

The Spark

Magazine



PUZZLES, QUIZZES, OUTDOOR LEARNING

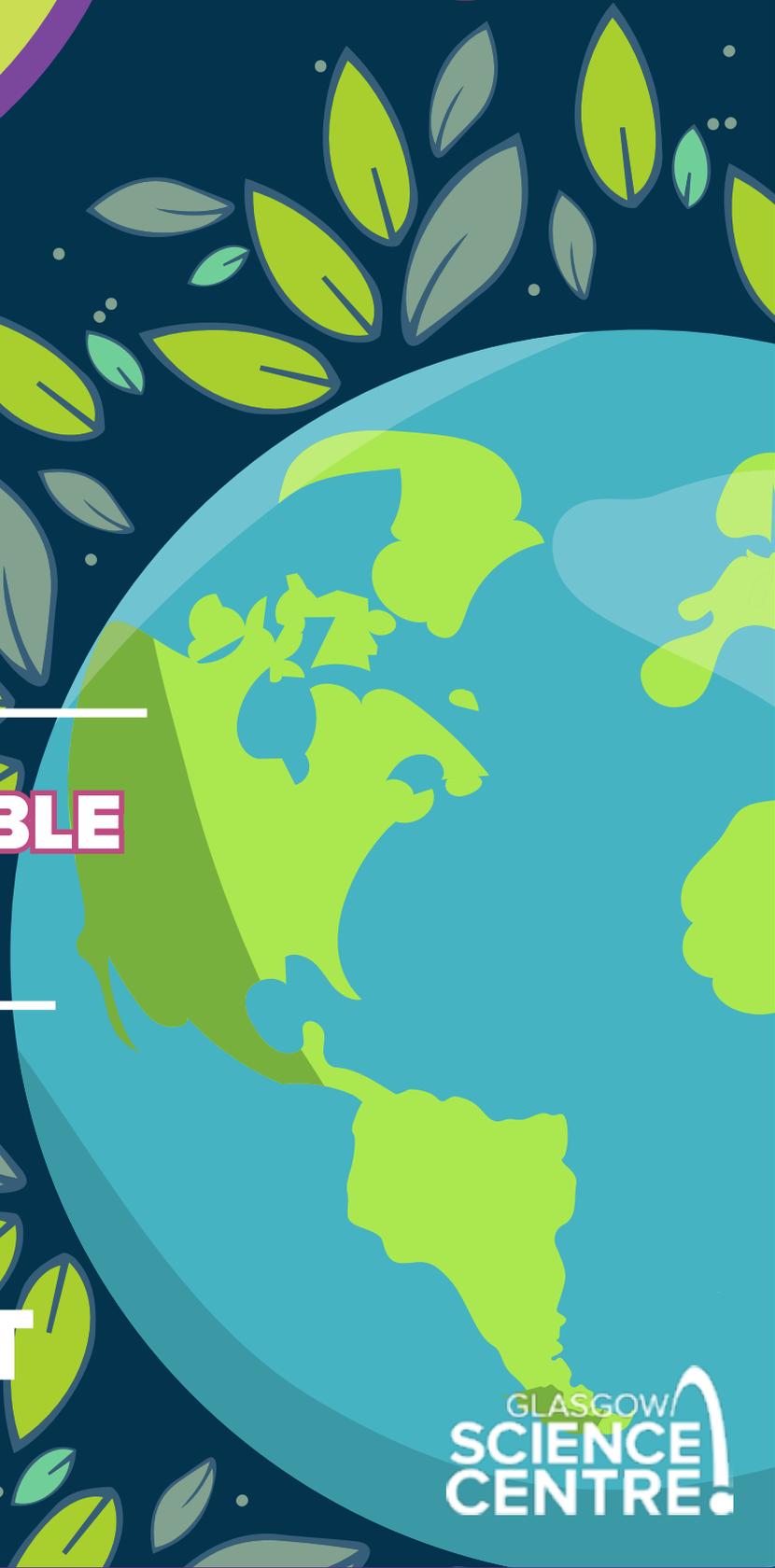
ISSUE
No9



**MAKE A
GARDEN
IN A JAR**

**UNBE-LEAF-ABLE
ART**

**MEET A
MARINE
GEOLOGIST**



GLASGOW
SCIENCE
CENTRE

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**SHARE
YOUR PICS
WITH US**



WELCOME

Welcome to this special edition of The Spark where we are focusing on our very own planet Earth!

There are exciting activities for you to try at home, fascinating facts to ponder over, and puzzles and quizzes to challenge your family.

This week our activities are linked to the natural environment. Our planet is constantly undergoing transformation, with the changing seasons, with the weather, but also through the actions of humans. What changes do you see in your natural environment?

We'll be making a miniature garden in a jar and finding out how Earth recycles water through our land, oceans and skies. We're also collecting colourful autumn leaves to make beautiful pieces of art, and we meet Heather Stewart, who studies changes in the Earth at the bottom of the sea.

You can watch our Operation Earth-themed videos that go along with the experiments on the Glasgow Science Centre Facebook page or YouTube channel.

Best wishes,
Glasgow Science Centre



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
email to CLDteam@gsc.org.uk**



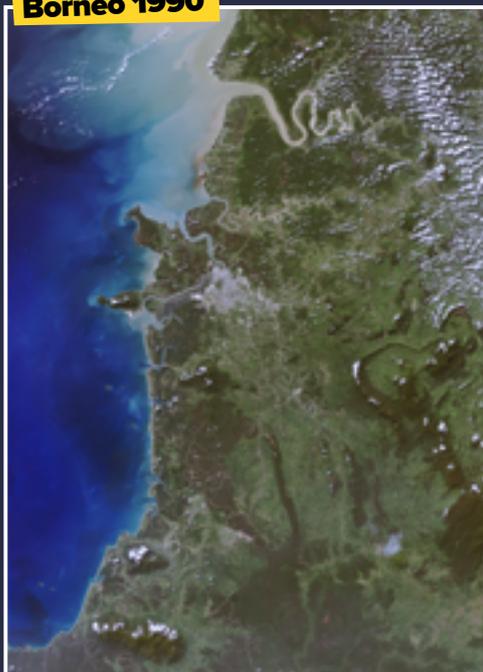
EARTH OBSERVATION SPOT THE DIFFERENCE

Environmental scientists can use satellite images to monitor how Earth is changing.

They can also observe the impact that we are having on the planet. These images both show Borneo, but taken twenty three years apart. Your challenge is to see how many differences you can find! We've spotted four, but do you think you can find more than us?

Why do you think these changes happened?

Borneo 1990



Borneo 2013



Landsat data from USGS processed by NCEO, provided by ASDC.



FAMILY QUIZ

All questions linked to activities in this issue

Answers on back page

DID YOU KNOW?

The Arctic is a frozen ocean, whereas Antarctica is a frozen land mass.



There's more to explore! Delve into our natural environment at www.operationearth.co.uk

QUESTIONS

- How much of the Earth's surface is covered in water?
a) 40% b) 50% c) 60% d) 70%
- True or False. Sea turtles live 100% of their lives in the ocean.
- What does a food chain always start with?
a) Plant b) Predator c) Prey d) Producer
- True or False. The temperature of a sea turtle's nest determines whether the hatchlings will be male or female.
- What can we do to help protect our environment?
a) Buy less plastic and use reusable shopping bags
b) Cut down waste – reduce, reuse and recycle
c) Plant a tree d) All of these
- A turtle's shell is made of keratin. This can be found on the human body as well, but where?
- True or False. Trees can help prevent flooding and soil erosion.
- What type of water makes our planet unique?
a) Ice b) Liquid water c) Water vapour

HINT

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

I'M A... MARINE GEOLOGIST

Meet Heather Stewart

Heather is from the British Geological Survey and studies the seabed – its shape, its features and its composition.

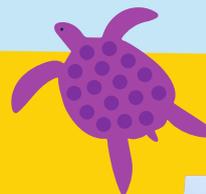
"My job involves going to sea onboard ships to collect samples from the seafloor and to map the seabed. Just now I am looking at how past glaciers shaped the seabed around Scotland and the geomorphology [the shape, features and origins] of the deepest places on earth like the Mariana Trench!

Only 19% of the Earth's seafloor has been mapped, it is very important to fill in the blanks so we can make better decisions about how we sustainably use and protect our marine environment in the future.

I grew up in the central highlands of Scotland and always loved looking at the spectacular Scottish landscape and wondering what natural forces made it like that. I loved to pick up interesting looking stones when I was small. Often they ended up in my mum's washing machine which she wasn't too pleased about!"

Hobby: Running half marathons

Fun Fact: I dived 2400m deep in a submarine in the Arctic Ocean, I think I am the deepest diving British female!



ACTIVITY

Tiny Terrariums



Water is constantly being recycled around our planet. It moves from the land into our rivers and oceans, gets heated by the Sun and rises into the sky as water vapour, cools into tiny droplets of water, forming clouds, and then falls back to the land again as rain or snow. This process is called the water cycle. Plants are part of this process too – they absorb water from the soil through their roots and release water vapour from their leaves into the air.

The Water Cycle

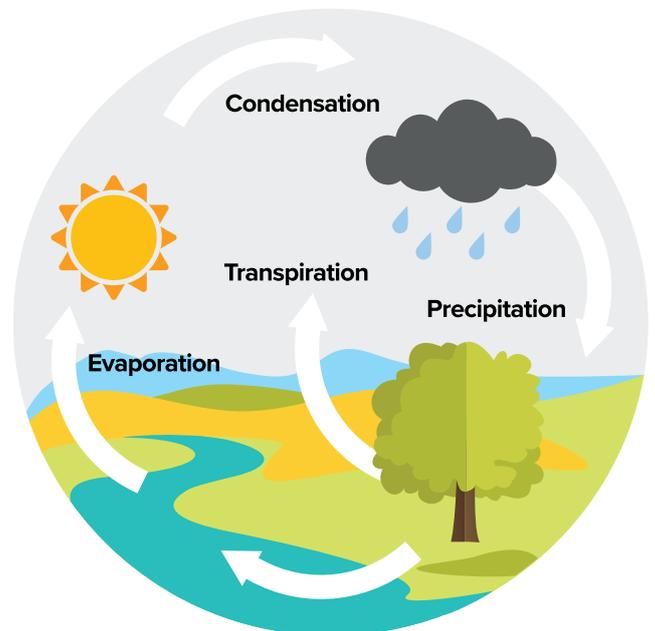
Evaporation - water from rivers and oceans gets heated by the Sun and rises as water vapour into the air until it starts to cool down.

Condensation - as the water vapour cools it turns back to liquid water, forming tiny water droplets which we see gathered together as a cloud.

Precipitation - when there is too much water within a cloud it will fall to the ground again as rain, sleet, snow or hail.

Transpiration - trees and plants absorb water through their roots and release water vapour from their leaves. Water vapour rises and condenses, contributing to precipitation.

Rainwater soaks into the ground and flows into our rivers and oceans. And then the cycle can begin again.



What will you do?

In this activity you will watch the water cycle in action by making your own miniature garden in a glass jar. Your terrarium will have its own mini climate and water cycle.

Make sure you have adult supervision before starting. Be careful if you are using a glass jar.

This activity can be messy so best to do this at a table that can be wiped clean.

What will you need?

Jar (jam jar or similar)

Soil

Pebbles and small stones

Selection of small plants

Optional: decorations for your garden (shells, bridges, twigs, toy figures)

When choosing plants, make sure that they all require the same environment (e.g. the same amount of water and light) to ensure the survival and maximum beauty of your terrarium. You could choose a group of plants that don't need much water, like cactus plants or other succulents which store their own water. Or you could use a selection of plants that all survive well in moist and humid conditions, like ferns and mosses.

How to build your terrarium

Step 1. Clean out your jar, rinse well with clean water and make sure that you'll be able to see your plants.

Step 2. Start with a layer of stones in the bottom of your chosen container. This will allow the water to drain away from the soil.

Step 3. Add a thick layer of dampened soil.

Step 4. The next part is to add your plants. This part is completely up to you to arrange them however you want your miniature garden to look. You might want to think about height and colour to add some variation.

Step 5. Add any decorations if you have them to provide different shapes and colours - shells, stones, toy animals or dinosaurs. Whatever you like!

Step 6. Add a little water to the plants and soil. This may be trial and error to get the right balance for your plants.

Step 7. Put on the lid and display your terrarium where the sunlight will reach it.

Step 8. Enjoy watching your very own water cycle inside the jar. You'll start to see drops of condensation appear within a few minutes after it's been sitting in the sunlight.

Good to know: If you've used cactus plants or other succulents, you'll need to take the lid off to allow the plant to get plenty of fresh air.

More to try

Experiment with different sizes and types of plants to see which ones thrive best in your home.

It doesn't always have to be a garden, you can make different environments, a desert island perhaps or even your own fairytale planet.

Try making an edible terrarium garden with herbs that you can use in the kitchen.

Fun fact

Earth has been recycling the same water for over 4 billion years through the water cycle, or to give its scientific name, the hydrologic cycle. This means that the water you are drinking now, could once have been dinosaur pee!



ACTIVITY

Tree Art



What will you do?

In this activity you will walk to your nearest park, woodland, or anywhere you can find trees and collect a variety of leaves. You'll create beautiful art with them, and look at the differences between different types of leaves.

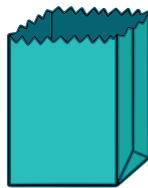
What will you need?

A bag for your leaves

An assortment of leaves

Crayons or pencils

A4 sheets of paper



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

How to do this activity

Step 1. Collect your leaves, making sure they aren't crumpled. You'll need them to be quite flat. Can you find different shapes of leaves? Can you find a heart-shaped, hand-shaped, or even a spear-shaped leaf?

Step 2. Take your first leaf and flatten it down as much as possible on a table or counter top.

Step 3. Stick a sheet of paper over it and flatten it a little bit more.

Step 4. Take a crayon and start rubbing lightly over the leaf. You will begin to see patterns on your paper as you go.

Step 5. Keep rubbing until you can see the whole leaf on your piece of paper. But don't press too hard or you won't be able to see all the different parts coming through.

Step 6. Admire your fantastic tree art!

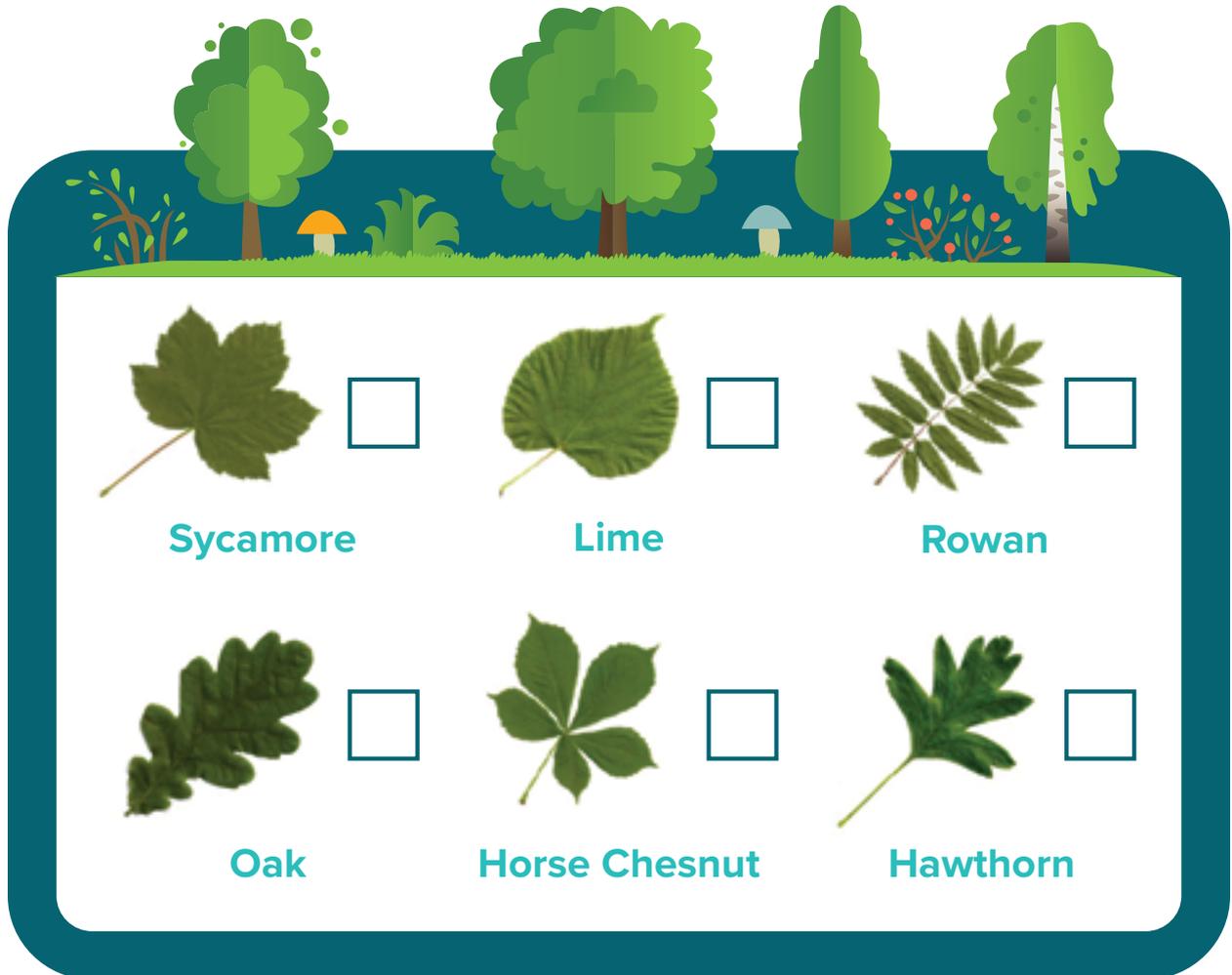
More to try

Make a collage. Use different colours of crayons and different leaves on your page.

Try categorising your leaves into groups, according to their shape or colour or texture.

Can you identify which trees your leaves came from?

Do they match any of the examples below?



Fun facts

Leaves have veins just like us, but instead of transporting blood, they transport water and glucose to and from the leaves.

The midrib of the leaf – the thickest vein that runs along the middle - provides the leaf with strength so it can weather the wind.

Leaves have a large surface area to absorb as much sunlight as possible, as they use the energy from the sun to make their food.



Share your Unbe-leaf-able Art with us on social media using #GSCAtHome

ABOUT US

We're back! Get your dose of socially distanced science fun this October half term.

Travel from Earth to Space online with all new #GSCAtHome videos this October, or visit us! Glasgow Science Centre is open again and our brand new exhibition - Idea No59 is ready for you to explore. Please note we have additional measures in place to ensure everyone has a safe yet fun time when they visit. As we're operating at a reduced capacity and timed entry, you must book online in advance.

Glasgow Science Centre is a registered Scottish charity SC030809.

For more information and bookings, visit: glasgowsciencecentre.org



Scotland's largest indoor Halloween party is moving online this year and into your home - it's like a bumper and spooky edition of GSC At Home! To find out more, please visit: glasgowsciencecentre.org.



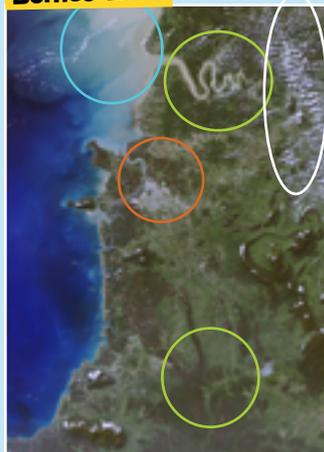
QUIZ ANSWERS



1. d) Water covers around 70% of our planet.
2. False. Sea turtles start their lives on land. After they hatch, baby turtles immediately head for the sea. Females return only for nesting, but males never do.
3. d) Food chains always start with a producer – a living thing that is able to produce, or make, its own food. Often it is a plant, but not always. Algae and some types of bacteria can also be producers.
4. True. If the nest is warm, turtles will be female. If the nest is cooler, they will be male. (What could happen to turtles if temperatures across the Earth continue to rise?)
5. d) All of these are great to do to help protect our environment here on Earth.
6. We have keratin in our hair and finger nails!
7. True. Trees can help prevent flooding and soil erosion because they can absorb hundreds of litres of rainwater from the ground, every day!
8. b) Although water can be found on Earth as a solid (ice), liquid (water) and gas (water vapour), the fact that we have liquid water means we have life and biodiversity.

PUZZLE SOLUTION Spot the difference

Borneo 1990



Borneo 2013



Answers

Orange circle - This is the city of Kuching and we can see that by 2013, it has expanded. More and more people are moving to live in cities. This is called Urbanisation.

White circle – One picture has more clouds than the other! This isn't due to climate change, clouds are always moving. Sometimes when we look up we can't see any clouds, and sometimes the whole sky is cloudy!

Green circles - By 2013, the rainforest here has been cleared, mainly to plant oil palms. This crop is in a lot of demand across the world, but clearing the forests means hundreds of animal species are losing their habitat and could become extinct. Borneo has already lost over half its natural forests.

Blue circle – There is more sediment in the ocean in the picture on the right. This may be a temporary change, possibly after increased rain and river flow, or it may be due to soil erosion as a result of forests being cleared and replaced with oil palm plantations.

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](https://twitter.com/TheBothyGSC)

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

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KEEP IN TOUCH



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