work in space and the International Space Station (ISS) is a truly unique project where countries work together to advance science, medicine and engineering to benefit all humans."

Favourite thing about my job: Watching the Earth plus orbital sunrises and sunsets from the ISS cameras!

Favourite Food: Korean BBQ and Italian Gelato



The International Space Station has hosted 240 people from 19 countries since November 2000!

ACTIVITY

Make your own Stalactites

What will you do?

In this activity you will grow your own miniature stalactites. Real stalactites look like icicles made from rock and form very slowly as water drips from the ceiling of caves. But you are going to make stalactites that grow in seven days!

Ensure you have permission from an adult and their supervision before starting.

What will you need?

This experiment can be messy. So, it is best NOT to do it on the living room carpet!

- Absorbent cotton string (make sure it isn't waxed or waterproof) or wool
- Salt or another crystalline substance (baking soda or washing powder)
- Two glasses that are the same height
- Small plate or similar to catch drips
- Scissors



How to do this experiment

Step 1. Fill each glass about three-quarters full of warm water.

Step 2: Add 3 teaspoons of salt to each glass and stir until it is dissolved. Keep adding more salt, a teaspoon at a time, until small amounts of salt appear at the bottom of the glass after stirring. Now the solution is saturated – this means the water can't hold any more salt!

Step 3: Sit your glasses roughly 15 cm apart and place your plate in between them.

Step 4: Cut a piece of string long enough to reach from the bottom of one glass, over the plate and down to the bottom of the other glass with a little dip in the middle.

Step 5: Place one end of the string in each glass.

Top tip: make a little bend in the string down towards the plate to encourage the stalactite to grow there.

Step 6: Sit your experiment somewhere safe where it won't get knocked over by people or pets. Leave your experiment for seven days and see if you have managed to grow any stalactites.

More to try

- What would happen if you left your experiment for more than seven days? Can you see any stalagmites growing up from the plate? Stalagmites are like stalactites, but they grow from the ground, at the bottom of caves rather than from the top!
- What would happen if you added food colouring to your water?

Fun facts

- Stalactites are usually made of minerals left behind by water dripping from the roof of limestone caves but when volcanoes erupt, we sometimes get stalactites made of lava!
- Stalactites come in lots of different shapes like straws, petals, buttons and shark teeth. Their shape depends on lots of conditions inside the cave, like air currents and how fast or far droplets can fall.

Share pictures of your activities with us by sending to CLDteam@gsc.org.uk or message [@TheBothyGSC](https://twitter.com/TheBothyGSC) on Twitter

ACTIVITY

Make your own Sundial



What will you do?

Shadows appear when an object blocks the path of light. In this activity you will become a human sundial and record how your shadow moves throughout the day.

Ensure you have permission from an adult and their supervision before starting.

What will you need?

- A spot outside that gets sunlight all day
- A partner
- Measuring tape
- Paper
- Pen or pencil
- Watch
- Chalk or some stones

How to do this experiment

Step 1. Find a spot on the ground outside where it's sunny and isn't going to be covered by shadows from trees or buildings later in the day.

Step 2: Stand on a spot and have your partner mark where your feet are with chalk or by placing a stone.

Step 3: Have your partner draw around the outline of your shadow or place another stone at the top of your shadow right where it ends.

Step 4: Measure the length of your shadow from where you were standing to the end of it and write this down on a piece of paper.

Step 5: Write down the time of day you measured your shadow and some observations about what it looked like, for example, was it thin or wide? You can even take a photo of your shadow.

Top tip: It might help to write your results in a table with the headings: time, shadow length and observations.

Step 6: Repeat this experiment at different times throughout the day always standing on the same spot you started on. Don't forget to write down your results each time.

Step 7: Now it's time to look at our results and answer some questions:

1. What happened to your shadow throughout the day? Did it move? Did it change shape?
2. What time of day was your shadow the longest? When was your shadow the shortest?

Fun facts

- Ancient Egyptians used shadows to tell the time with sundials. Although sundials are a very cool tool, they can't be used at night or carried around. Luckily humans have invented lots of other amazing ways to tell the time using pendulums, clocks and even lasers!
- The Greek astronomer Eratosthenes used shadows to first calculate the distance around the Earth. This is known as the circumference.

Share your activities!
Send your pics to
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on Twitter.



ACTIVITY

Huff and Puff



What will you do?

In this activity you will build a wind-powered sail car and use a hairdryer or fan to make it travel.

Ensure you have permission from an adult and their supervision before starting.

What will you need?

- Egg box or small cardboard box
- Cardboard
- Tape
- Cardboard tube (this can be a sweet tube)
- Scissors
- 3 pencils
- Paper or card
- Blue tac or plasticine
- Pens/crayons/colouring pencils
- A hole punch if you have one (not essential)
- A hairdryer or fan
- Adult supervision



How to do this experiment

Step 1. Find a cup or glass with a diameter of about 5-6cm. Draw around the cup to make four circles on the cardboard. Cut out the four circle shapes. Mark a dot in the centre of each of the cardboard circles and use a pencil to make a hole through the dot.

Step 2. Take your cardboard tube and cut it in half, so that you have two shorter tubes of the same size.

Step 3. Put a pencil inside both of the cardboard tubes. Take the four cardboard circles and push one onto each end of the pencils that are sticking out of the tubes to make two sets of wheels for the car.

Step 4. Use sticky tape to attach your wheels to the underside of the egg box, by taping the cardboard tubes in place. You should now have a basic car shape.

Step 5. Take the plasticine or blue tack and push it down into one of the dips in the egg box car. This will hold your sail in place.

Step 6. To make your sail, take your A4 sheet of card or paper and cut it in half. Mark a dot about 1.5 cm from the top and bottom edges of the paper, as close to the centre as possible. Make a hole where the marks are - use a hole punch if you have one, or you can use a pencil.

Step 7. Now it's time to decorate your sail! You can use your colouring pens or pencils to create a great design. (Remember that the sail will be attached with the holes at the top and bottom.)

Step 8. Take the third pencil and push it down into the plasticine or blue tack. This will act as a mast for the sail. Thread your decorated sail onto the pencil through the holes in the bottom and top. If you have a paper sail, you may need to use sticky tape to secure the sail to the pencil mast.

Step 9. Cut out a little flag to stick at the top of the mast, it can be any shape you want. Use sticky tape to secure it.

Step 10. You have made your very own wind-powered sail car! You can use your breath and blow into the sail to make it travel. Here's a top tip: the sail should be at the back of the car because it's more likely to tip over if it's at the front. All you need to do is spin the sail around to make sure it's at the back.

More to try

Use a hairdryer or fan to give your car more speed!

Get the people around you to make their own car and have a race.

Can you think of anything you could change to make your car travel further or faster?

Fun facts

In the first half of 2019 Scotland generated twice as much electricity as it needed, just from wind power alone.

The fastest wind speed ever recorded was 302 miles per hour (486 kilometres per hour) when a tornado hit Bridge Creek, Oklahoma, USA, in May 1999.

People have harnessed the power of the wind for thousands of years to sail ships and pump water. Windmills have been used to crush grain to make flour for hundreds of years.

Find more
exciting activities
on our Facebook and
YouTube pages
#GSCAtHome

Share your
huff and puff
experiments
#GSCAtHome

Send your pics to
CLDteam@gsc.org.uk or message @
TheBothyGSC on Twitter.

ABOUT US

Glasgow Science Centre is a 5-star visitor attraction located beside the River Clyde. We are home to hundreds of interactive exhibits where you can discover how the world works. Explore the inner workings of the human body, find out how we can power the future, challenge your family and friends to solve puzzles, explore technologies of the future and marvel at the wonders of the solar system under our fulldome Planetarium. Our team of passionate presenters are always on hand to bring you exciting experiences in our hands-on workshops and live demos in our spectacular Science Show Theatre.

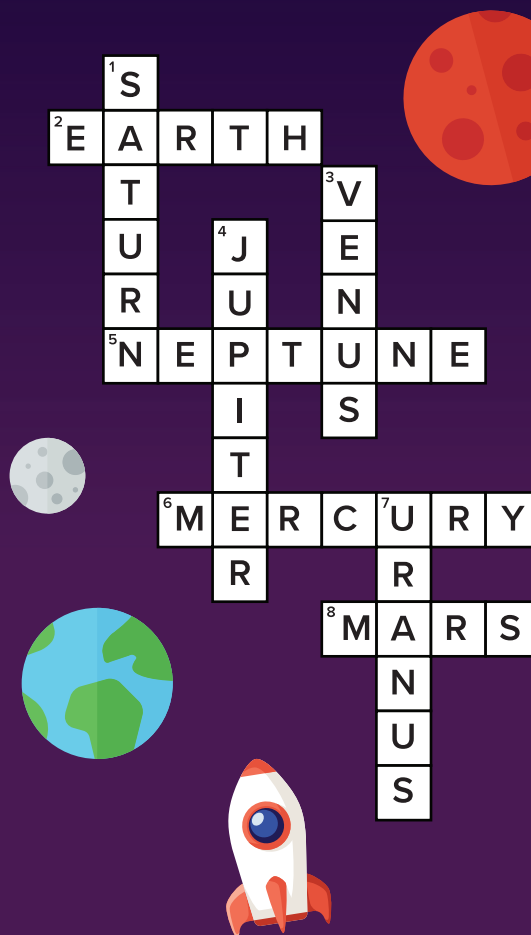
During these challenging times while we are unable to open our doors to you, we are bringing you the excitement of Glasgow Science Centre through GSC At Home. We're online every morning at 10am on our Facebook page and YouTube channel.

QUIZ ANSWERS



1. a) Stalactites grow down from the ceiling of caves and stalagmites grow up from the floor. Sometimes the two will eventually join together stretching from floor to ceiling, forming what geologists call a column.
2. d) Wind power. Other key sources of renewable energy for Scotland are hydroelectric power and solar power. About 90% of Scotland's electricity consumption is powered by renewable energy.
3. Sundials are instruments that can tell us the time by using the position of the sun and the shadows it makes.
4. c) It can take a limestone stalactite 1000 years to grow just 10 cm! The longest stalactite recorded so far is found in Brazil and measures 28 m (or 92 ft). That's slightly higher than 6 double-decker buses piled on top of each other!
5. b) A molecule of oxygen has two atoms.
6. True. People used windmills for hundreds of years to crush grains to make flour.
7. It takes around 92 minutes to complete one orbit of Earth, travelling at a speed of 8 kilometres per second (5 miles per second). That's 28,800 kilometres per hour (17,900 miles per hour)!
8. Most stalactites are found in limestone caves and are made of the mineral calcium carbonate. They form very slowly as water drips from the ceiling of caves. There are also stalactites made of lava during volcanic eruptions, but these form much more quickly and stop growing when the lava stops flowing.
9. The Expedition 1 crew arrived on the 2nd of November 2000, and the ISS has been continuously occupied since then!
10. Neptune has the fastest winds in our solar system. Winds blow clouds around the planet at more than 2,000 kilometres per hour (1,200 miles per hour). That's almost five times faster than the most powerful winds on Earth.

CROSSWORD ANSWERS



WE WANT YOUR FEEDBACK

We would love to hear what you think!



We hope you liked this issue, but if you didn't, what should we change? What other things would you like to see or what topics are you most interested in?

Don't forget to send us photos of your creations, discoveries and experiments. **You can send feedback and pictures to CLDteam@GSC.org.uk or message us on twitter @TheBothyGSC.** We'll print a selection of your pictures in the magazine.

KEEP IN TOUCH



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