

The Spark

Magazine

PUZZLES, QUIZZES, EXPERIMENTS

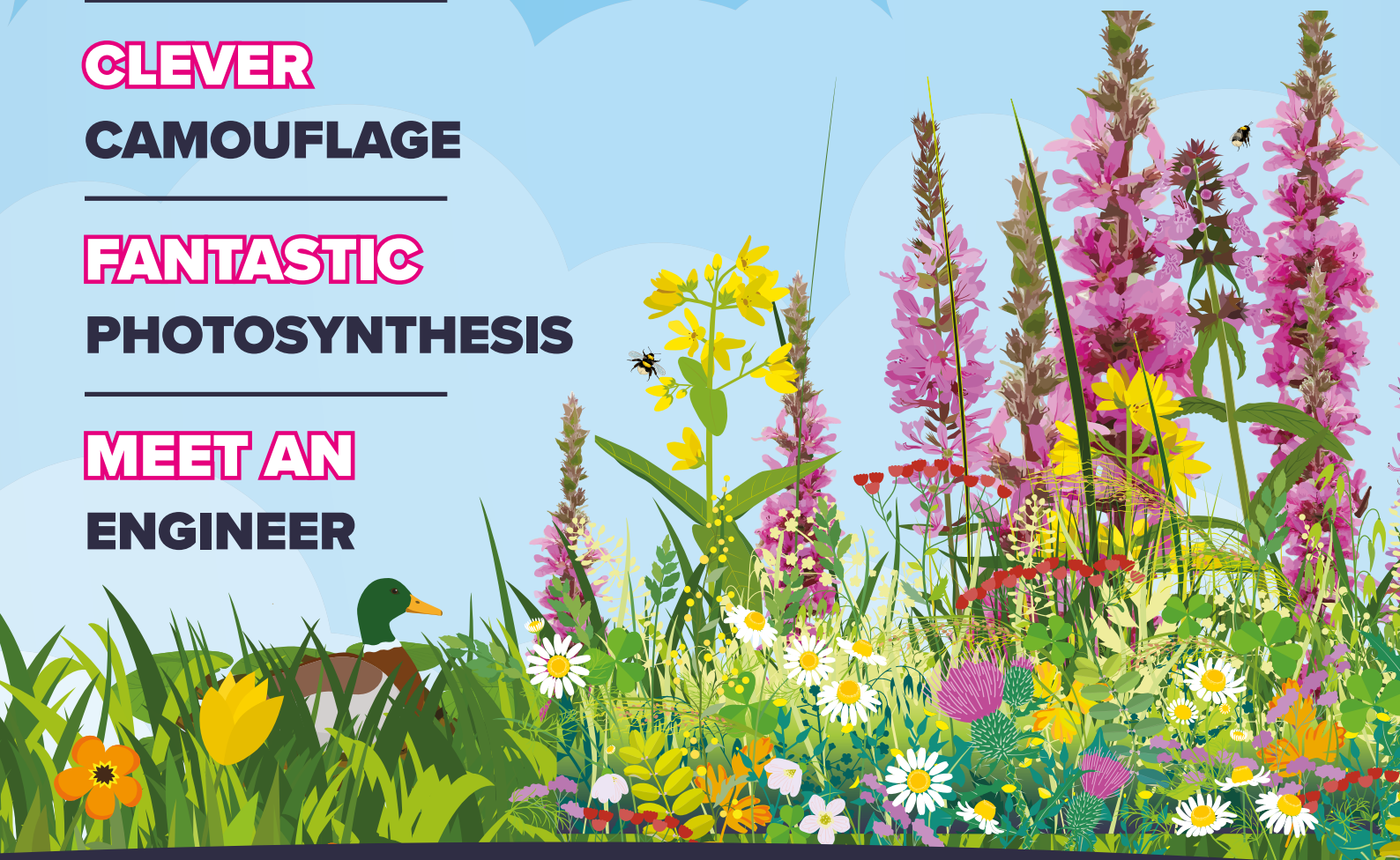
ISSUE
No19

BRILLIANT
BIODIVERSITY

CLEVER
CAMOUFLAGE

FANTASTIC
PHOTOSYNTHESIS

MEET AN
ENGINEER



This issue is supported by the Scottish Government's Nature Restoration Fund, which is facilitated by the Scottish Marine Environmental Enhancement Fund (SMEEF), and managed by NatureScot.



GLASGOW
**SCIENCE
CENTRE!**
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Inside

This issue

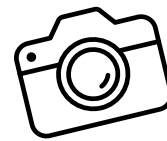


Hello!

Welcome to another fun-filled, fantastic issue of the Spark magazine. In this issue we are exploring biodiversity and the natural world. Learn about the vast collection of plants and animals you can find in all sorts of places, and find out how they benefit our planet. We will be going on a lichen hunt, discovering amazing ecosystems in our back gardens, as well as seeing photosynthesis in action with an easy experiment you can do in your kitchen. We will also meet Niall, an engineer who is working to create a robot to help save our ocean plants!

We hope you will enjoy learning and experimenting with the Spark magazine.

All the best,
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 or share with us @TheBothyGSC on Twitter.

We are building a floating wetland!



Glasgow Science Centre is on a mission to increase biodiversity in our back garden. We are building a floating wetland.

The three floating platforms will be installed in the Canting Basin, the area of water behind the science centre. They will have over 2,000 plants and trees which will provide a new habitat for animals to thrive. The wetland will have six nesting spots for birds and we are also installing binoculars on the decking for you to observe the animals without disturbing them. You can learn more about our floating wetland in our pull-out infographic poster in the centre pages of the magazine.



Images supplied by:



Biodiversity

at Glasgow Science Centre

Scan here to learn more about our outer space.

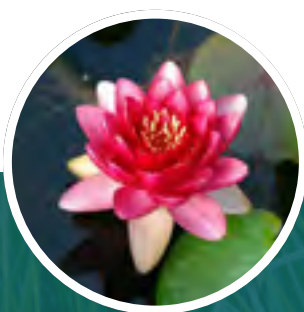


Glasgow Science Centre's outdoor space recently had a makeover. The moat surrounding the IMAX building has been turned into a beautiful reed bed, surrounded by hundreds of flowers, trees and plants in our new science garden.

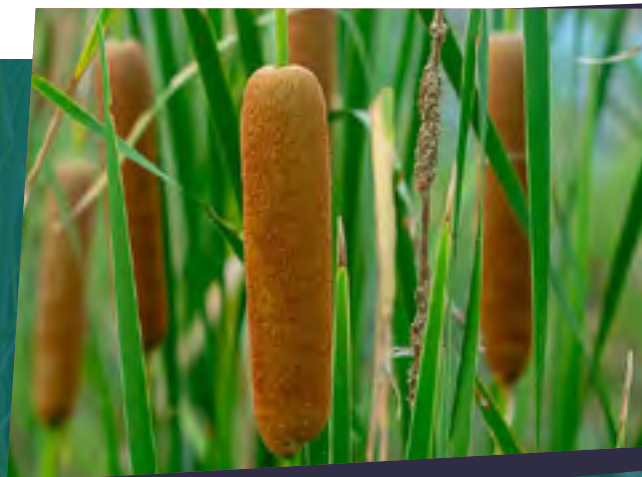
By increasing the number of plants and habitats outside the science centre we are improving the biodiversity of the area.

Biodiversity is all the different types of life you can find in a particular area.

What could you do to increase biodiversity in your own outer space?



When bulrushes produce seeds, the brown flower heads explode into fluff. Some birds like to use this material to line their nests as it helps to keep in the heat.



Our wildlife residents

See if you can spot these animals during your next visit to the science centre.



Moorhens can be spotted in the moat. They eat aquatic plants, snails, and other insects. They like to live near water and marshes, and will use the fluff from the reeds to keep their nests nice and warm.

Cormorants can often be found on the deck behind the IMAX. They have special feathers, which are not waterproof, unlike most water birds. Cormorants are excellent swimmers, diving to catch fish. After swimming, cormorants will stand with their wings outstretched, helping their feathers to dry.



Sticklebacks are small fish living in the moat. If you're lucky you might just catch a glimpse of them hidden amongst the reeds. They are carnivorous, feeding on insects.



Freshwater snails can be seen on the plants at the moat. They like to eat algae and dead leaves and are often gobbled up by birds and fish.



Bees love all the wildflowers that grow in spring and summer and can often be seen buzzing about, collecting nectar and pollinating plants.

Our new floating wetland project will help increase biodiversity even more! Learn about this project in the centre pages.



If you are lucky, you might spot seals and otters on the deck, like this seal pup caught on camera by our security officer, Beth.



Did you see any other animals? Get in touch and let us know on Twitter @gsc1

Saving Scottish seagrass

Seagrass meadows are the lungs of the ocean and can capture CO₂ 35 times faster than rainforests.

Meet the founder of Scottish company Robocean, who are working to restore our endangered seagrass meadows.

Meet an Engineer

My name is Niall McGrath

I design and build new robots to protect our oceans. Seagrass meadows are incredibly important ecosystems which support marine life and suck CO₂ from our seas, but unfortunately, they are in trouble. In the last 100 years we have lost 33% of our global seagrass coverage. I work with my friends to build exciting subsea technology which will restore seagrass meadows on a massive scale.

From a young age I have been obsessed with our natural world, and with my experience as an engineer, this job is perfectly matched to my talents. David Attenborough has always been a massive inspiration to me, I don't know where I would be without his documentaries inspiring me every step of the way. I think the kid-version of me would be very happy to see what I am doing now!

Being an engineer can be equal parts exciting and exhausting, the secret to success is to make the exhausting parts exciting! I love coming up with my own ideas and trying them out, they don't always work out but that's all part of the engineering process.

When I was younger, I was very loud, curious, and entrepreneurial. When I wasn't asking a million questions, I was instead trying to set-up little projects to keep myself occupied. I loved French, geography, and physics but ultimately focused a lot of my time on mathematics.



My hobby is rugby.



My favourite food is tacos.



My party trick is doing backflips.

Pond dipping

What could be hiding in the waters in your local park? Let's discover the amazing creatures that live there as we go pond dipping!

What will you need?

- A net
- A shallow tray
- A pencil
- A camera



! Before you start:

It's important to keep safe around the water, as it can be very slippery. Always have an adult present and don't lean over the water.

What to do

Step 1. Slowly walk up to the water's edge. By walking slowly, you won't scare away all the animals, giving you the best chance to see them.

Step 2. Ask your adult to collect some water in your tray. This will be a place to put any animals you find in the water.

Step 3. Gently lower your net into the water and move it slowly in a figure of eight motion.

Step 4. After a few circles of your net lift it out of the water and place it into your bucket or tray then turn the mesh inside out. Transferring all the creatures you have collected into your tray.



Step 5. Use the counting sheet to record what you find. If you find anything that's not on the sheet, add it to the bottom and take a picture.

Step 6. Once you are finished, gently pour the tray back into the water, returning all the creatures to their home.







Step 7. Wash your hands and rinse out your bucket and net before you use it in another pond.






What did you find? Use the table below to count how many of each creature you saw. If you find anything not on the table, let us know on twitter @gsc1



Below the water

Frog spawn	Tadpole	Water boatman
		
TOTAL	TOTAL	TOTAL
Water louse	Snails	Damselfly larvae
		
TOTAL	TOTAL	TOTAL

Above the water

Pond skater	Damselfly	Bee
		
TOTAL	TOTAL	TOTAL

Floating Wetlands



The plants will provide a new habitat and food source for **birds, bees and insects.**



The wetland is **built from strong, eco-friendly materials** that float on the surface of the water. The floating modules are filled with a **planting substrate** made from a mixture of **clay and woodchips.**

The **platforms will be lowered into the water from the quayside,** floated into position by boat and then connected together. Once in place a team will then install **over 2,000 plants and trees.**



The plants get their energy **from the Sun,** and they'll draw up nutrients from the water using their roots.



The forest of roots will **provide shelter and a safe feeding** ground for local fish.



The root system will create an ideal habitat for **millions of micro-organisms,** which will use the **nutrients** in the water as a **food source.** The micro-organisms will also help **clean the water.**



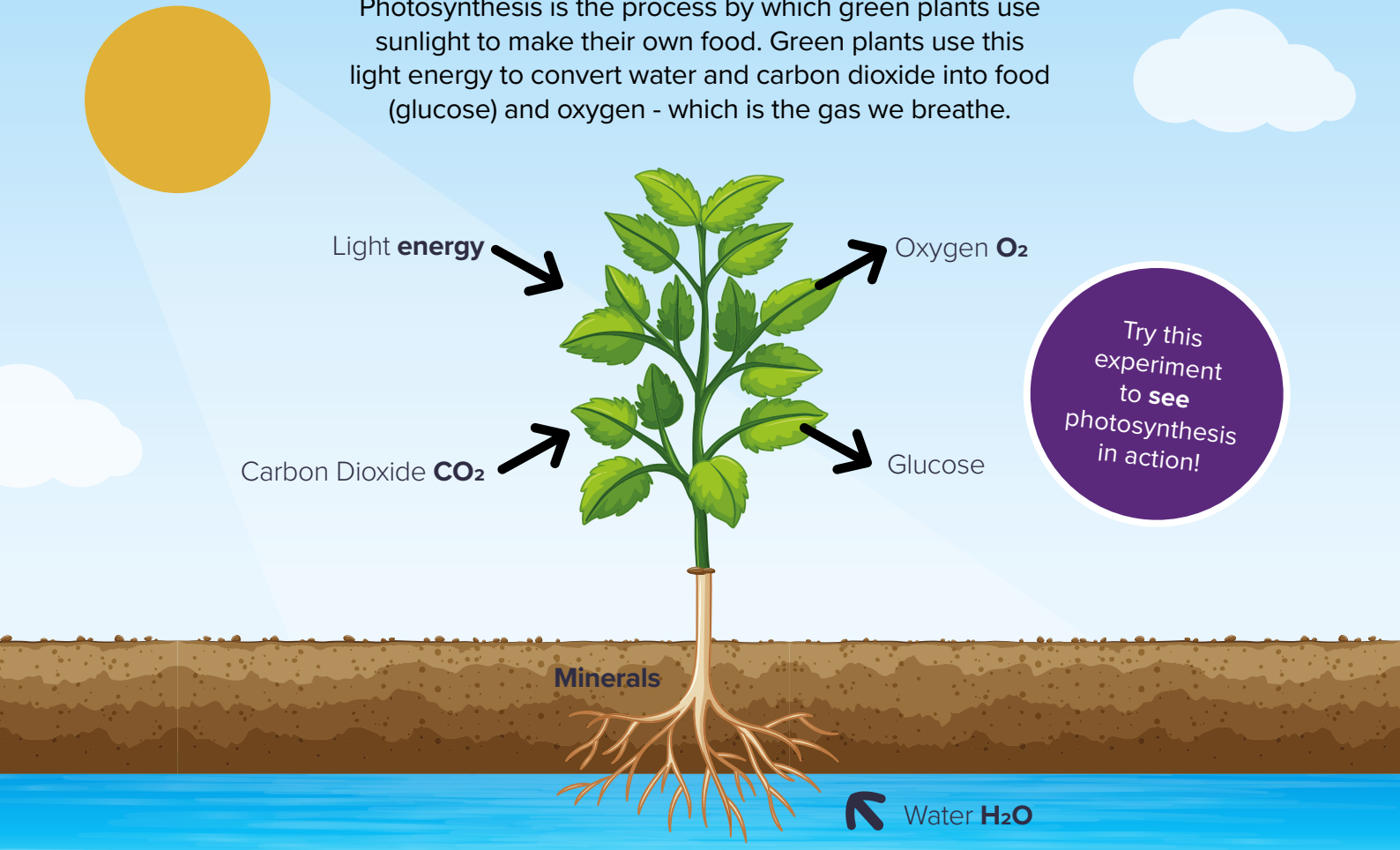
The floating wetlands will be **anchored in place** by four cables, which will also allow the wetland to **rise and fall with the tide.**



Scientists and students from the University of Glasgow will be able to use the wetlands as a living laboratory. This gives us the opportunity to study the effects plants have on the local animal populations and monitor any changes in the water conditions.

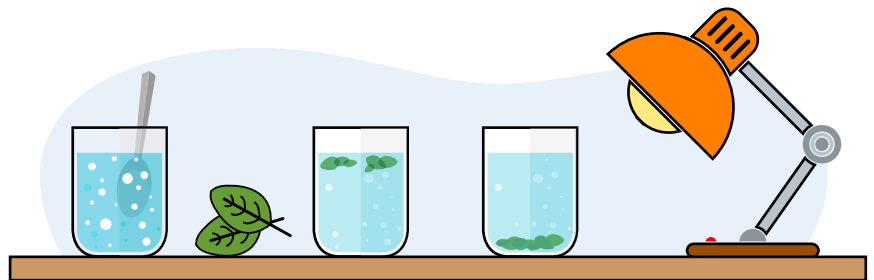
Fantastic Photosynthesis!

Photosynthesis is the process by which green plants use sunlight to make their own food. Green plants use this light energy to convert water and carbon dioxide into food (glucose) and oxygen - which is the gas we breathe.



What will you need?

- A glass of water
- Baking soda
- Spinach leaves
- A spoon
- Scissors
- A light source
eg. a lamp or a windowsill on a sunny day



What to do

Step 1. Put a tablespoon of baking soda into your glass of water and mix it together until it dissolves. The baking soda will create carbon dioxide in the water, an essential part of photosynthesis.

Step 2. Cut the spinach leaves into small pieces, about 1 cm by 1 cm. Add 5 to 10 pieces into your glass. You don't need many to see the science.

Step 3. Shine a light onto your glass or leave it in a sunny spot. Observe what happens to the spinach.

Do you see bubbles in the water?
When the leaves are exposed to light, they use the carbon dioxide and water to produce bubbles of oxygen. You may even see the leaves float as the oxygen carries them upwards.

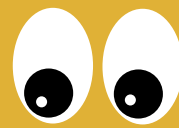


What do you think will happen when you remove the light source?

Clever Camouflage



Animals have developed some clever ways to hide in plain sight.



Can you spot the hidden animals in the pictures below?



Answer



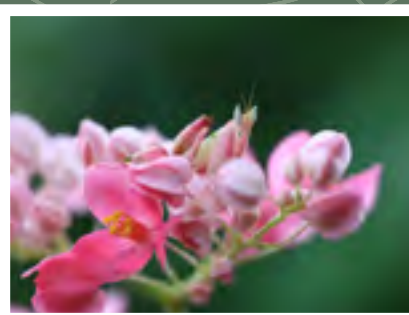
Answer



Answer



Answer



Answer



Answer



Did you spot them all? Check your answers on the back page.

Why do you think animals would want to be camouflaged?



Try camouflaging yourself and ask your friends to find you in a game of camouflage hide and seek.

We're going on a lichen hunt



Have you ever seen these
yellow patches on branches?



Or these spots on pavements and walls?



These peculiar organisms are called lichen and come in many different colours and shapes.

Lichen are tiny ecosystems, made of fungus (like mushrooms) and algae. These two organisms work together to survive. The algae lives inside the fungus and makes sugars using the Sun to feed them both. The fungus in turn protects the algae and provides a home for them both. Perfect teamwork.

Lichen can grow almost anywhere, from your garden or local park, on pavements and walls, in cities and in the countryside.

Lichen can come in many different colours, white, green, brown, and yellow. The colour of the lichen can tell you a lot about the air quality of the surrounding area.



Green coloured lichen is more likely to grow in places with clean air.



Can you think of any reason why air might be more polluted in some areas than others?

Yellow coloured lichen is more common in places with lots of nitrogen in the air, which indicates pollution.



Make a field journal to track your lichen adventure



What will you need?

- A notepad and pencil
- A camera
- A ruler



Go on a lichen hunt and use your field journal to track what you find. Check on rocks, trees, walls and paths. Take a photo of the lichen you find, measure it with your ruler, and use as many descriptive words as you can to record the shape and texture of the lichen.

Add your photo here, or you could draw a picture of the lichen that you have found.

Location found

Colour

Size

Description

Descriptive words

You can use some of these words to describe your lichen, or you could come up with your own adjective.

Stringy

Powdery

Spotty

Thread like

Hairy

Puffy

BRIGHT SPARKS!



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

What is the name we give to the variety of life that lives in one habitat?

- A) Biodegradable
- B) Biodiversity
- C) Beneficial

1

Green plants use which process to create energy using the Sun?

- A) Photography
- B) Photographic
- C) Photosynthesis

2

What covers one third of all the land surface on Earth?

- A) Forests
- B) Grasslands
- C) Deserts

3

Why are pollinators, like bees, essential to life on Earth?

- A) They provide oxygen
- B) They make honey
- C) They help provide the food we eat

4

A snake's tongue helps them to ...

- A) Hear
- B) Smell
- C) See

5

How much faster can seagrass absorb CO₂ from the atmosphere than the rainforest?

- A) 20 times faster
- B) 35 times faster
- C) 60 times faster

6

What is the largest land animal on Earth?

- A) African bush elephant
- B) Giraffe
- C) White rhino

7

What is the smallest land animal on Earth?

- A) African pygmy mouse
- B) Kitt's hog-nosed bat
- C) The Etruscan shrew

8

Lichen is made from what two life forms?

- A) Algae and bacteria
- B) Bacteria and fungus
- C) Algae and fungus

9

Bombus is the Latin name given to what buzzing insect?

- A) Bumblebees
- B) Wasps
- C) Fly

10

Mushrooms are plants?

- A) True
- B) False

11

Which land-based ecosystem has the most biodiversity?

- A) Grasslands
- B) The Arctic
- C) Tropical rainforests

12

What is an ecosystem?

- A) More than one species living in the same area.
- B) A biological community of interacting organisms and their physical environment.
- C) An area that an animal can live.

13

Animals that eat plants and animals are called...

- A) Herbivores
- B) Carnivores
- C) Omnivores

14

The bull-headed dung beetle is the strongest insect in the world, how much weight can it pull?

- A) 50 times its own weight
- B) 500 times its own weight
- C) 1,000 times its own weight

15

Which of these insects has been sent into space on a rocket?

- A) Cockroach
- B) Fruit fly
- C) Soldier ant

16

Yellow coloured lichen means there is a lot of which gas in the environment?

- A) Oxygen
- B) Nitrogen
- C) Carbon dioxide

17

A person who studies fungus is called...

- A) A mystic
- B) A mycologist
- C) A mazing

18

What is the name for a species of plant or animal that can only be found naturally occurring in one place on Earth?

- A) Endemic
- B) Epidemic
- C) Energetic

19

Grass > Rabbit > Fox
In this food chain, which of the three would be considered the producer?

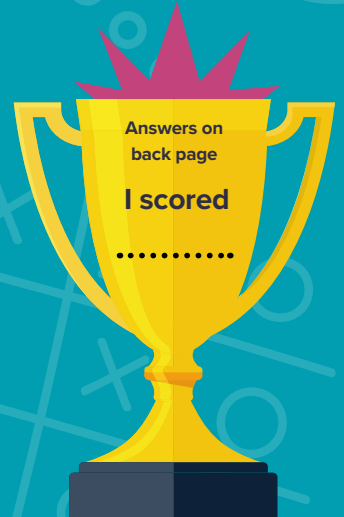
- A) Grass
- B) Rabbit
- C) Fox

20

Answers on back page

I scored

.....



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

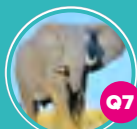
PUZZLE SOLUTIONS



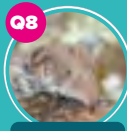
Clever Camouflage



Bright Spark QUIZ ANSWERS

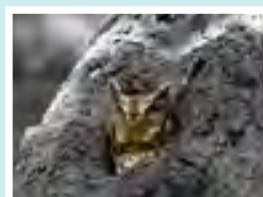


African bush elephant



Etruscan shrew

- Q1. B.** Biodiversity is the name we give to the variety of life that lives in one habitat.
- Q2. C.** Photosynthesis is the process green plants use to grow and survive.
- Q3. A.** Forests cover one third of the land surface and help keep our planet healthy by storing carbon and producing oxygen.
- Q4. C.** Pollinators help produce food by pollinating plants that, in turn, produce seeds and fruits that we eat.
- Q5. B.** Smell. Instead of noses, snakes grab chemicals in the air with their tongue and use a special organ in the roof of their mouth to 'smell' what's around them.
- Q6. B.** Seagrass can absorb CO₂ 35 times faster than the rainforest.
- Q7. A.** The African bush elephant is the largest land animal on Earth.
- Q8. C.** The Etruscan shrew is the smallest land animal. An adult is only 3.5-5 cm long!
- Q9. C.** Lichen is an ecosystem made from algae and fungus.
- Q10. A.** Bombus is the Latin name for bumblebees. Bombus is a word meaning buzzing or humming.
- Q11. B.** False. Mushrooms are not plants, they are a type of fungus.
- Q12. C.** Tropical rainforests contain almost three quarters of the world's animal and plant species.
- Q13. B.** An ecosystem is a biological community of interacting organisms and their physical environment.
- Q14. C.** Omnivores are creatures that eat both plants and animals.
- Q15. C.** It can pull over 1,000 times its own weight. This would be like a 70 kg person pulling six double decker buses!
- Q16. B.** Fruit flies were sent into space in 1947 to test the effects of cosmic rays on living organisms.
- Q17. B.** Nitrogen in an environment will cause more yellow lichen to grow.
- Q18. B.** A mycologist is a person who studies fungus, moulds, and yeasts.
- Q19. A.** An endemic species can be found naturally occurring in only one place in the whole world!
- Q20. A.** The grass is the producer, as it makes its own food from the Sun and provides food for the rabbit, which in turn is prey for the fox.



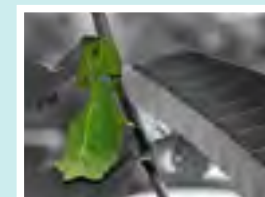
Eastern screech owl



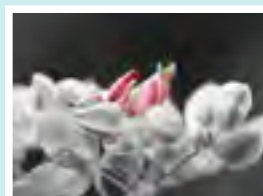
Indian leopard



White-tailed deer



Leaf insect



Pink orchid mantis



Octopus

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 or message us on Twitter @TheBothyGSC

KEEP IN TOUCH



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