

The Spark

Magazine

PUZZLES, QUIZZES, OUTDOOR LEARNING



ISSUE
No2

**MAKE
YOUR OWN
GLORIOUS GOO!**

**CREATE A SECRET
MESSAGE USING
INVISIBLE INK**

**MEET AN
IMMUNOLOGIST**

**WHAT'S A
CRESS MONSTER?**

FIND OUT **INSIDE**



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

GLASGOW
**SCIENCE
CENTRE!**

Inside

This issue

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 contact.us@gsc.org.uk or share with us on our social media channels with #GSCAtHome. We'll print a selection of your pictures in the next magazine.

Share on social #GSCAtHome
email contact.us@gsc.org.uk

WELCOME

Welcome to the second 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 are looking at secret messages, glorious goo, immunology and so much more! Without skipping ahead, what do you think an immunologist does?

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.

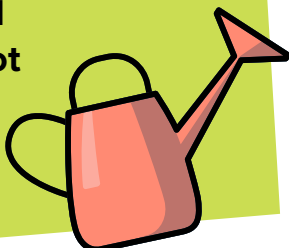
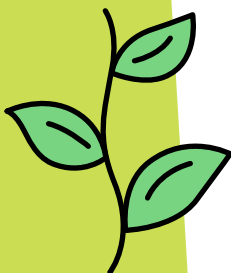
Best wishes,
Glasgow Science Centre



WORDSEARCH

Can you find the hidden words?

- Sunlight
- Water
- Seed
- Plant
- Grow
- Green
- Leaf
- Flower
- Cress
- Soil
- Root



HOW DOES YOUR GARDEN GROW?

S	S	O	K	T	L	E	A	F	A	S	K
A	K	E	F	O	D	Z	O	F	S	P	T
T	R	E	T	A	W	M	R	E	J	O	S
N	S	X	R	S	H	K	R	S	O	G	U
F	U	P	H	V	U	C	A	R	Q	U	N
L	A	H	L	E	E	N	Y	O	T	A	L
O	Y	B	D	A	P	S	E	E	D	Z	I
W	E	R	G	O	N	T	R	R	W	O	G
E	H	J	R	R	K	T	S	I	S	G	H
R	L	S	H	J	E	H	O	S	O	N	T
A	C	Y	R	W	F	E	A	L	I	W	M
W	O	R	G	J	E	P	N	K	L	S	T





FAMILY QUIZ

All questions linked to activities in this issue



QUESTIONS

Answers on back page

DID YOU KNOW?



The largest and heaviest seed in the world is the **double coconut from the Coco de Mer palm tree.**



It can grow up to half a metre wide and weighs up to **30kg** – that's the same as **30 bags of sugar!**

1. Which planet is closest to the Sun?
2. True or False: grains like wheat, rice and corn are all types of seeds.
3. What is the name scientists use for the 'glorious goo' substance? Hint: it can act like both a solid and a liquid!
4. What is the largest planet in the solar system?
5. The first electronic digital computers were the size of a whole room! Which of the following has allowed computers to shrink in size? a) Faster electricity b) Microchip technology c) Shorter cables d) Wi-Fi technology
6. The Sun is a... a) Galaxy b) Moon c) Planet d) Star
7. What does viscosity measure?
a) the visibility of a fluid b) the internal friction of a fluid
c) the colour of a fluid d) the prettiness of a fluid
8. Seeds need to be dispersed from their parent plant in order to have space to grow. What three methods of transport can seeds use to get around?

HINT

You may find some answers throughout this magazine or in our #GSCAtHome videos.

I'M AN... IMMUNOLOGIST

Meet Faith Uwadiae.

Faith investigates how our immune system works and is based at the Francis Crick Institute in London.

"I was the kid that never knew what they wanted to do the whole way through school. I was very quiet and shy but very cool in my own way. I was inspired to study science by my high school science teacher. I now study how our immune system changes when people get infected with malaria and how this is linked to a type of cancer called Burkitt's Lymphoma. My favourite thing about my job is knowing that there are so many unanswered questions and every time I figure something out it is a mini scientific breakthrough."

Hobbies: sports and dancing.

Favourite Food: full English breakfast.



ACTIVITY

Make your own Glorious Goo



This experiment uses cornflour and food colourings. If used, custard powder may contain traces of milk. Although rare, in some people these foodstuffs may cause an allergic reaction.

What will you do?

In this experiment you will be making a glorious goo substance with strange properties. You will explore the effect that **forces** (*pushes and pulls*) have on your goo - behaving as either a **liquid** or **solid**.

What will you need?

Like all experiments, ensure you have permission from an adult and their supervision before starting. This experiment can be messy. So, it is best NOT to do it on the living room carpet!

You will need:

- Cornflour (or custard powder)
- Jug of water
- Food colouring (*optional*)
- Spoon
- Small bowl or container



How to do this experiment

Step 1. Add three heaped spoonfuls of cornflour to your bowl or container.

Step 2. Fill a jug with some cold water from the tap and to this add a few drops of food colouring (*optional*).

Step 3. Make a well in the middle of the cornflour. Add 20ml of the coloured water. Start to mix in a slow circular motion. You will notice that it will be very clumpy and difficult to stir at this stage. When the water has been mixed in add another 20ml of water and carry on stirring slowly until you have a thick custard-like consistency. If it looks a little too watery just add a little more cornflour.

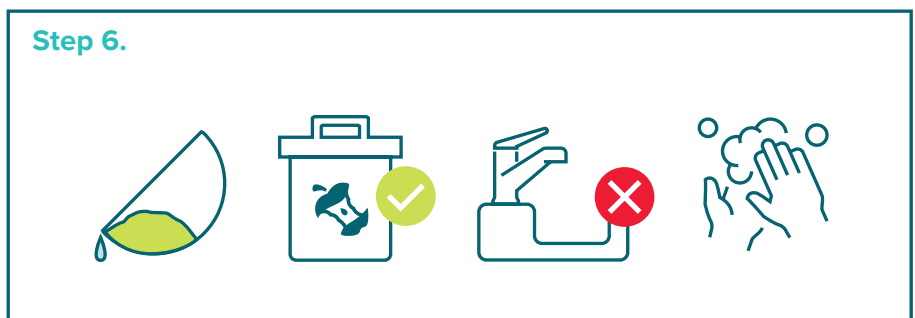
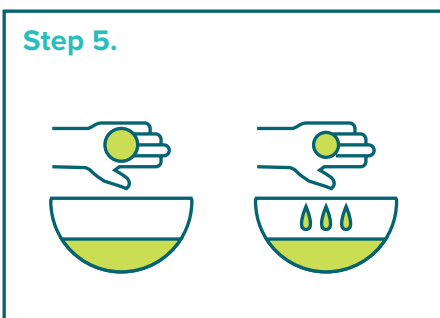
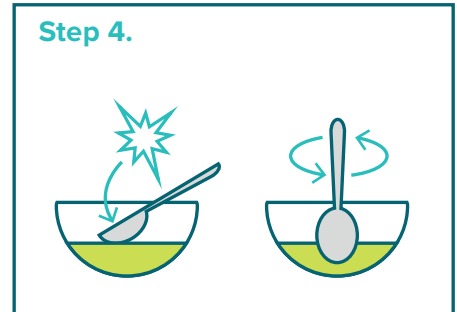
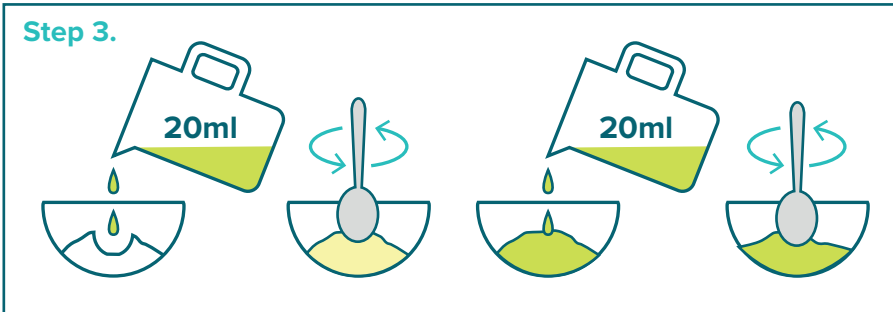
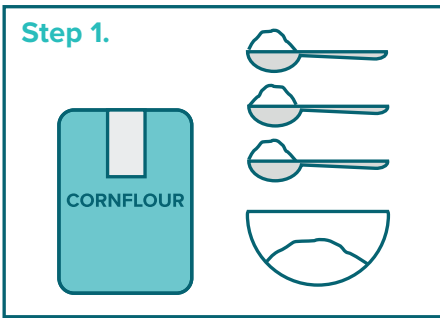
Step 4. Test that your glorious goo is ready by carefully hitting the surface of the goo with a spoon. Watch what happens when you apply different **forces** (*pushes and pulls*) to it.

The goo should resist any heavy pressure and should spring back like rubber. It should also behave like a **liquid** when stirred slowly or is picked up and allowed to drip back into the bowl.

Step 5. Have fun! Try rolling your goo into a ball and see how long you can hold its shape for until returning to liquid form and oozing through your fingers into the bowl.

Step 6. Don't forget to clean up when you are finished! Drain off any excess water and your glorious goo can be disposed of in a food waste bin. Don't put your goo down the sink as it may cause blockages.

Make your own Glorious Goo



More to try

Try using different colours of food colouring for your glorious goo.

Experiment with different ratios of cornflour to water to create the ultimate glorious goo. Record your results.

Can you think of any other common substances that have similar properties?

Fun facts

Your glorious goo is a substance known as a **“non-Newtonian fluid”** by scientists.

Substances like this have no fixed shape and can flow; their **viscosity** can change when under **force** to become more **liquid** or **solid**. Viscosity is a measure of the internal **friction** of a **fluid**.

In a non-Newtonian fluid, the particles in the substance are far enough apart that they can flow over one another and behave as a liquid. When enough force is applied though, the particles (which have ‘jaggy’ edges) lock together and have more friction between them so the substance behaves as a solid.

It is also sometimes called **“oobleck”** - given its appearance in a book by Dr Seuss, “Bartholomew and the Oobleck”.



Watch the Glorious Goo video on
#GSCAtHome Facebook or YouTube page

ACTIVITY

Cress Monsters

What will you do?

In this activity you will decorate a small container and plant some garden cress seeds. Cress is a fast-growing herb and after 2-3 weeks you'll be able to eat what you have grown!

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

What will you need?

Small plastic tub or yoghurt pot
Paint and paint brushes or felt-tip pens
Kitchen roll
Cotton wool
Water
Garden cress seeds
Teaspoon



How to do this experiment

Step 1: Take your plastic tub or yoghurt pot and decorate it with a monster face.

Step 2: Line the bottom of your tub with a sheet of wet kitchen roll.

Step 3: Wet the cotton wool and put this on top of the kitchen roll. Leave about 3 cm between the cotton wool and the top of your container.

Step 4: Take a teaspoon of garden cress seeds and sprinkle them onto your cotton wool.

Step 5: Spray the seeds with a little water to help them stick to the cotton wool. You may need to press the down very gently.

Step 6: Place your pot of seeds in a warm, sunny place like a windowsill

Step 7: Spray the seeds with a little water every day to ensure the cotton wool stays damp.

Step 8: Watch your cress grow – it will give your monster face some wild green wavy hair!

Step 9: After 2-3 weeks it will be ready to eat. You can cut the cress and add it your sandwich or salad. What do the leaves taste like?

More to try

Trying growing two pots of cress seeds – what happens if you put one pot on the windowsill and the other one in a cupboard?

Use a ruler to measure how many millimetres your cress has grown every morning. Record the measurements and see if you can spot a pattern – does your cress grow faster at the start or grow faster after a week or more?

Fun fact

A seed needs soil, water and sunlight to grow. So how does the garden cress grow without any soil? As cress is such a small plant and it grows so quickly, it can get enough nutrients from the water and from inside its own seed instead of from the soil. The cotton wool helps hold its roots in place.

ACTIVITY

Share your activities!
Send your pics to
contact.us@gsc.org.uk
or #GSCAtHome on our
social media channels



Secret Message

What will you do?

In this activity you will make invisible ink to write a secret message.

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

What will you need?

Bowl
Knife
Lemon
Small paintbrush
White paper
Iron and ironing board



How to do this experiment

Step 1: Cut the lemon in half.

Step 2: Squeeze the juice from the lemon into a bowl.

Step 3: Dip the paintbrush into the bowl containing lemon juice.

Step 4: Write your secret message on the paper using the paintbrush soaked in lemon juice.

Step 5: Leave the message to dry.

Step 6: Use a hot iron to iron the paper and reveal the message!

More to try

Try the experiment using different liquids e.g. orange juice, onion juice, vinegar or honey.

Disguise your secret message by writing a boring sentence or drawing a picture on the paper with a pencil after you have written your secret message.

Fun facts

Invisible ink was used by the ancient Greeks and Romans thousands of years ago. They used milk from a cactus-like plant to create their secret messages.

Secret agents have also been around for thousands of years. Egyptian hieroglyphs show that the Pharaohs employed people as spies.

Animals can also work as secret agents. Carrier pigeons were used by the Intelligence Services during World War I to pass messages from the frontline to military headquarters.



Watch the Secret Message video on
#GSCAtHome Facebook or YouTube page

ABOUT US

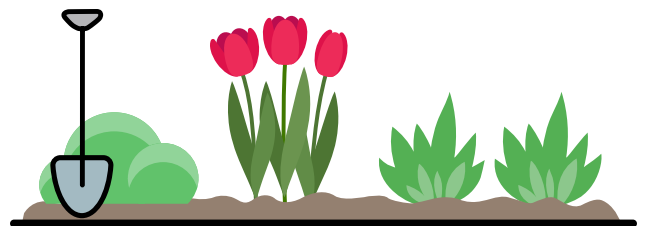
Glasgow Science Centre is a 5-star visitor attraction located beside the River Clyde. We are home to hundreds of interactive exhibits where you can discover how the world works. Explore the inner workings of the human body, find out how we can power the future, challenge your family and friends to solve puzzles, explore technologies of the future and marvel at the wonders of the solar system under our full-dome 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.

WORDSEARCH ANSWERS



S	S	O	K	T	L	E	A	F	A	S	K
A	K	E	F	O	D	Z	O	F	S	P	T
T	R	E	T	A	W	M	R	E	J	O	S
N	S	X	R	S	H	K	R	S	O	G	U
F	U	P	H	V	U	C	A	R	Q	U	N
L	A	H	L	E	E	N	Y	O	T	A	L
O	Y	B	D	A	P	S	E	E	D	Z	I
W	E	R	G	O	N	T	R	R	W	O	G
E	H	J	R	R	K	T	S	I	S	G	H
R	L	S	H	J	E	H	O	S	O	N	T
A	C	Y	R	W	F	E	A	L	I	W	M
W	O	R	G	J	E	P	N	K	L	S	T



QUIZ ANSWERS



1. Mercury is the planet closest to the Sun.
2. True. Wheat, rice and corn are all types of seeds that humans eat as part of our diet.
3. Non-Newtonian fluids can act as both a liquid and a solid. (Whereas Newtonian fluids are ones where the viscosity, or runniness, doesn't change no matter how you pull, push, stretch or hit it. Fluids like water and oils are Newtonian fluids.)
4. Jupiter is the largest planet in the solar system. It's almost twice as massive as all the other planets in our solar system combined.
5. b) Microchip technology has allowed computers to shrink in size.
6. d) The Sun is the star at the centre of our solar system.
7. b) Viscosity measures the internal friction of a fluid.
8. Seeds are specially adapted to be able to sail on the water, fly on the wind or hitch a ride with an animal (usually by being eaten!)

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. **Send your favourite pictures to contact.us@gsc.org.uk or share with us on our social media channels with #GSCAtHome.** We'll print a selection of your pictures in the magazine.

KEEP IN TOUCH



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