

# The Spark

Magazine

PUZZLES, QUIZZES, EXPERIMENTS



ISSUE  
No26



**WHAT IS**  
**BIOPLASTIC?**

---

**FASCINATING**  
**ARCTIC FOXES**

---

**CREATE YOUR OWN**  
**BIRD FEEDER**

---

**HOW UNIQUE**  
**ARE YOU?**

---

**MEET A**  
**CONSERVATION**  
**EDUCATOR**



GLASGOW  
**SCIENCE  
CENTRE!**  
Registered Scottish Charity: SC030809

# Inside

This issue



## HELLO!

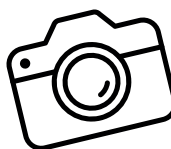
Welcome to the winter edition of The Spark magazine, where we'll take a look at lots of different winter treats! Explore how different animals change their behaviour (or fur!) in the winter, use your fingerprint to decorate a reindeer and discover how to make your own ornaments using milk!

We'll also meet a conservation educator who travels around teaching people why and how we should take care of animals.

We've got puzzles, activities and our Bright Sparks quiz too! Time to dive into this exciting edition of The Spark.

Happy holidays!  
Glasgow Science Centre

## SHARE YOUR PICS WITH US



If you try any of our activities, please show us how they turned out! Send your favourite pictures to [CLDteam@gsc.org.uk](mailto:CLDteam@gsc.org.uk) or share with us @TheBothyGSC on X.

## MINI PUZZLE

### Seasonal Socks

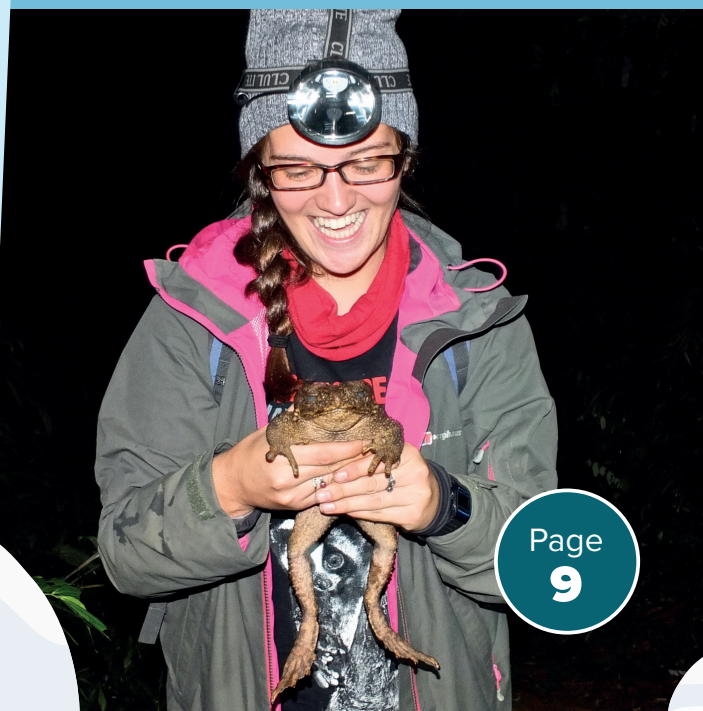
Brrrr! It's cold outside and it's time to get cosy in your favourite footwear.

Match the socks below. Can you find the sock without a pair?



### Meet a Conservation Educator

Meet Jess Wise who helps educate and connect people with nature and animals!



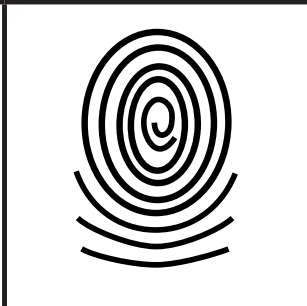



Page  
9

# Fingerprint Fun

Everyone has fingerprints, which are formed before you're born. These ridges and bumps help you feel different textures. Because everyone has unique fingerprints, they can be used as a biometric. Biometrics are physical traits that can be used to identify a person. For example, most smart phones can be unlocked using the owner's fingerprint!



 <p><b>What kind do you have?</b></p> <p>3 of the main fingerprint patterns are pictured opposite:</p>			
	loop	whorl	arch
<b>Do you have different patterns on different fingers?</b>			



## Red-nosed reindeer

### What will you need?

An adult's supervision  
A red felt-tip pen

**We suggest you practice this on a piece of scrap paper first.**

### What to do

**Step 1.** Colour in the fingerprint on one of your fingers with the red pen.

**Step 2.** Gently push your finger down where the reindeer's nose should be.

**Step 3.** Lift your finger off and see what kind of fingerprint nose your reindeer has! Is it a loop, whorl or arch?

**Step 4.** Let the reindeer's nose dry before you turn the page!

# Bioplastic Fantastic!

Our world is full of plastics. From the clothes we wear, the packaging our food comes in, the transport we travel on, and the toys we play with, we find plastics everywhere!



Plastic is strong, light-weight and lasts a long time. It can be made into any shape and is cheap to use. However, plastic products take hundreds of years to break down. Plastics can break down into smaller pieces called microplastics. These pollute our environment, drinking water and food. Most plastics are also made from fossil fuels which will eventually run out, so finding other ways we can make plastics is important.



## How can we solve the plastic problem?

Using less plastics in our daily lives and finding plastic alternatives are part of the answer! Bioplastics are made from living things like plants, or from materials made by bacteria. Bioplastics are great because once we're finished using them, they can be broken down using high temperatures and pressure!

## We can even make plastic from milk!

This technique is old, with people in the 1930s making clothes out of milk! Some people are trying to make clothes today using the same technique.

People have been using milk plastic to make ornaments, buttons, combs and jewellery, like fancy rings from the 1800s!



In the UK, **490 million pints of milk are wasted every year**. That's the same volume as **122 Olympic swimming pools!** What if we could use this extra milk to **make biodegradable plastics** instead?





# Make Your Own 'Plastic'

## ACTIVITY

Have a go at making a milk plastic decoration!

### What will you need?

An adult's supervision

A microwave

Microwaveable bowl

250ml of milk

Paper towels

1 tablespoon of white vinegar or lemon juice

Bowl

Spoon

Sieve

Moulds or cookie cutters

Nail file or sandpaper



### What to do

**Step 1.** Pour the milk into the microwaveable bowl and microwave it until it starts to let off steam.

**Step 2.** Careful, it will be hot! Remove the steaming milk from the microwave. Add the vinegar or lemon juice. Stir the mixture gently using a spoon for 1 minute. You'll notice it splits and curdles – you've made curds and whey! The curds are the solid parts, and the whey is the liquid part.

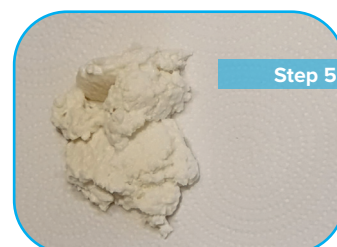
**Step 3.** Place 4 pieces of paper towel into the sieve to make a filter and sit it on top of a bowl.

**Step 4.** Pour the curdled mixture into the sieve. Let this filter for 30 minutes until most of the liquid has drained off. Very gently push down on the mixture with a spoon to help filter the liquid.

**Step 5.** Lay out a few layers of paper towel on a table. Remove the curds from the sieve and place them on the paper towel. Gently pat and squish the curds to remove as much liquid as possible. You may have to do this a few times.

**Step 6.** Once most of the liquid is removed, you should be able to mould, squish and shape the curds! Squash the curds into a mould or flatten and use a cookie cutter to shape.

**Step 7.** Leave the curds to dry for at least 2 days. Once completely dry, smooth off the edges with some sandpaper or a nail file. You can paint your creations with acrylic paint and then display them with pride!



## WHAT HAPPENED?

Milk contains lots of proteins, which are large folded up molecules found in lots of foods. When an acid, like vinegar or lemon juice, is added to milk, it causes the proteins in the milk to unfold, tangle and clump together. This forms the solid lumps of curds we see. These curds contain a protein called casein, which can be used to make bioplastic.



# Bye Bye Birdie



## Look up to the skies

Did you spot any birds flying away for the winter?

As winter approaches, about 50 different bird species leave the UK and fly south. This journey is called migration. Most of these travellers will spend the winter in Africa, whilst some fly even further. The Arctic Tern travels all the way to Antarctica! Some only fly shorter distances, like the Blackcap, who takes a trip to nearby Spain.

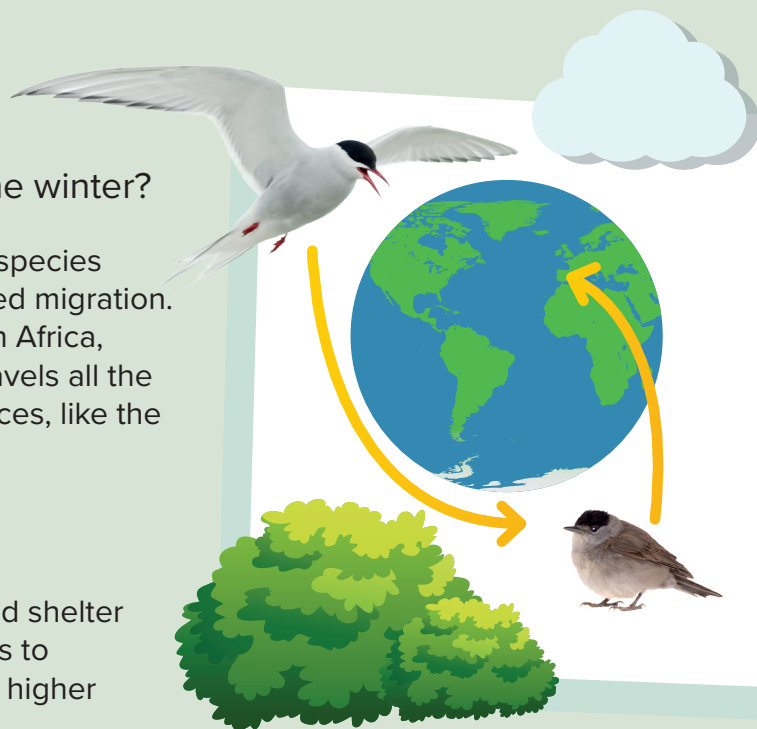
## Why do some birds migrate?

Winter in the UK can be very cold, and food and shelter can become hard to find. Migration allows birds to find warmer weather, plentiful food and have a higher chance of surviving.

## How do migrating birds know where to go?

Birds use their instincts, as well as changes in their bodies and environment, to know when and where to migrate. Following and learning from their parents can also help them navigate to their new location. They can use obvious landmarks, like coastlines, rivers or mountains to make sure they follow a similar path each year. Once a bird has done their first migration, they usually follow the same pattern and route for the rest of their lives.

For the birds who stay with us for the winter, and those who travel from other countries with much harsher winters, we can help them through the chillier days by feeding them. Providing an easy food source means birds can use their energy to keep warm rather than use it to hunt for food. This helps them survive and stay healthy.



# Make a bird feeder

Help your local feathered friends by providing some energy rich food.

## What will you need?

- An adult's permission and supervision
- Lard (alternatives include beef or vegetable suet, Peanut butter, or almond butter mixed with flour)
- Bird seed
- Some chopped apples, bananas, sultanas, or raisins
- A butter knife
- A clean yoghurt pot
- Some string
- A bowl
- A pencil



## What to do

**Step 1.** Carefully make two small holes in the bottom of a clean yoghurt pot with the pencil.

**Step 2.** Thread the string through the holes and tie a knot on the inside. Leave enough string so that you can hang the pot on a tree or a bird table.

**Step 3.** Allow the lard to warm up to room temperature, but don't melt it. Cut it up into small pieces using the butter knife and put it in the bowl. Add the other ingredients to the bowl and mix them together with your fingertips. Keep adding the bird seed, raisins, chopped apples or bananas and squidding it until the lard holds it all together.

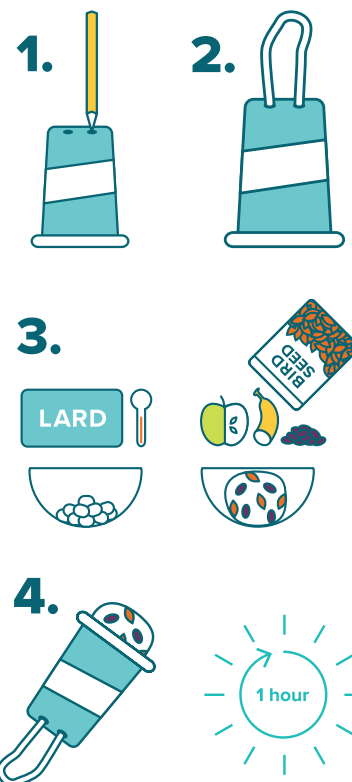
**Step 4.** Fill the yoghurt pot with this mixture and put it in the fridge to set for an hour or so.

**Step 5.** Hang the bird feeder on a tree or bird table. Make sure to do this in your own garden or green space, or that you have permission to hang it in another location.

**Step 6.** Wash your hands thoroughly and watch the birds from a distance.

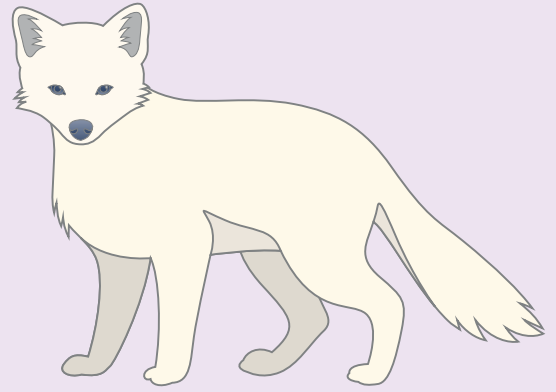
**Step 7.** Count the different species of birds that you see and keep a record of them.

Once your bird feeder is empty, make sure to tidy up any mess.



# Meet the Arctic Fox

## Top Facts!



An Arctic Fox in winter

- 1.** Their fur changes between the seasons. In summer, their coat is darker, shorter and thinner. In winter, their coat changes to white, and becomes longer and thicker. This helps them blend in with their environment and adapt to the changing temperatures!
- 2.** Small rodents called lemmings are their main source of food.
- 3.** They snow dive to catch their food. Lemmings live in tunnels under deep snow. Arctic foxes listen carefully to find their exact location, jump high in the air and dive into the snow to catch them.

- 4.** They can live for about 3-4 years in the wild.
- 5.** There are 8 subspecies of Arctic Fox. They live in different countries in the Northern Hemisphere, including Iceland, Greenland, Norway and Canada.
- 6.** Their small ears reduce heat loss from their body to help keep them warm.



An Arctic Fox in summer



# Meet a Conservation Educator



## Jess Wise from RZSS Highland Wildlife Park

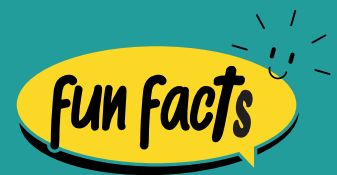
I manage the Discovery and Learning Team at the Royal Zoological Society of Scotland's Highland Wildlife Park. Our team does all the animal talks and tours at our park, hosts all the school and community groups, and in the last few years has grown enough so that we can go and visit clubs and schools around the Highlands too! We have the lovely job of making sure that we can help everyone (re) connect with nature, no matter who they are or where they've come from!

### What do you wish people knew about your job?

I wish that people knew that conservation in general revolves around us humans, not the wildlife we are working to protect. I have to help people understand why they need to care enough to protect animals, even if they might never see them in person!

### What's your favourite thing about your job?

That is an easy but surprising one! Although I love the animals that we work alongside and celebrate, my favourite thing is the people I work with. No two days are the same for us. I get to meet so many wonderful, interesting and passionate people from all around the world. I also love the view I have from my office window at Highland Wildlife Park. The Discovery and Learning team is based in our brand-new Learning Hive and I have seen eagles, ospreys and kites right from my own desk! Some days I get more work done than others...



I have a campervan called Tracey!



My favourite food is salt and vinegar crisps



# BRIGHT SPARKS!

Are you a bright spark? Test your knowledge with our tricky questions! Check your answers on the back page.



What are plastics made from?

- A) Rocks
- B) Fossil fuels
- C) Glue

1

What do you call a physical characteristic which can identify you?

- A) Bacteria
- B) Blunder
- C) Biometric

2

The main protein found in milk is called casein.

- True
- False

3

Approximately how many species of bird migrate from the UK every year?

- A) 10
- B) 100
- C) 50

4

How many subspecies of Arctic fox are there?

- A) 8
- B) 10
- C) 12

5

Which things help a bird to know where to migrate to?

- A) A map
- B) A compass
- C) Their instincts and using landmarks.

6

An Arctic fox's fur changes between seasons.

- True
- False

7

Why do birds migrate?

- A) Food and shelter are harder to find in the winter
- B) To meet different flocks
- C) To get exercise

8

What are the three main types of fingerprint pattern?

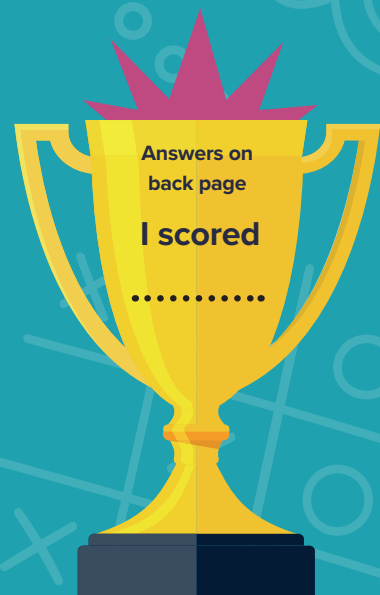
- A) Loop, whorl and arch
- B) Circle, swirl and bridge
- C) Curve, spiral and lump

9

What is an Arctic fox's favourite food?

- A) Leech
- B) Lemming
- C) Lamb

10



# PUZZLE PALOOZA



## Did you know?

Solve the calculations, then use the key to find out the hidden fact!

Key:					
A=2	B=3	E=4	G=5	H=6	L=7
N=8	O=9	P=10	R=11	S=12	T=13

5 +5	7 +2	4 +3	1 +1	6 +5

7 -4	2 +2	10 -8	7 +4	9 +3

5 -3	8 +3	3 +1

9 +4	12 -6	9 -5



10 -3	4 -2	13 -2	3 +2	10 -6	6 +6	8 +5

8 -5	7 -3	6 -4	9 +2

6 +3	5 +3

8 -4	9 -7	10 +1	7 +6	4 +2



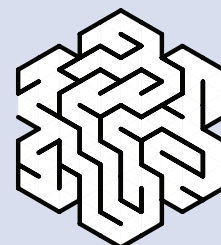
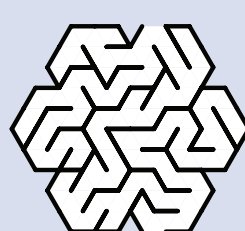
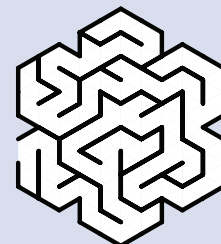
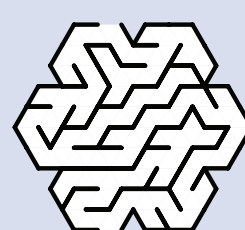
## Colour Sudoku

Colour in the blank squares using blue, red, green and yellow. Each colour must only appear once in each row, column and 4x4 block.

	Blue		Red
Green		Yellow	
	Green		Yellow
Red		Blue	

## Snowflake Frenzy

Can you find your way from one end of the snowflake to the other in the mazes below?



## 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.

Glasgow Science Centre is a registered Scottish charity SC030809.

For more information and bookings, visit: [glasgowsciencecentre.org](http://glasgowsciencecentre.org)

## Bright Spark QUIZ ANSWERS



- Q1. B** Fossil fuels.  
**Q2. C** Biometric  
**Q3. True** Milk contains lots of proteins! Casein is the main one.  
**Q4. C** 50.  
**Q5. A** 8.  
**Q6. C** Their instincts and using landmarks.  
**Q7. True** Their changing fur helps them adapt to their changing environment and temperature!  
**Q8. A** Food and shelter are harder to find in the winter.  
**Q9. A** Loop, whorl and arch.  
**Q10. B** Lemming.

### WE WANT YOUR FEEDBACK



#### We would love to hear what you think!

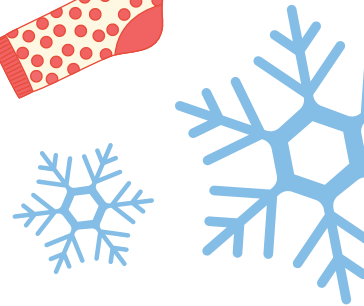
We hope you liked this issue, but if you didn't, what could we change? What other things would you like to see? What topics are you most interested in?

You can send feedback and pictures to [CLDteam@GSC.org.uk](mailto:CLDteam@GSC.org.uk) or message us on Twitter @TheBothyGSC

## PUZZLE SOLUTIONS



### Seasonal Socks



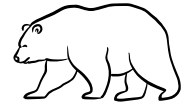
### Did you know?

5 +5	7 +2	4 +3	1 +1	6 +5
P	O	L	A	R

7 -4	2 +2	10 -8	7 +4	9 +3
B	E	A	R	S

5 -3	8 +3	3 +1
A	R	E

9 +4	12 -6	9 -5
T	H	E



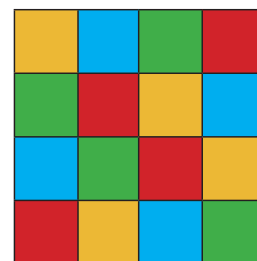
10 -3	4 -2	13 -2	3 +2	10 -6	6 +6	8 +5
L	A	R	G	E	S	T

8 -5	7 -3	6 -4	9 +2
B	E	A	R

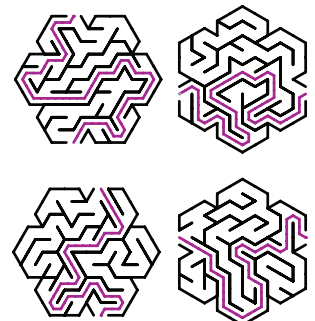
6 +3	5 +3
O	N

8 -4	9 -7	10 +1	7 +6	4 +2
E	A	R	T	H

### Colour Sudoku



### Snowflake Frenzy



### KEEP IN TOUCH



0141 420 5000 | [glasgowsciencecentre.org](http://glasgowsciencecentre.org)  
 50 Pacific Quay, Glasgow G51 1EA

GLASGOW  
SCIENCE  
CENTRE

Glasgow Science Centre is a registered Scottish charity SC030809