**PUZZLES, QUIZZES, OUTDOOR LEARNING** 

ISSUE

No5

ASGOW

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# JOURNEY THROUGH MY BODY

Spertz

Magazine

# MAKE YOUR OWN SPECTROSCOPE

## MEET AN EDUCATION, OUTREACH & DIVERSITY OFFICER

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



# WELCOME

Welcome to our fifth edition of The Spark! Every issue has exciting experiments for you to try at home, fascinating facts to ponder over, and puzzles and quizzes to challenge your family.

In this edition, we'll be getting a bit messy as we follow the journey of food through our bodies. We're also making a spectroscope to investigate light and colour, and this week's planetary tour takes us to Jupiter, the biggest planet of them all.

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** 

# 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 to contact.us@gsc.org.uk

## **BODY BITS**

Can you find all the body bits hidden in our wordsearch? Skeleton Organ **Bone Nerves** Hair

WORDSEARCH

E	v	0	R	G	Α	Ν	Е	R	Н	Ρ	Α
м	С	Ν	х	R	Υ	I	S	s	D	к	Ν
υ	z	Ν	В	т	s	F	К	Е	D	v	Е
s	L	0	F	Р	0	Е	Z	м	Q	Α	R
С	S	к	R	υ	L	I	н	к	s	Q	v
L	z	С	Ν	E	L	Α	F	Y	w	J	Е
Е	R	v	т	s	I	κ	L	R	т	Α	s
Α	v	0	Q	R	x	I	В	L	0	0	D
н	Ν	Ν	Е	н	в	L	х	т	I	w	с
м	z	x	Т	к	0	Е	R	м	С	Т	н
к	S	Υ	Ν	E	Ν	Ρ	R	D	G	Α	S
s	z	М	U	0	Е	L	Е	Ν	I	К	S

Blood

Skin **Muscle** 

2



# FAMILY QUIZ

All questions linked to activities in this issue

#### DID YOU KNOW?

If you've ever complained that there's not enough hours in the day, be glad you don't live on Jupiter, because...



## QUESTIONS

Answers on back page

1. What do we call the process of breaking down the food we eat to give our bodies energy?

2. True or false: Jupiter's moon Ganymede is larger than the planet Mercury?

3. Which astronomer discovered the first of Jupiter's moons?

4. How many stomachs does a cow have? a) 1, b) 2, c) 3, d) 4

5. In France, Jupiter gives its name to one of the days of the week, but which one?

6. How many primary colours of light are there?

7. True or false: Astronomers use spectroscopes to identify elements that make up stars and other objects in the night sky.

8. What's the name for our biggest teeth — the wide, flat teeth that crush and grind food?

9. Approximately, how long are your small and large intestines combined?

10. True or false: Dr Robert Bunsen is famous only for his work making the spectroscope.

HINT

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

## I'M AN... EDUCATION, OUTREACH AND DIVERSITY OFFICER

#### Dr Sheila Kanani,

#### from the Royal Astronomical Society.

I teach Astronomy, go in to schools and run workshops and assemblies about space, give speeches at conferences and festivals and run training for teachers about using space in the classroom. I have to be really flexible on a day to day basis. Some days I might be performing a space song with 4 year olds, the next day I might be in an important board meeting with MPs. When I was in primary school I wanted to be a vet, and then when I was a teenage I realised that working in the space industry, and be an astronaut, was what I wanted to do! I love how varied my work is. It keeps me on my toes and I challenge myself in lots of different ways. I love meeting lots of different people, and I love to wow people about space, because it really is inspiring! I am also an advocate for diversity in astronomy and geophysics, because space is for everyone!

Favourite food: Indian food (a.k.a. mum's cooking) Skill or Party trick: I can write backwards / mirror image almost perfectly!



Watch our Tour of Jupiter video on #GSCAtHome Facebook or YouTube page to find out more about the largest planet in our solar system.

# ACTIVITY

# Journey Through my Body

#### What will you do?

In this activity you will learn about the process of digestion by following the journey food takes through our bodies. Plus, you'll make your own model stomach!

Ensure you have permission from an adult and their supervision before starting. This activity can get a little bit messy so it might be best to do it at a table that can be wiped clean.

#### What will you need?

Kitchen paper (in case of spills)

Ziplock bag (nothing too thin, you don't want it to burst!)

Large bowl

Large spoon (e.g. a wooden spoon)

Sieve

Suggested food for stomach (use small amounts or leftovers)

Cereal, milk. soup, juice or water, crusts of toast or bread, pieces of banana or mashed potato

#### How to do this experiment

**Step 1.** Open up your ziplock bag and place it upright in your large bowl (so that the bowl will catch any spillages. The ziplock bag is going to be your model stomach. Let's find out what happens to food when it reaches your stomach.

**Step 2.** Add your first meal of the day - breakfast! Break up the cereal and put it into the stomach bag. Add a little milk and close the bag. Mush the contents together by squeezing the bag at the bottom.

**Step 3.** Now add some lunch! Pour in a little soup, add some bread crusts and juice or water. Mush these all together with your breakfast.

**Step 4.** Maybe now you're having a snack? Add some pieces of banana and a little bit of milk. Or maybe you're already starting dinner? Add some mashed potato.

**Step 5.** Gently squeeze the bag to mix all of the stomach contents together. Keep squeezing until your food is thoroughly mixed and mushed. This is what the muscles in your own stomach do – they squeeze and mix together all the food you've eaten, breaking it down, so that it is ready to go on the next part of its journey.

**Step 6.** Have a rest, after all that hard muscle work! Where does your food go next? It leaves the stomach and enters the intestines, which remove all the water and nutrients we need from our food to keep us healthy and full of energy. We're going to use the sieve to act as our intestines and remove the water and nutrients.



**Step 7.** Place your stomach bag to one side and put your sieve on the large bowl. Empty your stomach bag contents into the sieve.

**Step 8.** Now you should start to see the stomach contents straining through the sieve into the bowl. The watery contents and very small pieces of broken-down food will pass through the sieve. You can mix the contents in the sieve with the large spoon to speed up the process.

**Step 9.** The watery liquid in the bowl represents all the water and nutrients that would be transported around your body to where it's needed. What does the solid mass left behind in your sieve represent? Yes, this is your waste products, or poo!

#### More to try

Measure out a length of ribbon, string or wool of 7.5 m. This is the average length of our intestines. Food we eat passes along the length of this tube – how do you think this very long tube manages to fit into our bodies? Draw a picture of where our stomachs and intestines are placed in the human body.

#### **Fun facts**

The Bristol stool chart is a medical scale used to classify the shape and consistency of our poo. It has seven categories ranging from: too hard (which can be a sign of constipation) to too watery (which can indicate diarrhoea).

As our digestive system breaks down the food we have eaten, gases are produced. Our bodies need to release these gases, and they escape as burps or farts!

Ruminants are animals like cattle, deer, and reindeer. To help them digest their food (usually tough grass) they don't have just one stomach, they have four.

Peristalsis is the movement of the muscles in our oesophagus and intestines that pushes the food we eat along our digestive system.



Send your pics to contact.us@gsc.org.uk or share with us on social #GSCAtHome

### ACTIVITY

# Make your own Spectroscope

#### What will you do?

In this activity you will learn all about spectroscopes, what they are, how they work, and why they are important, before getting the opportunity to build a spectroscope of your very own!

Make sure you have adult supervision before starting we recommend following our instruction while watching along with the accompanying video.

Never point a spectroscope directly towards the sun.

#### What is a Spectroscope?

The spectroscope is the invention of Dr Robert Bunsen. With a few simple items Dr Bunsen realised that he could split up the light he saw around him, and separate it into different colours. Just like purple is made by mixing blue and red paints, different colours of light are made by mixing red, green, and blue light, with white light being a mix of all three. The spectroscope is a great tool for learning about the universe around us. Just by pointing a spectroscope at a star, astronomers can use the star's twinkling light to tell us what elements it is made of!

#### What will you need?

Cereal box, blank CD Felt tip pen, two small squares of tin foil Sticky tape, ruler Scissors, protractor

#### Protractor

This activity requires a protractor, we've included one that can be cut out and used.





#### How to do this experiment

**Step 1.** First we will make our viewing window. Ensure your cereal box is empty and the top is folded over closed. With the cereal box standing upright, use the ruler to measure 2.5 cm into the top right-hand corner of the top surface of the box. Starting from this point, use your pen to draw a neat 3 cm by 3 cm square, before unfolding the flaps and cutting along the lines to make a window.

**Step 2.** Lie the cereal box down on its face. Using the protractor, measure an angle of 60 degrees from the top of the box, starting at the corner closest to your viewing window, and mark a dot. With this dot as a guide, line the ruler up to draw a 9cm line from the corner of the box. Repeat this step for the opposite side of the box, so that the lines meet at the same edge.

Step 3. Open the box and use the scissors to carefully cut along these two lines.

**Step 4.** Standing the box upright, slot the blank CD in from the corner of the box, along the newly cut lines. The CD's blank "rainbowy" side should be facing upwards.

**Step 5.** Close over the box with the CD slotted inside, and tape it shut. The viewing window on the top should be the only opening in the box.

**Step 6.** On the narrow edge of the box on the opposite side to the CD, use the ruler to measure 7 cm down from the top and draw a rectangle in the centre that is 1 cm wide, and 1 mm tall. You will need an adult to use scissors to cut this out.

**Step 7.** To make this slit as narrow as possible take the tin foil squares and tape one above and below the narrow rectangle. This should leave light only just getting into a horizontal gap between two pieces of tin foil. This is the light which will shine on your CD which you will be able to see from your viewing window.

**Step 8.** Test out your brand new spectroscope! To use, just point the small slit towards a light source and look through the viewing window. Can you see the hidden colours that make up the light around us?

#### Remember, never point your spectroscope towards the sun, as this will hurt your eyes

#### More to try

Go explore and use your spectroscope to find the hidden colours in all types of light sources. Try pointing your spectroscope at:

Your TV

A tablet or smart phone

A patch of sunlight shining on a wall

A street lamp

Anything at all that gives off light!



spectroscope and share with us: contact.us@gsc.org.uk or or #GSCAtHome on our social media channel

#### **Fun facts**

We learn in art class that the primary colours of paint are red, blue and yellow. Did you know light has three primary colours too? They are red, blue and green!

Dr Robert Bunsen is not only famous for inventing the spectroscope, he also gives his name to the Bunsen burner.

The first spectroscope was made out of a cigar box, a prism, and some pieces taken from old telescopes.

Does the light in your spectroscope remind you of a rainbow? Rainbows are what we see when sunlight is separated into its different colours as it passes through drops of water. This is just like what happens in a spectroscope! indicate diarrhoea).

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Ruminants are animals like cattle, deer, and reindeer. To help them digest their food (usually tough grass) they don't have just one stomach, they have four.

Peristalsis is the movement of the muscles in our oesophagus and intestines that pushes the food we eat along our digestive system.

### **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. Digestion is the process by which food is broken down so it can be used for energy, and to keep us healthy and strong.

2. True, if Ganymede was orbiting the Sun instead of Jupiter, we'd probably consider it a planet!

3. The first four of Jupiter's moons were discovered 1610 by the astronomer Galileo, and their names are Ganymede, Callisto, Io, and Europa.

4. d) A cow has 4 stomachs

5. Jeudi, or Thursday. The name comes from the Latin for "Jupiter's Day". In English, Thursday is named after the Norse god Thor.

6. Three. The primary colours of light are red, blue and green.

7. True. Spectroscopes can help astronomers identify what stars are made of.

8. These teeth are our molars. As adults, we have six molars in our top jaw and six in the bottom.

9. If stretched out in a line, our small and large intestines together would be approximately 7.5 metres long.

10. False. Dr Bunsen also gives his name to the Bunsen burner.

### WORDSEAROH ANSWERS

E	v	ο	R	G	Α	N	Е	R	н	Р	Α
м	с	Ν	x	R	Y	I	S	S	D	к	Ν
U	z	Ν	в	т	S	F	к	Е	D	v	Е
S	L	0	F	Р	0	Е	Z	М	Q	Α	R
С	S	к	R	υ	L	Ι	н	к	S	Q	v
L	z	С	Ν	Е	L	Α	F	Y	w	J	Е
Е	R	v	т	s	I	К	L	R	Т	Α	S
Α	v	ο	Q	R	х	Ι	В	L	0	ο	D
н	Ν	Ν	Е	н	в	L	х	т	I	w	С
м	Z	x	Т	к	0	Ε	R	М	С	Т	н
к	S	Υ	N	E	N	Ρ	R	D	G	Α	S
S	z	М	U	0	E	L	Е	Ν	I	К	S



## 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** 

