



Whizz! Bang! Wow!

Exploring God through science and technology

Roots are pleased to have teamed up with **God and the Big Bang** – a Christian organisation that helps children to discover and discuss the compatibility of science and faith – to create this engaging holiday resource for children aged 5-10. We provide five fascinating STEM sessions:

Session 1 Can science help us to believe in God?

Session 2 Can science answer all our questions?

Session 3 Can faith be based on evidence?

Session 4 Does science make it hard to believe in God?

Session 5 Does science solve all our problems?

Through fun science-based activities, children are encouraged to discover more about faith and science. As well as experiments, discussions, crafts and quizzes, each session features a Bible passage to explore together, and tells the story of a significant scientist that helps us to unpack the session theme.

Roots would like to thank the following people for their assistance with writing this resource pack:

Petra Crofton, God and the Big Bang Science Faith Communicator and author of *Science Geek Christy*

Sarah Moring, God and the Big Bang Science Faith Communicator

Michael Harvey, Executive Director of God and the Big Bang

Structure of each session

GATHER | 15+ MINS

An activity to introduce the question and get everyone engaged and talking.

SHARE THE WORD | 15 MINS

Exploring the Bible story and how it relates to the theme question.

EXPLORE AND RESPOND | 20-60 MINS OR MUCH LONGER

Two or three activities/experiments/games/discussions to explore the theme question, plus crafts and songs. Optional to run these as stations or all together as a group.

MEET A SIGNIFICANT SCIENTIST | 10 MINS

Exploring the profiled scientist and how their journey helps us with the theme question.

REFLECT AND WRAP UP | 15 MINS

The opportunity to reflect, ask questions, and say a prayer.

Key to Spiritual styles: **W**ord, **E**motion, **S**ymbol and **A**ction

You will see these letters alongside the activities in all five sessions. Spiritual styles are based on the work of Joyce Bellous and David Csinos. These letters describe different ways to worship and what helps us to perceive and connect with God. Using different spiritual styles in a session can enable everyone to connect with God more readily. Find more information at [Worship & learning support](#)

Plan your sessions

- The five flexible sessions can be run as a holiday club, or during your usual Sunday slots. Designed so you can adapt them according to your group and setting, each session contains enough content for around one hour 45 minutes, but you can increase or decrease the activity lengths, swap the order of activities round, or run a carousel of activities to suit you.
- Feeling a little daunted about teaching science? We provide scripted sections that can be read out. And see Michael Harvey's article '[Lessons in Chemistry](#)'. Do consider asking for volunteers who have STEM backgrounds – teamwork makes the dreamwork! And remember: enthusiastic and confident delivery is key!
- You might like to begin and end each session with a song, e.g. 'God of Science (Our Great God)' by Rend Co. Kids and Rend Collective on [SPARKLE. POP. RAMPAGE](#). There are new songs to familiar tunes for each session, as well as closing prayers. It will be helpful to find backing tracks and have the appropriate set-up to show the videos and PowerPoints provided.
- Have paper and pens to hand for the crafts and experiments, and any necessary cleaning or baking equipment. A small number of templates are available to print out within this document.
- With the discussion questions and quizzes, judge what level to pitch the questions at, as appropriate to your group. We've signposted some of the activities as being more suitable for younger or older children, though most can be adapted, or read out to early readers.
- Don't forget to check in with your safeguarding officer, complete risk assessments, and recruit appropriate volunteers. Consider how you would like your registration process to go – whether you'd like to charge for this event and what, if any, refreshments you'll be providing.
- Remember to have fun and enjoy helping children to discover more about God's amazing world!

Whizz! Bang! Wow! – contents

Session 1 Can science help us to believe in God?



Science helps us discover more about the world God has created.

Science topics:

The Solar System and the 'Goldilocks zone'.

Bible story:

God answers Job
Job 38:1-7,34-41

Scientist:

Georges Lemaitre and the Big Bang.



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Session 2 Can science answer all our questions?



Science leaves us with unsolved mysteries and unanswered questions.

Science topics:

Gravity, including exploding apples plus boats and telescopes.

Bible story:

Jesus walks on water
John 6:15-21

Scientist:

Isaac Newton and gravity.



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Session 3 Can faith be based on evidence?



Science helps us test our ideas using the scientific method: eyes, brain, feet, repeat.

Science topics:

The Scientific Method, exploring fossils and exploding volcanos.

Bible story:

Gideon tests God
Judges 6:36-40

Scientist:

Mary Anning and palaeontology.



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Session 4 Does science make it hard to believe in God?



Science draws us closer to God and is an opportunity for awe and wonder.

Science topics:

Our senses, cells and DNA.

Bible story:

Wonder at God's creation
Psalm 19

Scientist:

Francis Collins and the Human Genome project.



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Session 5 Does science solve all our problems?



Science offers us solutions that we can choose to use by demonstrating compassion, love, kindness.

Science topics:

Viruses and vaccines.

Bible story:

The Good Samaritan
Luke 10:25-37

Scientist:

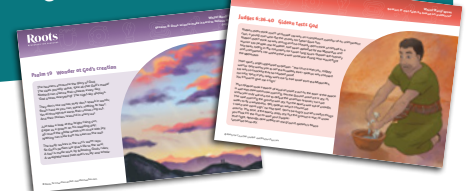
Kizzmekia Corbett and the Covid-19 vaccine.



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Bible stories

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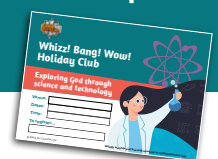
Scientist biographies

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Invitation postcard & poster

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Session 1



Can science help us to believe in God?

GATHER | 15 MINS

Today we are going to look at a big, important question: Can studying the world, as scientists do, help us to believe in God?

Perhaps we should first ask: What do we already know about the world, our enormous universe? And, what have scientists found out about our planet so far?

For a long time, people thought the earth was the centre of the universe, and that the sun and everything else rotated around the earth. Fortunately, for us, this isn't the case! We and other life would not have coped – and most likely, not even existed. As it happens, the earth sits in a perfect and unique place within the cosmos. Astronomers, scientists who study the cosmos, and geographers have discovered some jaw dropping facts about this. Let's explore together!

Goldilocks story

WE

Ask the children to talk in pairs about something they only like when it's cold (ice cream, snowball fights) and then something they only like if it's hot (chips). Ask some children to share their ideas.

See if the children can recall the story of Goldilocks and the three bears.

ASK

- Who was Goldilocks? (A picky girl who wandered into the home of a bear family and tried out various things.)
- What things did she try? (Three very different bowls of porridge, chairs and beds. Use props to remind the children.)
- What did she find out? (That there always was just one perfect choice.)

Did you know? Scientists have discovered that planet earth is a bit like Goldilocks! It's the most comfortable place possible for life, from plants and parrots to porpoises and people. The earth officially sits in the 'Goldilocks zone'. Do you know what that means?

It's not too hot or too cold (the perfect distance to the sun), the strength of gravity is just right (so nothing collapses, and nothing flies away), earth has the perfect protective 'blanket' (atmosphere), it is just the right size and spins at the perfect speed. And there are many other things* that allow life to thrive on planet earth. Isn't that awesome?

Going further (ages 9+)

The universe: coincidence or planned?

Science answers questions, such as:

- How are stars born?
- How do babies grow?
- Why are people heavier on larger planets?
- Why can't everything float on water?

There are lots of other questions that science can't answer, such as:

- What is love?
- Why do people give up their lives for others?
- How did the world begin?
- Does God exist?
- If so, was God created?

Science can't say much, if anything, about these questions. Does God exist? Science can neither prove nor disprove this.

Things point to someone very intelligent, powerful and good... who is involved in our world or... who was involved in making our world work so well. The position of the earth, its size, the speed at which it spins, its atmosphere and the amount of water and oxygen make our planet the perfect place for life. Coincidence or planned?

Also, the laws of nature are the same everywhere, and they are beautiful and work brilliantly. Is there a God who has designed all these laws so that the universe can operate in a precise and perfect way?

- What if the strength of gravity had been a very, VERY tiny bit stronger during the Big Bang? Well, the universe would have collapsed again straight away.
- What if gravity had been a teensy bit weaker? Then the universe would have stretched out so much that stars and planets, like earth, wouldn't have formed.
- What If Earth Was As Small as Pluto?
<https://www.youtube.com/watch?v=1kn87ntfmCc>

Extension Read more in the fascinating science and faith adventure story 'Science Geek Sam and his secret logbook' (C Dekker and C Oranje, Lion Hudson, 2017).

SHARE THE WORD | 15 MINS

A read and share idea

WS

Project and share the story presentation, see p.36

Offer the children a piece of paper and pen/felt tips. While the story is being read, show the story presentation on a PowerPoint or printout. Ask younger children to make sound effects for rain and animals that are mentioned (highlighted in blue), and older children to repeat any science words (in bold). Ask all the children to draw pictures of the 'science words' while the story is being read to them.

Science helps us to discover more about the world God has created.

Today we will read about God's conversation with Job, listening out for science words that describe our amazing world.

Job 38:1-7,34-41 **God answers Job**

Job asked God some questions and the Lord answered Job, speaking out of a mighty whirlwind.

God said, 'Who is this, who talks about my plans but doesn't really understand? Prepare yourself, Job; I will ask you a series of questions; Do you dare to reply?

Where were you when I laid the **foundation of the earth?**

Tell me, if you are wise.

Here's an easy one – Who measured the **dimensions of the globe?**

Who wound the **equator** around it?

Who determined the earth's place in the **solar system?**

Or set its **orbit** round the sun while all the **stars** sang together for joy, accompanied by angels?

Can you – Job – call out to the **clouds** causing **rain** to flood down on you?

Can you make **lightning** bolts crack? Do they report to you saying, "Here we are"?

Who puts wisdom into **human beings**, or gives their **minds** understanding?

Who, in their cleverness, knows the **clouds?** Who can tilt them, pouring down **rain** from heaven to put an end to **drought** and water the **hardened earth?**

Tell me, Job, can you hunt like a **lioness**, to feed her hungry **cubs** who crouch in their **dens**, or lie waiting in the bushes?

What about the **raven?** Who provides for its chicks when they cry to God for food?



Discuss

In the Bible passage where this story comes from, there are lots of science words, from the equator to the solar system; from clouds to creatures.

- Why do you think God uses all these words when he talks to Job?
- What have you learned about God in this story?
- How does God relate to his creation in this story? Imagine you were one of the creatures, say an ibis, rooster, lion or raven. How would you feel if you knew it was God who gives you your food and shelter? What would you say to God?
- What about us humans – how does God provide for us? (Remember the Goldilocks story and planet earth!)

Did you know? All life on earth was created to worship God, and even the mountains and seas praise him. See Psalm 148. How can we join in?

Not all Bible passages are meant to be scientific explanations, but there is a lot of wildlife science in the Bible.

Why do you think God inspired Bible writers to write about creation?

Why is God's creation important?

- Back to our big question:

Can science help us to believe in God? What do you think?

EXPLORE AND RESPOND | 20-60 MINS

Select activities based on your group age and size, time and resources.

1 Big Bang balloon experiment

WS

You will need: a large balloon and a felt tip.

How can we understand the Big Bang, that marks the very beginning of our universe? What is the Big Bang and how did it trigger the formation of the universe, with billions of stars and planets?

A very long time ago, nearly 14 billion years, all energy and space and time were packed together in a tiny, incredibly hot and heavy speck. During the Big Bang, energy, space and time were released as the speck exploded, and everything dispersed. It's a bit like nuclear energy, which is a lot of very powerful energy packed together in tiny atoms – but this first speck was MUCH more packed and powerful.

Very slowly, thanks to gravity – the same 'pulling force' that keeps us safely on the surface of the earth – pieces began to clump together, and the first stars were formed. Over time, billions of stars, planets, moons and whole galaxies were formed and our universe is still expanding!

Let's test how this works.

- Take a balloon and blow it up a little.
- Mark the balloon with dots using a felt tip. Pretend that these dots are stars, planets and moons.
- Blow up the balloon to full size and watch everything moving apart. Say: Did you know... this is exactly what is happening in our universe? Galaxies are moving away from each other. The universe is getting bigger and bigger all the time, and we can measure exactly at what speed it is expanding.
- Pop the balloon. Explain: Without God, the universe would not have happened. It would not have become so amazing. Without God, the world would have popped again very quickly, just like this balloon – with nothing left.

Extension For more stories and explanations about science and faith, please read the Science Geek books (*Science Geek Sam and his secret logbook* (2017) and *Science Geek Christy and her eco logbook* (2021)).

2 Solar system placemats

W S

You will need: a sheet of black A4 paper and a colouring sheet of our solar system and a picture of our solar system in colour (see templates at the end of this session) for each child, a laminator with plastic sheets, colouring pens, glue, scissors.. Some bright (glow-in-the dark) paint and paint brushes.

- Ask the children to colour in the different planets and the sun (and try to use realistic colours and patterns), cut them out, stick them in the right order on the black sheet (with the sun on the far left).
- Ask the children to paint the Goldilocks zone (see <https://twitter.com/StarWalk/status/1713183009585643618/photo/1>) with the (glow-in-the dark) paint, as a thick, curved line around the sun, with the earth in the middle.
- Paint some glow-in-the-dark stars.
- Leave the paint to dry and laminate the sheets. Your placemats are ready. If the children look at their placemat in a dark place, it should glow.

3 On target game

E

You will need: a velcro dartboard, some velcro balls or missiles and a blindfold. Please risk assess for safety.

- Place the dartboard on a wall and ask the children to throw a ball/dart from 3 metres distance (or distance appropriate to your space). Did you hit the target?
- Move back another 3 metres (adapt to your own space) and let them throw another.
- Put a blindfold over their eyes and let them throw. How did they get on?
- Ask them to imagine throwing from 20 metres away with a blindfold, when they don't ever know where the bullseye is. How likely is it that they'd hit the bullseye the first time? Hitting it would be such a coincidence that it can't be coincidence.

Discuss

- Do you think God created the universe and our 'perfect-for-life' Earth with great care and purpose, so that we and other creatures can live here?

4 Fizzy bomb explosion

W E

You will need: baking soda (or bicarbonate of soda), 150ml white vinegar, 50ml warm water, a square of paper tissue (10x10cm), a small, resealable, transparent sandwich bag (in which you could snugly fit about 200ml of liquid), tablespoon and measuring jug.

Tip Test your fizzy bomb-making skills before your session, to make sure it works.

- Gather all the ingredients and equipment. Put everything on a table, either outside or in a room with no carpet on the floor. Let the children watch you create your water bomb:
- Mix the white vinegar with the warm water in the measuring jug.
- Place the flat piece of tissue on your hand and add three tablespoons of baking soda in the middle. Fold up the tissue so it resembles a small parcel.
- Pour the liquid from the jug into the sandwich bag until it is almost full and add your tissue parcel. Seal the bag immediately.
- Place the bag on the floor and walk away as you watch your bag explode!

Explosion science – How it works

When white vinegar and baking powder mix, they react, and carbon dioxide is formed. This gas makes the liquid mixture expand. As we know, expansion of something in a limited, confined space creates pressure. The mixture wants to 'escape', which is why the sealed bag explodes so quickly.

5 'Goldilocks Earth' drama

W E

Enlist some children to help you perform this drama, with audience participation. You could perform this again at a weekly service or at the end of the holiday club, for the parents.

You will need: four copies of the script (see the next page), a different colour highlighter to highlight each of the the speaking parts for each actor, four actors: Narrator, Earth, Sun and God. (Optional) props: a cardboard or inflatable sun and earth.

'Goldilocks Earth' drama

Narrator: (to the audience): Did you know, there once was a little planet called Earth. Earth was a very curious planet and travelled round our solar system to see where and who it wanted to be. We are going to act out a story about our adventurous planet. We need some audience participation:

- Each time you hear the word 'Sun,' close your fists then flick them open, wiggling your fingers to show the sun is hot and shining.
- For 'Earth,' mime a ball shape with your hands.
- When you hear 'God', point at the sky.

Nearly five billion years ago, a planet was born. God had made it and decided to name it planet Earth. Planet Earth had yet to settle in the universe.

Earth: I know, I will go into the solar system with that lovely Sun and seven other planets and move as close to the Sun as possible.

Narrator: And so the Earth drifted towards the Sun, all the way past Venus and Mercury. As soon as the Sun spotted the Earth, it spoke up.

Sun: Don't come too close! I may be lovely and light, but my rays will roast you alive and evaporate all your precious water at once. Your glaciers will melt within minutes.

Narrator: The Earth tried anyway, but soon it realised it was a big mistake.

Earth: I must escape the heat, this is unbearable. I will go as far as possible, past Mars and beyond.

Narrator: So the Earth sped back, past Mars, and Jupiter, Uranus and Neptune. But soon it felt extremely dark and cold.

Earth: This is awful, I am frozen to my core, even my seas are rock solid. Let me quickly find a better place.

Narrator: So the Earth went back, and eventually, between Mars and Venus, Earth stopped and settled. Very slowly, over a very long time, the Earth became the most beautiful and luscious planet in the solar system.

Earth: Look at me, I have rainforests and polar ice, coral reefs and deserts. My surface is awash with life!

Narrator: But still, Earth was not completely satisfied. Impressed with its humongous neighbours Jupiter and Venus, Earth wanted to grow not just a little bit, but until it was 10 times its size! God had watched Earth patiently, over time, and listened when Earth spoke.

Earth: God, you made me wonderful, but I would have liked to be as big as some of the other planets. Could you make me bigger?

God: Oh Earth, you're already the most awesome planet, with animals small and big, from tiny ants to long-necked giraffes. But since you ask, all right. I'll make you three times as big.

Narrator: Earth was delighted as it felt itself swelling – even if it felt disappointed that God had not allowed the 10-time increase Earth had bargained for. Yet, Earth felt important and mighty. But after a while, Earth noticed that all life with bones started to struggle to move. And also, more and more asteroids and other space rocks started to hurtle towards the Earth and solar storms were crashing into it. Earth got scared.

Earth: What's going on, God?

God: Well, Earth, since you are so much bigger, you are denser and heavier, and gravity has become stronger. You attract rocks and planets which may crash into you. And the poor creatures on your surface and in the seas are struggling too, as they feel so much heavier. They now can't grow very well anymore.

Earth: Everything is falling apart! Even giant trees are tumbling over. Please make me smaller and lighter, as small and light as Pluto!

God: Are you sure? You'll have other challenges to overcome! But okay.

Narrator: So God reduced Earth to half its original size. But again, things went terribly wrong.

Earth: Help! All my land creatures are bouncing off my solid surface, everything is flying and crashing around. I am also getting cooler, and I am losing precious gases. Please, change me back to normal!

Narrator: And so, God changed Earth back to normal. Earth was very relieved, although not for long...

Earth: God, it would be really cool if you would get rid of my atmosphere. It's a bit in the way, like a thick duvet. Or maybe, you could make me spin a bit faster, that would be great fun too...

God: No way, Earth. You've had your fun. If I removed the atmosphere, nasty space radiation would kill my precious, tropical creatures. And spinning twice as fast? Ha! Spinning faster means that the oceans at your North and South Pole would drain towards the equator, where sea levels would rise by 100 metres! I can't let my poor creatures drown. You need to stop now and be glad to be such a privileged planet. You're already perfectly comfortable. You know, I put you in the top spot in the universe, the perfect 'Goldilocks zone'!

MEET A SIGNIFICANT SCIENTIST | 5-10 MINS

Project and share the scientist's profile, see p.43

Each session we'll meet a significant scientist. Our first significant scientist, Georges Lemaître, was born in 1894, in Belgium.



Georges Lemaître

Born in 1894 in Belgium.

Georges was very curious and loved science, and he also loved God. He became a priest in the Roman Catholic church AND a brilliant scientist. He was kind, modest and very brave. As a young soldier, he fought in the First World War and received a special medal for his bravery. Georges was very good at maths and physics and enjoyed studying the cosmos (space and the universe). After a while, he discovered something new and amazing: that the universe had started from a single, extremely hot and heavy point. He also discovered that we can calculate this point in time, namely nearly 14 billion years ago, and that the universe has been expanding ever since. The explosion that marked the beginning of the universe is now called the Big Bang. However, at the time, many scientists including Georges' good friend Albert Einstein initially disagreed with this theory.

Georges Lemaître remained a committed Christian and worked for the Roman Catholic church, including the leader of the Church, the Pope. Georges was very clear: science and faith don't conflict. However, it's best not to mix up science and theology: theology is the study of God and religion, so it explores different things and questions to science.

Watch this video – leaders will find this useful (in preparation or for children over 10, time permitting):
[How a Priest Discovered the Greatest Theory of All Time - YouTube](#)



REFLECT AND WRAP UP | 15 MINS

Discuss

- What is something you've learned this session?
- Do you think Georges Lemaître is interesting or impressive? Does he inspire you?
- Think back on the drama about the Goldilocks zone. Isn't it awesome how God made the Earth perfect for life, including us?

There are many other examples of how God created everything brilliantly, so that life isn't just possible, but very good. We haven't got time to explore these, but perhaps you could look into this at home or in school. Examples are the human body and all its cells; eyes and brains; rainforest ecosystems and how everything hangs together so that life can thrive; soil; the 'wood wide web' – how trees work together all the time, including other creatures like fungi.

- Back to our big question: **Can science help us to believe in God?** What do you think?

Sing

The perfect place (see lyrics on the next page).

Pray

(see suggested prayer on the next page)

Sing

The perfect place

To the tune: backing track: 'Every move I make',
Hillsong Kids

(Na na na na na na na x4)

God is great He made the perfect world,
It is so amazing:
Perfect planets, perfect stars and moons.
Planet Earth is not too hot or cold,
It is just amazing:
Not too big or small, and even tilted.
(nananana, etc.)

God is great He made the perfect world,
It is so amazing:
Perfect planets, perfect stars and moons.
Planet Earth is full of oxygen,
Good for plants and people,
And an atmosphere to keep us safe – from space rays.

(Bridge:)

Not too big and
Not too tiny –
Planet Earth is just
the perfect place.

We adore our
God creator,
Who shows the world, his
amazing grace.

(nananana, etc. x2)

God is great He made the world,
It is so amazing:
Perfect planets, perfect stars and moons.
Planet Earth is not too hot or cold,
It is just amazing.
God's gravity keeps us on our toes.

(Bridge:)

Not too fast and
Not too slowly,
Planet Earth spins at
the perfect pace.

We adore our
God creator,
Who shows the world his
amazing grace.

(nananana, etc.)

Pray

Dear Heavenly Father,
you are the awesome maker of the universe. You created
space, time and life.

Thank you for our Sun, our Moon and planet Earth.
Thank you for making our planet,
the perfect place for life.

Thank you for making it just the right size, in the right
place, spinning at the right speed and with the perfect
angle. Thank you for our Sun, shining with warm, bright
rays on our faces.

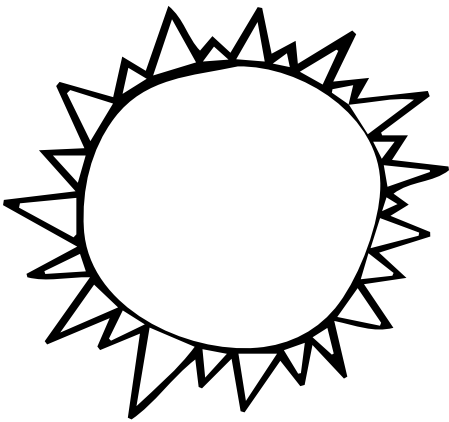
Thank you for sunshine making plants grow,
giving us oxygen.

Thank you for water too, and for all the fruits and
vegetables plants make.

You are the awesome maker of the universe.

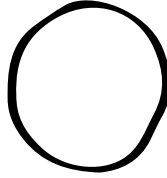
Thank you, God, for our perfect planet Earth!

Amen.

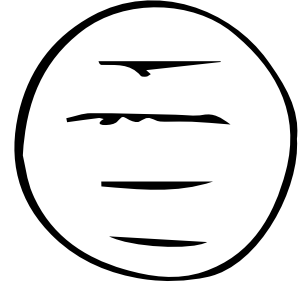


Sun

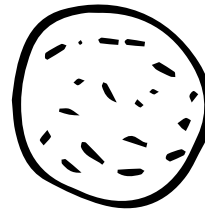
1. Mercury



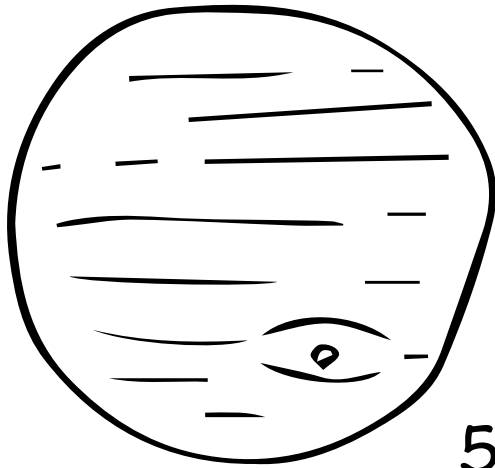
2. Venus



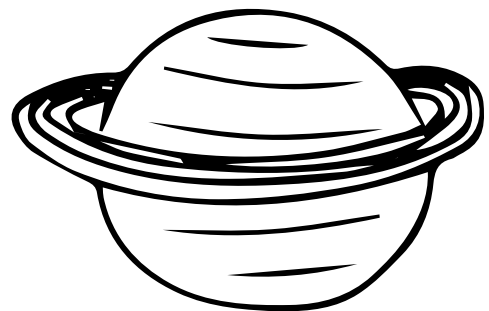
3. Earth



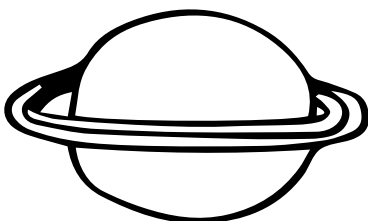
4. Mars



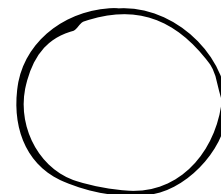
5. Jupiter



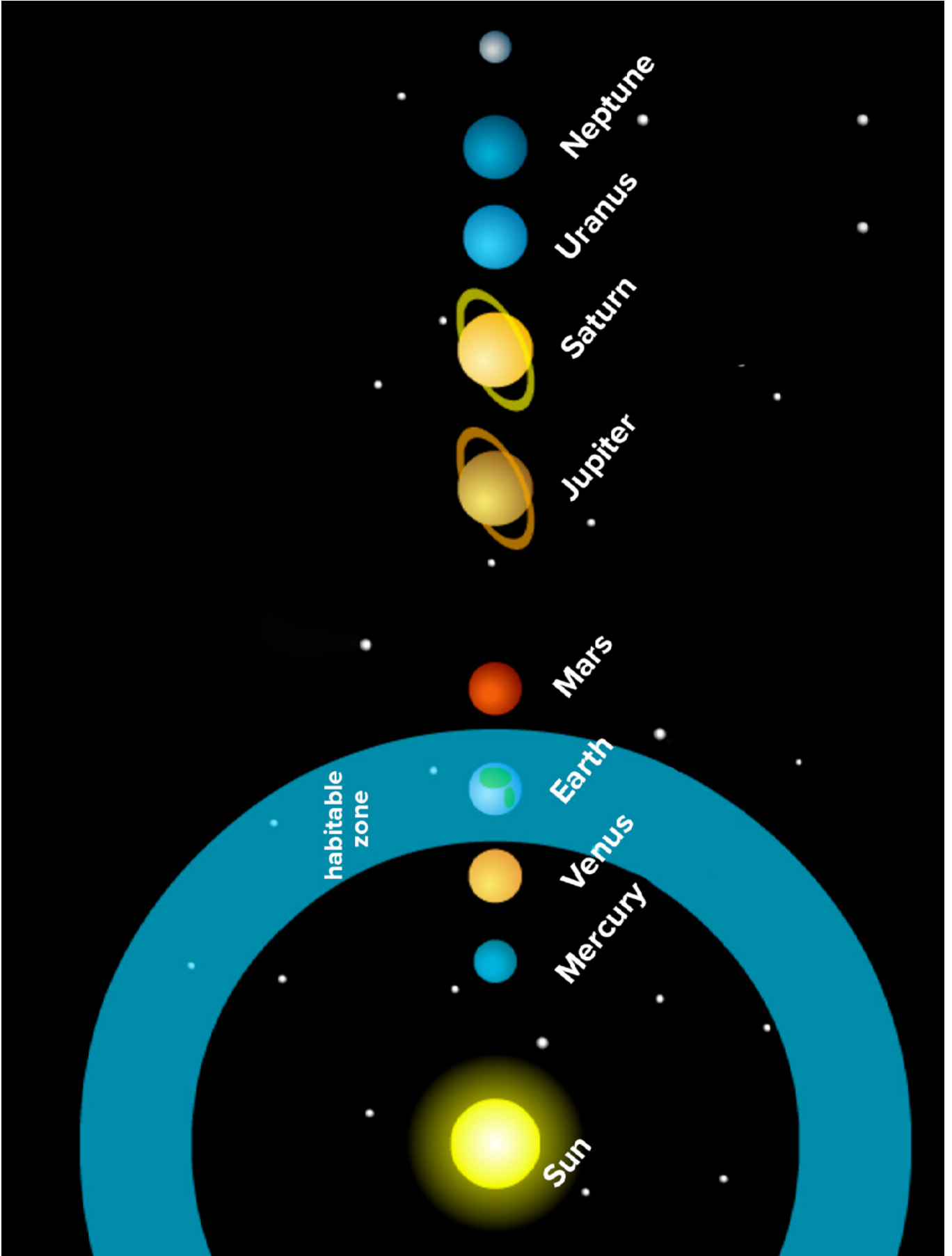
6. Saturn



7. Uranus



8. Neptune



Session 2



Can science answer all our questions?

GATHER | 15 MINS

Apple science

W E

You will need: a washing-up bowl, water, a few small apples, a pear, a knife, a stopwatch/phone, towels to clean up.

Ask a volunteer to take off their socks and step into the bowl filled with water. Ask the children:

- What is happening? (Their feet immediately 'sink' to the bottom of the bowl and water is displaced.)
- Why? (Gravity; the density and weight of water are less than the density and weight of the person.)
- Put an apple in a clean bowl of water. What happens to the apple? (It should float/bob – do check in advance.)
- Why? Why don't we bob for pears, do you think? (The way gas is distributed inside an apple makes it float, whereas a pear is different on the inside (denser, harder, heavier) and so it sinks. This is linked to various things, for instance, that pears ripen much more slowly than apples!)



Apple bobbing game

Place apple quarters in clean water and play a game of apple bobbing. Who can get their piece of apple out the quickest? You could also ask the children to test if pears float or not (to prove your teaching point, above).

Exploding apples

Did you know? An apple explodes when you spin it round really fast, say 100 times per second. Actually, don't try this! It's so fast, you need a machine. See the following video – you'll see an explosion at around 2 minutes:

<https://www.youtube.com/watch?v=nedusgCUZC4>

This explosion happens because apples are made up of relatively thin, soft skin and flesh that is quite loose and fibrous.

God designed apples to be an easy snack or meal for animals that disperse apple seeds when they poo, so more apple trees can grow. (For more detail: <https://physics.stackexchange.com/questions/597099/why-did-the-apple-explode-when-spun-very-fast>)

The power of gravity

Science can help us answer questions about water, human bodies, apples and pears, weight, density and gravity. Scientists now know the precise details of what happens when you step into a bowl of water and why you can't walk on water. Science also explains why things that are lighter than water float.

Physics and maths explain about the forces at work between objects, and that water must go somewhere when moved.

Other sciences look at water, feet and apples in a different way. Chemistry understands the make-up of water, air, bodies and other objects; Biology explains about the life within a human body, apple trees, etc.

You may know quite a few facts yourselves – none of this seems 'rocket science' to us now. However, until these things were unravelled, and the 'laws of nature' understood and described, people could only guess and there were many incorrect or 'unscientific' explanations of natural phenomena.

As much as we have discovered about the world, and now understand through science, science still leaves us with unsolved mysteries and unanswered questions. Let's look at something that happened that is hard to understand even with science.

Explanation of gravity for younger children: Planet Earth, on which we live and stand, pulls at everything that you can weigh on weighing scales. It's like when you pull down a toy from a shelf, with your arm. Earth pulls just like your arm. This is called gravity. That's why, when you throw a ball into the sky, it drops back to the ground. But: water is not the same as air. If something is lighter than water, it will float: corks, leaves, bits of paper and, often, apples. There are tiny air bubbles in apples which make apples lighter than water. But your feet and the rest of your body are heavier than water, so they sink when you step into a bath or a bowl of water.

SHARE THE WORD | 15 MINS

A read and share idea

WS

Project and share the story presentation, see p.37

Create a story mat by using blue material for the sea and brown or yellow material for the sand, a simple toy boat and wooden figures for Jesus and the disciples. Set out and move the figures while you tell the story. Finish with some 'I wonder' questions.

John 6:15-21 Jesus walks on water

Because of all the miracles he had performed, the people wanted to make Jesus their king. They weren't going to take no for an answer, but this wasn't God's plan, and so Jesus went away from the crowds. There was a mountain beside the Sea of Galilee and he went there by himself.



Now, the disciples had been expecting to meet up with Jesus, but when it got dark, they decided to get into a boat and cross the lake. They headed for Capernaum, the town where Jesus was based.

As the disciples rowed, the wind picked up, until conditions were stormy. The surface of the water became choppy and dangerous, but still they kept on their way.

After rowing for three or four miles, the disciples looked out and saw a figure approaching them, walking on the surface of the lake. Naturally, they were terrified, not sure what they were seeing.

'Do not be afraid,' the figure said. 'I am Jesus.'

Frightened that the storm might harm their friend, the disciples wanted Jesus to join them in the boat, but immediately, and miraculously, they found that they had reached their destination.

'I wonder' questions

- I wonder which is your favourite part of the story?
- I wonder what it felt like to be in the boat during the storm?
- I wonder where you are in the story?
- I wonder what questions you have for Jesus?

Some children may want to share some of their thoughts.

What about gravity? In this story, Jesus does away with God's law of gravity. There are several examples in the Bible where the laws of gravity don't work! In the Old Testament, the prophet Elisha rescues an expensive, lost axe head from the river. It would have been impossible to find it without God's miraculous help: God defeats his own law of gravity and brings up the heavy axe (2 Kings 6: 4-7)*

As for Jesus, in the New Testament, he suddenly appears in the disciples' house, regardless of locked doors and roofs – he basically teleports himself. The laws of gravity are defeated, just like when Jesus walked on the water and when he rose towards heaven, to be with his Father, at the Ascension. Isn't it amazing how Jesus, creator and master of the universe, can stop his own natural laws from working any time.

*When they arrived at the Jordan, they began cutting down trees. 5 But as one of them was cutting a tree, his axe head fell into the river. "Oh, sir!" he cried. "It was a borrowed axe!" 6 "Where did it fall?" the man of God asked. When he showed him the place, Elisha cut a stick and threw it into the water at that spot. Then the axe head floated to the surface. 7 "Grab it," Elisha said. And the man reached out and grabbed it.

Discuss

- Can you remember any other times when Jesus performed a miracle? (Answers: e.g. when he turned water into wine, healed people, and raised people from the dead. On Easter Sunday, Jesus himself came back to life after three days.)
- What about the Old Testament: Did many miracles happen before Jesus was born? (Yes, see [Old Testament Miracles \(biblestudy.org\)](http://Old Testament Miracles (biblestudy.org)). Examples: quail and manna in the desert, a widow's cooking oil not running out, healing of Naaman.)
- Do miracles still happen? Have you ever witnessed a miracle? (Share stories of miraculous healing as well as God's 'everyday intervention' – provision and guidance by God for everyone who asks. Be mindful of children wrestling with unanswered prayers and of conversations around disability theology).
- What is the point of God performing a miracle – why does God do it?
- How can we trust science and the 'laws of nature' that God has put in place, so everything happens orderly and predictably, AND believe in miracles?
- And coming back to our original, big question: **Can science answer all our questions?** What do you think?

EXPLORE AND RESPOND | 20-60 MINS

Select activities based on your group age and size, time and resources.

1 Floating and propelling boats (with washing-up liquid) experiment ES

You will need: a washing-up bowl or tray, washing-up liquid, paper, scissors. Pre-prepared resources for younger children.

- Let the children cut out a little flat (2D) boat shape, or create a simple, shallow 3D boat by folding paper. [How to make a soap powered boat](#)
- Let children fill the bowl with water and place the boats on top. They should float.
- Squeeze some washing-up liquid on your index finger and touch the water behind the boat. What can you see? Your boat will start moving. Do you know why? Well, when there is just water, the boat will sit on the water surface without moving or sinking. The tension is the same all around the boat. Washing-up liquid reduces the surface tension. Let's watch [this video on surface tension](#), so when you add washing-up liquid, the tension near that end of the boat will go down and the stronger surface tension at the front of the boat will pull your boat forward.
- Mix the washing-up liquid with the water in the bowl, and the boat will stop moving – the surface tension is the same everywhere.

2 Make a little boat ES

You will need: various materials, e.g. corks, plastic tubs, etc., depending on the boats you are making. Make a few boats and encourage children to float them on a puddle, stream or pond after the session? See [15 easy boat crafts for kids](#).

3 Exploring telescopes S

Use a telescope or pair of binoculars and go outside – what can you see? Collect some moss, leaves, bark, etc., and use a microscope inside to inspect the detailed patterns and textures of your finds. See also: [How do telescopes work? NASA and microscope - Kids | Britannica Kids | Homework Help](#)

 **4 Miracles mini-quiz**

W

Work together in small teams to answer these questions.

1 In which Bible story does God split water?

- a) When God created water and divided it into oxygen and hydrogen
- b) When Moses led the Israelites through the Red Sea, away from Pharaoh
- c) When God showed Noah the rainbow

2 What was Jesus' first miracle?

- a) Healing a blind man
- b) Turning water into wine
- c) Raising a girl from the dead

3 Which animal talked in the story of Balaam?

- a) A parrot
- b) A monkey
- c) A donkey

4 Who wanted to walk on the water, just like Jesus?

- a) Peter
- b) His mother Mary
- c) The twelve disciples

5 What food did Jesus multiply to feed the crowds?

- a) Five loaves of bread and two fish
- b) Five fish and two baskets of chips
- c) Five sausages, five burgers and ten bread rolls

MEET A SIGNIFICANT SCIENTIST | 10 MINS

Project and share the scientist's profile, see p.44

You may want to use this video as an introduction <https://www.youtube.com/watch?v=m2JhWkQzw9A> but also use this explanation to talk about Newton's faith and other discoveries.



Answers to Activity 4 Miracles mini-quiz on p.13: 1b, 2b, 3c, 4a, 5a



Isaac Newton

Born in England in 1642.

Our second significant scientist is Sir Isaac Newton, who was born in England in 1642. Isaac had a tough time as a child, but soon became a 'polymath', someone who knows a lot about lots of types of science. He was also a theologian, someone who studies God. Isaac's most famous discoveries include the law of gravity and the three 'laws of motion', which describe the relationship between objects, forces and movement. Each child around the world will learn about these laws at school! They are relevant all the time, as they describe gravity and movement in the entire universe. They even confirmed the theory that planets move around the sun, and that our sun (and not the earth) is at the centre of our solar system. Isaac Newton discovered lots about light too, developed the telescope, and invented 'calculus', the mathematical study of ongoing change.

Isaac also studied the Bible and wrote about how to best interpret it. He warned people against seeing the universe as just 'mechanical' and said that God was behind it all: "So then gravity may put the planets into motion, but without the Divine Power (God) it could never put them into such a circulating motion, as they have about the sun". Isaac Newton was one of the most significant scientists of all times and his scientific discoveries and laws kickstarted a new era: the Enlightenment.

REFLECT AND WRAP UP | 15 MINS

Discuss

- Thinking about Isaac Newton: do you think his brain, curiosity and gift for understanding science were 'just there', or do you think maybe God gave him inspiration, talents and guidance? Do you think he had to work hard to build on what God gave him? Why do you think this?
- How could God inspire us? Do you have a talent you want to use, now and in the future? What, why and how?
- Back to our big question: **Do you believe that science can answer ALL our questions?** If not, what kind of questions can't be answered by science?

Sing

Can science answer all our questions? (see lyrics on the next page)

Pray

(see suggested prayer on the next page)

Can science answer all our questions?

To the tune: *Who's the King of the Jungle* (see backing track on **WEB**) King of the Jungle CD, MP3 Album, Individual songs, Backing Tracks, Sh | Colin Buchanan)

Where do humans come from? (where where)

Why do people faint? (why why)

Who's behind the Universe?

And how is love explained?

I'll ask you:

what does science know? (what?)

Science helps us out.

But it can't explain miracles,

or what dreams are about.

(So I ask you...)

When did you start thinking? (when when)

How did life begin? (how how)

Who's behind the Universe?

And why do monkeys grin?

I'll ask you: what does science know? (what?)

Science helps us out.

But it can't explain miracles,

or what dreams are about.

(So I ask you...)

Why do we have thumbprints? (why why)

How do people pray? (how how)

Who's behind the Universe?

Will robots save the day?

I'll tell you:

Life is full of questions (yeah yeah),

Filled with mystery.

But God is our creator,

and God loves you and me.

God is our creator, YES –

God loves you and me!

Pray

Dear God,

you are the awesome creator of the universe.

We praise you for creating life, time and space, out of nothing.

There are many things we don't understand but thank you for giving us science.

Thank you for helping us to learn more about your world and find answers to questions and solutions to problems. Help us to trust you, even with the many questions we can't answer.

Thank you for love, laughter, kindness and joy – things you gave us that science can't explain.

Thank you for miracles, in the Bible and also today.

Thank you, God, for Jesus who died for us and rose again.

Thank you for the hope that Jesus gives us – for our lives now and for the future of the world.

Amen.

Session 3

Can faith be based on evidence?

GATHER | 15 MINS

Fossil exploration

WE

You will need: a box of stones and fossils (ammonites, trilobites, belemnites, oysters, e.g. 'Devil's fingers' and bivalves like clams) – these fossils can be found in limestone and mudstone in the UK, and are easy to obtain on eBay.

Spread out the fossils on a table and ask the children to have a look. What are these? Can the children describe what they can see? Can they use their knowledge to interpret the patterns and shapes of the prints in the rocks? If you have extra time, you could bury fossils in the sand for children to dig out.

Explain, if needed, that these are fossils* (of prehistoric sea animals) and ask if anyone identify the type/species.

ASK

- Can you guess how old these are?
- Where can you find these?
- How do we know all this?

Later, we will learn about Mary Anning, a famous palaeontologist who initially sold fossils to tourists who believed these were mythical 'snake stones' and 'devil's claws or toenails'. They believed old folktales about the devil turning coiled snakes into stone (ammonites).

- How do you use your body (hands, feet, eyes, ears, nose) and your brain to study the world around you?
- How do you make sure you get the right answers?

(Answers: *repeat, share, read, discuss 'scientific methods' based on observation; test a hypothesis; repeat the test; compare with other scientific findings; try out new experiments, etc.*)

The Scientific Method: 'eyes, brain, feet, repeat'

Scientists have a way of working that helps test information and ideas to see if they are true. It's called the Scientific Method. We can think of this process as: eyes, brain, feet, repeat.

- **Eyes:** we observe what's happening with our eyes.
- **Brain:** we can wonder how things work and make a guess about why it might happen, using our brain. This is called a hypothesis.
- **Feet:** We design an experiment to test if our ideas are correct. We might need to do this in a lab, a kitchen or outside. We can't just sit around, we need to get up and measure the outcome of our experiments. This means getting up on our feet, getting involved and experimenting.
- **Repeat:** Was our hypothesis correct? If not, we start again with another hypothesis and another experiment. (If it was correct, we could repeat the experiment, just to make sure it's not a fluke, and to find out more).

*Fossils are prints and bits of animals and plants that lived at least 10,000 years ago. These creatures died and were covered by sand or mud, usually at the bottom of a sea, lake, swamp or river. Their soft tissue like flesh and hairs would usually decompose quickly, but bones, teeth, shells, etc. survived. Over a long time, when mud or sand are pressed together, trapped bones, other hard bits and prints eventually turn into stone.

SHARE THE WORD | 15 MINS

Did you know there is a story in the Bible of a man who did an experiment with God?

A read and share idea

W

Project and share the story presentation, see p.38

Use one of these videos: [Superbook: Test of the Fleece](#) start at 50 secs in if you want a shorter version. Or this one [God's Story: Gideon](#) but stop at 1:23.

Judges 6:36-40 (Gideon tests God)

Gideon didn't think much of himself. He was an unimportant member of an unimportant clan, a young man who did the chores his father gave him.

Gideon didn't think he was strong and he certainly didn't think of himself as a warrior. His people, the Israelites, had been defeated by the Midianites and had been hiding in the mountains for seven long years. Gideon felt ordinary and unimportant. He wished there was someone strong who would fight the Midianites.



Then God's angel appeared to Gideon. "The Lord is with you, mighty warrior. God wants you to set the Israelites free." Gideon was shocked. He was so shocked that he needed proof.

He said, 'God, If you really want me to free Israel from the Midianites, you'll have to give me a sign'.

Then Gideon took a fleece of wool and laid it out on the floor. 'If the fleece is wet with dew tomorrow morning, but the ground around it is dry, I'll know you truly will use me to defeat the enemies of Israel,' he said.

The next morning the ground was dry, but the fleece was full of enough water to fill a washbasin. Still, Gideon wasn't convinced.

'I need one more sign,' he told God. 'Don't be angry, but let's switch things around. This time, if the fleece stays dry, but the ground is wet, I'll know you think I'm the man to lead your people.'

That night, although dew settled on the ground, Gideon's fleece remained bone-dry.

Discuss

- What do you think of Gideon's deal with God, testing if God really wanted him to fight the Midianites?
- What would you have done in Gideon's case? Would you use science to test God?
- Would the outcome of your experiment be enough to make you go on your mission? Would it mean you'd trust God?
- Why do you think people use science to test things? What body parts would you use as a scientist if you were to test something? (*eyes, ears, touch, smell, taste and your brains*)
- **Can faith be based on evidence?** Why or why not?

EXPLORE AND RESPOND | 20-60 MINS

Select activities based on your group age and size, time and resources.

1 Fossils ID

E

You will need: your box of fossils (from **GATHER**), ID sheets (see template at the end of this session), hand magnifying lenses and a few books with pictures of prehistoric animals that have fossilised in large numbers.

- Earlier, we explored some fossils using our eyes and hands. Now we are going to have a proper go at science ourselves, like real palaeontologists.
- We have ID keys for you to find out the names of the fossils, hand lenses for further inspection, and a few books with pictures of prehistoric animals that have fossilised in large numbers.
- Talk about what you see and discuss how you can find out more about each fossil and what extra information you need to decide in more detail where, when and how the creature(s) lived.

Explanation for younger children: Shells are the leftover bits of soft animals like shellfish and snails. You can sometimes find them on the beach. Fossils are prints and leftover bits of animals and plants from a very, very long time ago ('prehistoric'). It's amazing that these have survived! You can find them yourself, on the beach or in the cliffs and hills. See if you can match any fossils with the pictures in your book.

2 Jurassic volcano cake

S

You will need: about one kilo of dry ice*, gloves and tongs, homemade rice-pop cake mixture (of butter, rice-pops, mini-marshmallows, a wooden spoon, hob and pan, see recipe below), a pint-sized glass (mason) jar, a sheet of chocolate icing or fondant (homemade or bought), quick-to-make jelly (powder or cubes), a kettle, water, oil, some toy dinosaurs.

*Buy one kilo of small pieces/pellets of dry ice online (use a search machine) or in a shop on or just before the day of your experiment. Keep it in the freezer in an airtight container, especially if not bought on the day. Handle the dry ice only with gloves and tongs.

Make this with the children on the day, or in advance (follow up to step 3 if making ahead of time):

- 1 To make the rice-pop cake mixture, melt 200g butter on low heat. Stir until it turns golden-brown. Turn off the heat and add 200g (mini) marshmallows. Keep stirring until the marshmallows melt/puff up. Add five cups of rice pops or cocoa pops. Stir and add another few cups, until the mixture is about to crumble. Oil your hands or a spoon to help spread the mixture around the outside of the jar before it hardens.
- 2 Create the volcano cake by layering the rice-pop mixture around the jar until it looks like a cone-shaped volcano. Make sure the cake is at least half a centimetre higher than the rim of the jar, but don't cover the opening at the top of the jar.
- 3 Use a sheet of chocolate icing/fondant and cover your rice-pop cake, so it looks more like a volcano. Make sure there's still a hole on top. Place your volcano onto a large plate and put your toy dinosaurs around it to create a Jurassic scene.
- 4 Make hot red or orange instant jelly (with boiling water). Gather the children round your volcano and carefully pour the hot jelly ('lava') into the volcano until the jar is almost full. Be sure that they stand still and do not touch.
- 5 Immediately drop the dry ice into the jelly. Reminder: Never touch dry ice (or boiling jelly)!

See what happens...

Your volcano will erupt and smoke! You should see the hot, red 'lava' jelly pour out of the volcano; white clouds of smoke will form at the same time, thanks to the dry ice. You can repeat the eruption and smoke effects by adding more hot jelly and dry ice.

When you're done, cut up the cake and celebrate your successful Jurassic eruption by sharing it round! How does it taste?

See examples here:

[DIY Volcano cake](#)

Eruption science Dry ice is the solid form of the gas carbon dioxide (CO₂). It is called 'dry' because it never becomes a liquid. When the solid form ('ice') meets hot liquid, like boiling jelly or water, it immediately turns into a cloudy gas. Most solids first become liquids ('melting') before they turn into gases ('evaporation'). When a solid changes into a gas, it's called 'sublimation'.

Did you know? Dry ice is also used in smoke machines. And, when you see a comet in the sky, shooting past the hot sun with its long tail, you witness the sublimation of dry ice made out of carbon dioxide and other gases.

3 Fossil felting

S

Make a prehistoric felt creature or a 3D felt dinosaur.

You will need: A5 sheets of felt, scissors, glue, needles, thread. (Optional): sequins, buttons, Sharpies™ or marker pens. For the 3D felt dinosaurs you also need some cotton wool or other filling.

- Give each child a sheet of felt for the background.
- Give them another sheet for the actual animal. Show them some examples/books with images of ammonites, dinosaurs, mammoths (see template on pp.23-4). Ask them to sketch a simplified version of an animal of their choice onto their sheet and cut out the shape. You could pre-cut these for younger children.
- Sew or glue the shape/animal onto the sheet of felt.
- Decorate with sequins, other bits of coloured felt, buttons, pens.

And/or

4 3D felt dinosaurs

S

- Give each child two sheets of A5 felt and show them simple dinosaur shapes (or give them the templates, see pp.23-24).
- Ask everyone to put their two sheets of felt together, carefully draw the dinosaur shape onto the top sheet and cut round it. They now have the same shape twice. Pre-cut these for younger children.
- Help the children to sew the two shapes together and stuff with filling/cotton wool before you finish the sewing.
- Decorate the stuffed felt dinosaurs with sequins, buttons, pens or other bits of felt. Googly eyes are good too.

See also: [How to make felt dinosaurs](#)

For general felt stitching tips, visit:

[12 must-know stitches for sewing on felt](#)

5 Dinosaur mini-quiz

W

In a moment, we are going to learn more about one of the best fossil collectors ever, someone who found fossils of large marine reptiles like ichthyosaurs and plesiosaurs. Even though technically these weren't dinosaurs, many lived at the same time as land-dwelling dinosaurs and we still often think of them as dinosaurs. So, let's learn more about dinosaurs first. Put on your science hats and think carefully as you answer the quiz questions!

Work together in small teams to answer these questions.

1 On which continent have most dinosaur fossils been found?

- a) Antarctica
- b) North America
- c) Africa
- d) Asia

2 What did the majority of dinosaurs eat?

- a) Other dinosaurs
- b) Plants and leaves
- c) Small mammals, reptiles and birds
- d) Blood and bones

3 Stegosaurus was a herbivore, but no wimp. How did he protect himself?

- a) He jumped on top of predators and trampled them
- b) He hit them with his spiky tail
- c) He would stomp and kick predators with his legs
- d) He would bite them with his big teeth

4 How can you outrun a T Rex?

- a) Just by walking, T Rexes were not that fast, moving up to 5km/hour
- b) You'd need to jog at 10km/hour
- c) You'd need a bike or scooter; they would run at about 20-50km/hour
- d) You'd need a fast motorbike or car, or else they'd get you! They can reach 100km/hour

5 Dinosaurs lived at the time of...

- a) The first humans
- b) Sabre-tooth tigers and mammoths
- c) The very first real birds
- d) None of the above – earlier

6 The first dinosaur bones were discovered, some 2,000 years ago, in China.

What did people think they were at first?

- a) Chicken bones, left behind by Ancient Chinese tribes from the Iron Age
- b) Dragon bones
- c) Tiger bones
- d) Panda bones (they were found in bamboo forest)

MEET A SIGNIFICANT SCIENTIST | 10 MINS

Project and share the scientist's profile, p.45

Answers to Dinosaur mini-quiz on p.18: 1.b, 2.b, 3.b, 4.c, 5.d, 6.b



Mary Anning

Born in 1799 in England.

Have you heard of Mary Anning, the famous fossil collector from the Jurassic Coast? Mary is our third significant scientist and was born in 1799 in Dorset, England. From a young age, she went out fossil hunting with her dad. When she was twelve, she discovered and identified the first ichthyosaur fossil. She found several plesiosaur and pterodactyl as well as fish fossils, which have helped scientists piece together the history of life on earth.

Mary had a tough childhood: they were very poor, Mary didn't go to school, she lost half of her (many) siblings to illness when they were very young, and their house often flooded. Mary faced poverty throughout her life, and more than once she narrowly escaped death, including during her fossil finding adventures.

Until just over 200 years ago, fossils were just interesting pieces of rock; Mary's father collected prehistoric squid fossils and sold them to curious tourists as 'devil's fingers' (belemnites) and 'snake stones' (ammonites). Mary sold fossils to keep her family fed, but also loved reading scientific texts about palaeontology. She was super curious!

Mary contributed a lot to science, with her knowledge and writing, and very detailed drawings of fossils. But, in the nineteenth century, it was still very hard for women to be acknowledged as scientists. Eventually, Mary became a respected fossil specialist, and palaeontologists from all over the world visited her in Dorset.

Mary was a very faithful Christian and lived a life full of kindness and integrity, despite all the hardships she had to overcome. Her discoveries made a VERY important contribution to how people saw the history of life on earth, both the extinction of species and the development of new life forms. Until 1820 most people believed that God had made everything in the universe in six days, right at the beginning of creation, and that everything had always stayed the same. They thought that ideas about extinction and evolution of species would go against God's creation of a perfect world. Mary and other palaeontologists showed a different view, that evolution was part of God's plan.

You may want to show one of these short videos:

(ages 7+) [Why You Should Know the Prolific Princess of Paleontology - YouTube](#) (about Mary's incredible discoveries, incl of a fossil of a flying reptile)

[The true story of Mary Anning: The girl who helped discover dinosaurs | BBC Ideas - YouTube](#) (Mary's life story and discoveries – raises the question of why God would allow extinction)

[Mary Anning: Fossil Hunter | Science for Kids - YouTube](#) (Mary's life story and good explanations of prehistoric life and fossils)

REFLECT AND WRAP UP | 15 MINS

Discuss

The majority of Christian scientists these days believe that science shows how life has evolved over billions of years, but that this doesn't undermine God's good creation. They also believe that God is the first mover who keeps everything going in the universe, and is the creator of biodiversity.

- What have you learned today about science and evolution, and how to practise science in a solid way?
- How did Mary Anning show how a good scientist operates?

Going further (ages 9+)

- Mary's findings changed some important world views dramatically, for instance that a good creator God could not allow extinction. What do you think?
- Mary was a committed Christian and didn't ever give up her faith or her scientific activities. What kept her going like that, do you think? How would you have felt if you were her?
- For a very long time, Mary wasn't acknowledged for her amazing talents, hard work and successful finds and drawings and interpretation of fossils. This was mainly because she was a woman, from a modest and poor family. What do you think about this? How should we honour people who serve science?
- Back to our big question: Remember the story about Gideon and think of your own or other people's lives: **Do you think faith can be based on evidence?**

Sing

The fossil song (see lyrics on the next page)

Pray

(see suggested prayer on the next page)

The fossil song

To the tune: 'Harvest Samba'

<https://open.spotify.com/track/3hu554EuEOy1DS5IZN5dZA>

https://sameboatmusic.com/products/harvest-samba?_pos=1&_sid=ccdfcf949&_ss=r

Fish and belemnites, plants and coprolites
Ammonites and ple-sio-saurus, Mary found them all.
Devil's claws and crocs, spotted in the rocks.
Trilobites and pte-ro-sau-rus, creatures great and small.

Mary Anning had a knack for it, spotting fossil bones and other bits. Studying Jurassic life and learning about God's crea-tures.

She used her hammer and her pen, freed the fossils, wrote and sketched and then, she would show her finds to lots of men who shared her scientific findings.

Ich-thyo-saurs and rays, in limestone, mud and clays.

Mary combed through every layer and collected tons.

Fossils were her thing, always digging in.

She discovered so many species, just ama(ha)zing.

Mary Anning had a knack for it, spotting fossil bones and other bits. Studying Jurassic life and learning about God's crea-tures.

She used her hammer and her pen, freed the fossils, wrote and sketched and then, she would show her finds to lots of men who shared her scientific findings.

Mary was a Christian and she loved her science.
Fossils were her passion and God helped her to study his world.

Fish and belemnites, plants and coprolites

Ammonites and ple-sio-saurus, Mary found them all.

Devil's claws and crocs, spotted in the rocks.

Trilobites and pte-ro-sau-rus, creatures great and small.

Mary Anning had a knack for it, spotting fossil bones and other bits. Studying Jurassic life and learning about God's crea-tures.

(lyrics by Petra Crofton)

Pray

Dear Lord,
thank you for the Bible, which points us towards wisdom in so many of our questions in life.
Thank you for the story of Gideon. Thank you for helping him to know what to do.

God, please help us when we are confused and need wisdom.

Help us to ask you for help, like Gideon.

Help us to know your plans for us.

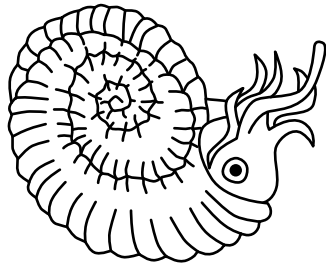
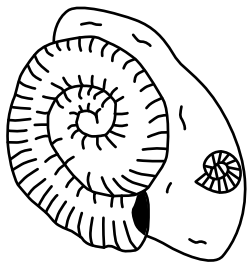
Thank you for helping Mary Anning to find amazing fossils and discover so much about your creation.

Thank you also for helping her to stay close to you.

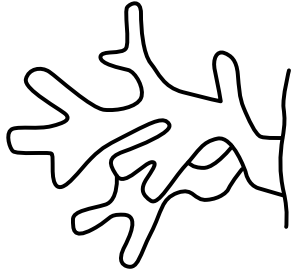
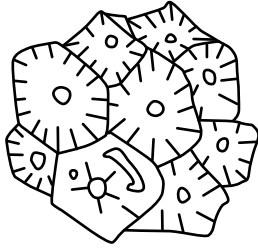
Dear God, help us to trust you, even if we need to be patient for answers and help.

Amen.

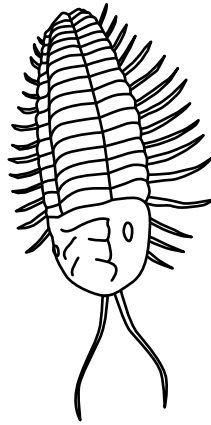
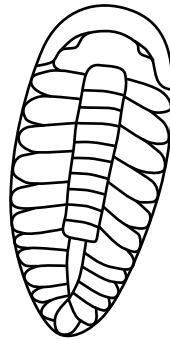
Ammonite (a squid)



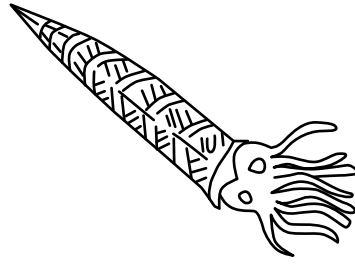
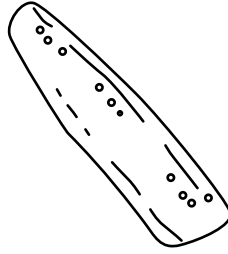
Coral



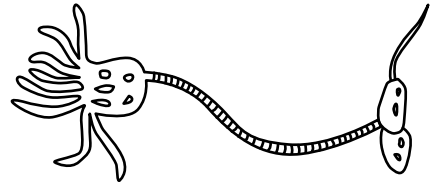
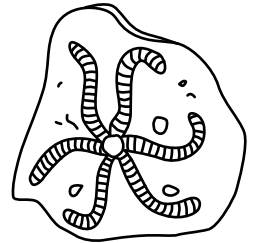
Trilobite (arthropod)



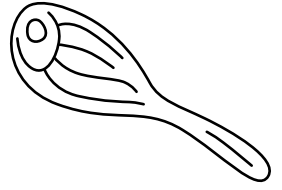
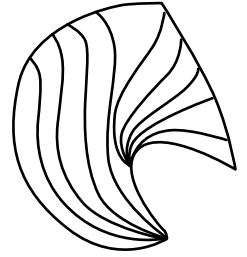
Belemnite (a squid)



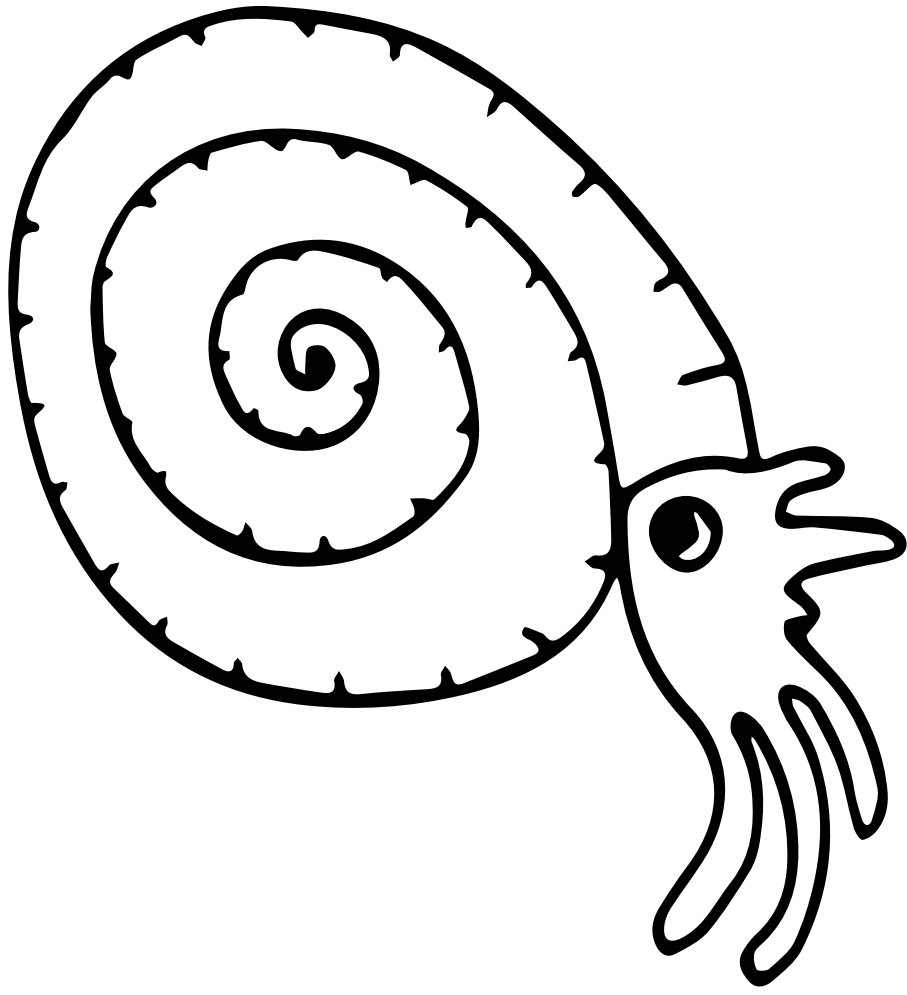
Sea lily (or crinoid)



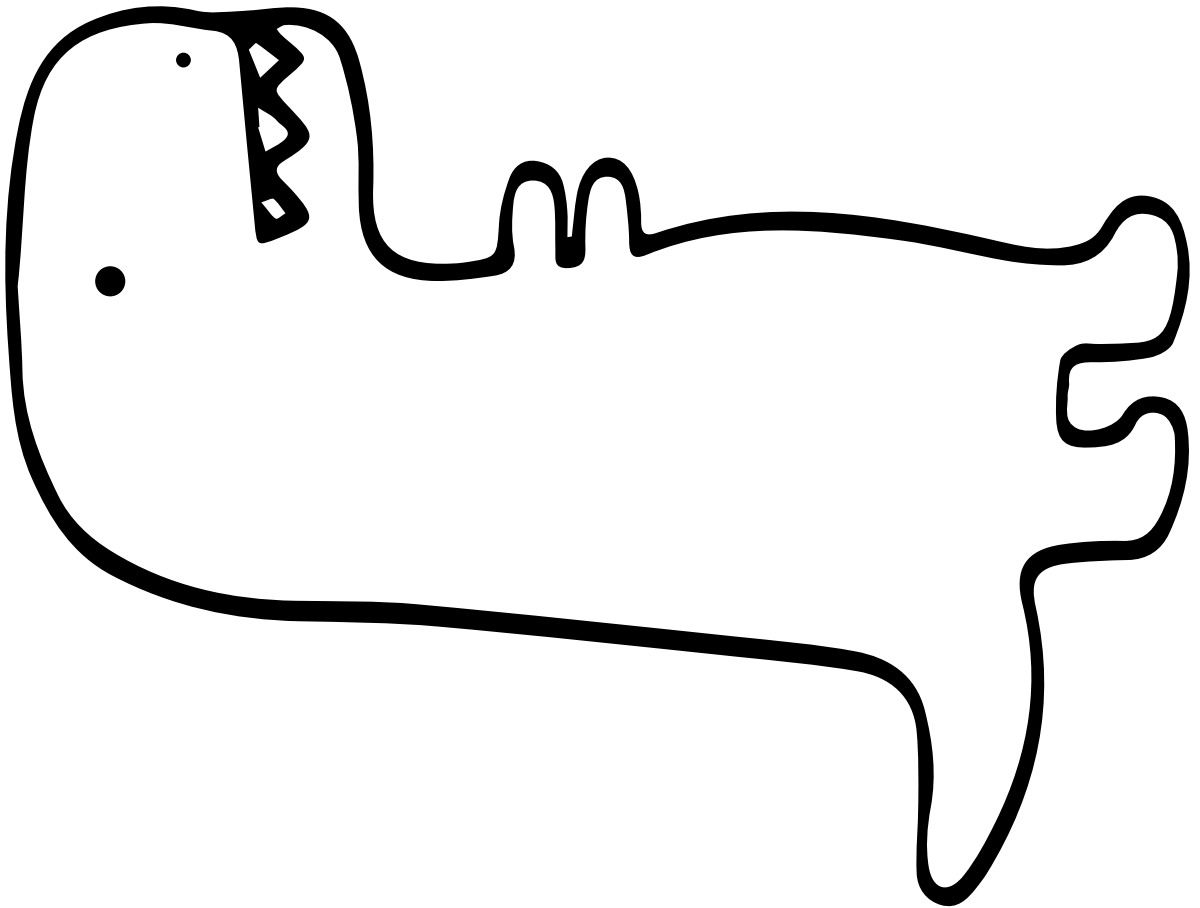
Devil's toenail (or Gryphaea, an oyster)

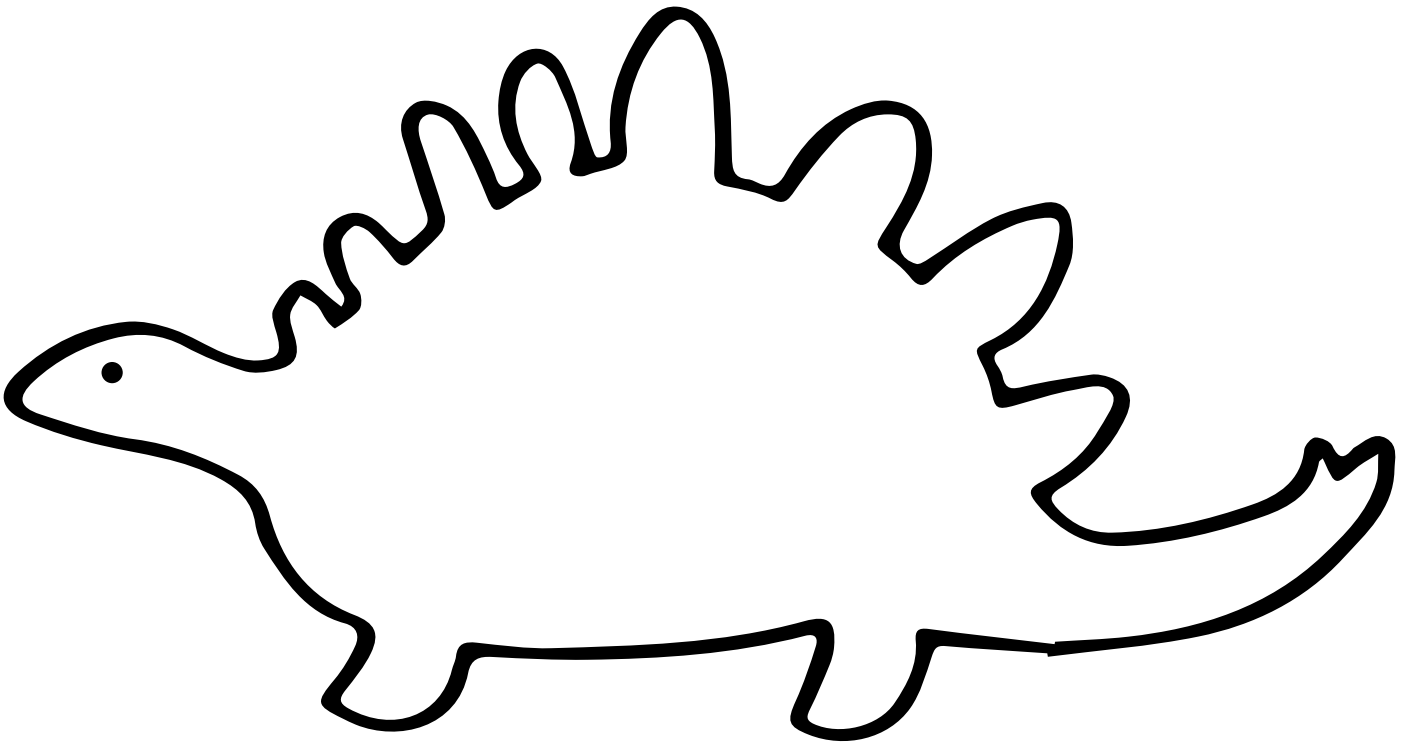


Ammonite

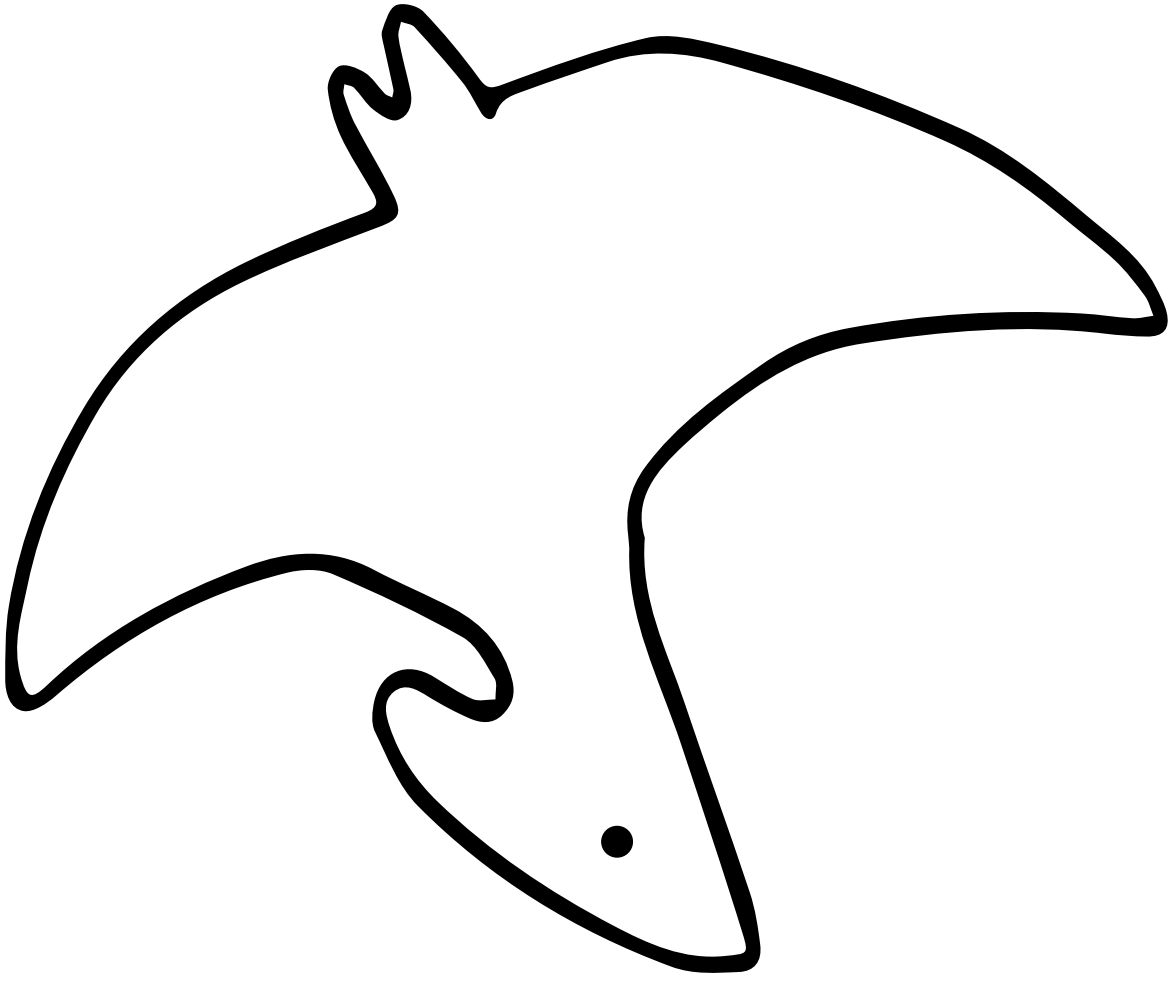


T-Rex





Stegosaurus



Pterodactyl

Session 4



Does science make it hard to believe in God?

GATHER | 15 MINS

Use your senses

W S

Choose one or two of the following activities to explore the senses (feeling, looking, smelling, tasting, hearing).

- 1) **Sensory boxes** Create closed boxes or cloth bags with a hole large enough for a hand, and things inside from nature: fluffy feathers, heavy rocks, prickly pinecones or branches, smooth stones, soft wool. Ask children to identify what's inside without looking.
- 2) **Show some close-up photos** of cells and DNA and a cell diagram (see suggested links below).

ASK

- What do you think these are?

[Human cell \(labelled\): Pinterest](#)

[Biology Art on Pinterest](#)

[3D Plant Cell](#)

[DNA models](#)

[Array of cells](#)

- 3) **Listen to fish and whales making noises in the sea/birdsong** (Use Spotify or YouTube – or similar [WEB](#)).

[Dawn chorus birdsong](#)

[Morning bird sounds](#)

[Forest birdsong](#)

[Whale song](#)

[Blue whale song](#)

[Fish sounds on a coral reef](#)

Science is a wonderful way to explore God's creation, drawing us closer to God, and it's an opportunity for awe and wonder. Let's read this passage where the Psalmist writes a poem about God's awe-inspiring creation.

SHARE THE WORD | 10 MINS

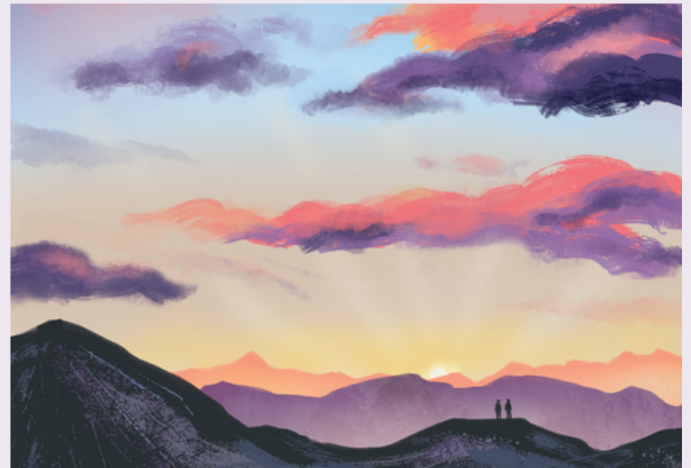
A read and share idea

W S

Download or project the story presentation, p.39

Invite children to point to their ears, eyes, nose, tongue or skin, as they hear the writer of the Psalm describing how we can use our different senses to experience the wonder of God's creation.

Psalm 19 **Wonder at God's creation**



The heavens announce the glory of God;
The skies proudly shout, 'See all that God's made!'
Nothing can silence their speech every day;
'God knows everything!' The night-sky displays.

They don't use voices; they don't speak in words;
Strain hard as you can, there's nothing to hear;
Yet all through the earth their voices ring out,
And their praises resound in every ear.

Just take a look at the bright rising sun,
Eager as a groom on his wedding day;
All round the globe watch him circle with joy,
Nothing can hide from his heat on the way.

The body revives in the sun's warm rays,
So God's perfect law gives life to the soul;
A fool is made wise, by following God's rules;
A straightforward path that's trusty and whole.

The heart rejoices, for God's law is right;
Yes! All God's commands are light to the eyes;
Lasting forever, they're righteous and true;
Following them you'll be holy and wise.

God's law: what competes? What else could compare?
Silver or gold? Not diamonds or rubies.
Finer than money and more wholesome too;
God's law is sweeter than tasting honey.

What warns us away from doing things wrong?
How should we behave to earn a reward?
How do we know that we've made a mistake?
We learn from the law, the law of the Lord.

Keep me pure, O God, and innocent too.
Don't let my dumb pride tell me what to do;
You're my redeemer, my shelter and rock;
Let my words and thoughts be pleasing to you.

Discuss

- What strikes you in this Psalm? What is it about? What does the writer try to communicate?
- What does this Psalm teach you about God? And about his creation?
- What senses are mentioned in the Psalm?
- Back to our original question: **Does exploring the world through science make it hard to believe in God?**

EXPLORE AND RESPOND | 20-60 MINS

Select activities based on your group age and size, time and resources.

Introduction to DNA

Have you ever heard of DNA? There's a blueprint inside every living thing that tells the amino acids how they should go together. It's like an architect's plan for every type of cell. Let's watch this video to find out a bit more about it:

[DNA - Sung Science](#)

1 Make your own DNA sweetie helix **S**

You will need: cocktail sticks; long tube sweets, like liquorice or strawberry pencils; four colours of small soft sweets like mini marshmallows, jelly tots or jelly babies cut in half. Paper plates and kitchen equipment.

Create your own DNA helix using toothpicks and sweets, see [Candy DNA model - edible science](#)

And/or

2 Decorate cell cookies

You will need: images of human cells (show template, at the end of this session), biscuits (or ingredients to make them, if you would like); icing sugar and gel, sweets like red laces, jelly beans and dolly mixture, an 'egg' sweet, or other larger round sweet, and Smarties™/Skittles™; paper plates and icing equipment.

Show, smell, and share cell cookies, see [Real science! Make an animal cell cookie](#)

Show some simple pictures of (animal/human) cells and ask the children to copy what they can see onto the biscuit.

3 Outdoor explore **ES**

Did you know, you can read about God's world in many different parts of the Bible? In Genesis, God told Adam to name all the wild animals – this was important, as God wanted Adam to get to know all the creatures so he would love and care for them. God asked Noah to build a massive boat to host and rescue lots of (wild) animals. It took Noah years to build the ark... And remember King Solomon? David's son who could ask for one thing. He asked for wisdom and God was so thrilled, that he gave him lots of other things: wealth, status and power. Solomon became very wise and knowledgeable indeed! He was soon a leading expert on trees, fish, amphibians, reptiles and birds. You can read about this in 1 Kings, and the Proverbs of Solomon. God delighted in scientist Solomon and gifted him with curiosity and intelligence, so he could become a great biologist.

- Go outside and have a look around: what can you see, hear, feel, smell and taste? Think back of the Psalm that describes the beauty of God's creation. Can you spot any of the creatures that Adam named, Noah saved and Solomon described?
- You could provide a very simple treasure hunt sheet with things to look out for (a smooth leaf, a prickly leaf; a smooth stone and a rough stone; any feathers, twigs, soil, bits of grass; not flowers or mushrooms), or to do outside (jump over a branch, tree stump or stone; spot out for a bird and an insect; find flowers/leaves of three different colours; listen to three sounds – what are they?).
- For groups with limited outdoor space: set up a treasure hunt, to find pairs of animal/nature clues. If you have a church that is decorated with nature/animal motifs, consider exploring the interior for signs of God's wonder and creation.

4 Write a prayer **WS**

Express awe and wonder about God's creation, based on Psalm 19, 104 or 139 – or even one about DNA! For example, this prayer was inspired by Psalm 139.

Dear God,

You are the mighty creator of our world: from the planets in the universe to the whales and corals in the oceans. Thank you for bees, trees, pets, mountains and beaches. And thank you for shaping me, from the very beginning, before I was born. Thank you for making me marvellous. Thank you for my body, my brain, my heart and my feelings. And thank you that you know me so well. You know what I think and what I feel, and you keep me company. Thank you, God, for caring for us even more than all the planets together. Thank you for making me unique and for being my friend. Help me to stay close to you and to look after others and the rest of your creation.
Amen.

Answers to Cell mini-quiz on p.27: 1.c, 2.a, 3.b, 4.a, 5.b, 6.c

 **5 Cell mini-quiz**

W

In small teams, work together to answer these questions:

1 We all started off as one cell. How many cells do you think we each have in our bodies?

- a) One million (1 000 000)
- b) Nine billion (9 000 000 000)
- c) 37 trillion (37 000 000 000 000)

Did you know? If you lined up all the cells in your body you'd create a cord so long, it could go around the world eight times!

2 What best describes a cell inside a living organism?

- a) A cell is like a beautifully organised spaceship, but with thousands of entrances – all protected with sensors, train tracks, power stations, waste disposal, an army, a huge library with manuals and thousands of different robots working hard to operate the 'spaceship'.
- b) A cell is a hard ball with a soft and slimy inside, just like a chicken egg. A lot of magic happens inside.
- c) A cell is like prison: it has hard walls and only one door with bars where things can pass through. It's very hard for anything to get inside or out, and it stays the same most of the time.

3 When cells are formed, they split and eventually, they start doing specific jobs. When does each cell become unique with specific 'jobs', e.g. a heart cell, a skin cell, a hair cell?

- a) Each cell is specific right from the start.
- b) Each cell becomes specific after one cell has split three times (so there are eight cells).
- c) Each cell only starts its specific job after splitting fifty times.

4 How does a cell know what to do? Should it produce blood? Or should it join with other cells to become a muscle?

- a) In each of your cells there is a kind of computer programme. It tells the cell exactly what to do.
- b) The brain sends signals to each cell all the time to tell it what to do.
- c) All the cells are connected to the heart, the centre of an organism. The heart 'talks' to each cell and instructs it.

5 A cell has a chemical substance in its core ('nucleus') called DNA. What is DNA, you may wonder? Well, DNA is the kind of 'computer programme' that makes sure the cell does exactly what it is supposed to do.

'YOU'-nique! Every person has their own unique DNA. No one else in the world has the same DNA as you. Well, unless of course you have an identical twin. Because then you both started off as the same cell. But you're still YOU-nique of course, as God has made you YOU with different gifts and passions.

What does DNA look like?

- a) A ball of wool with lots of different colour bits rolled up.
- b) Tiny strings like small 'rope ladders' (each with three billion steps, which each have a special 'code') and twisted into a spiral staircase called a 'double helix'.
- c) A mini-spaceship surrounded by star-shaped brain connectors. Electric currents connect everything.

6 How many cells do you lose per minute?

- a) 150
- b) 20 000
- c) 50 million (50 000 000)

Did you know? You don't notice losing cells. The cells you lose are instantly replaced by new ones!

MEET A SIGNIFICANT SCIENTIST | 10 MINS

Project and share the scientist's profile, see p.46



Francis Collins

Born in the United States of America in 1950.

Our fourth significant scientist is Francis Collins, an American scientist who was born in the United States in 1950. He studied medicine and genes (DNA), the 'code' in our cells that work like an instruction book for our bodies. He has made lots of important discoveries, including ones that help treat serious illnesses, and led the biggest project ever about the genetic code in our cells, called the Human Genome Project. He has advised several American presidents on national health and science. Francis loves music, plays in a rock band and his wise proposals helped society a lot during the Covid pandemic.

Francis Collins is a Christian and has written many books about science and faith. He even set up an organisation called BioLogos, to help people understand that Christianity and science can work well together, and that God can work through evolution. Francis Collins became a Christian as a doctor and believes that God created the world through evolution.

Watch this short video of Dr Collins (ages 7+) where he shares that science and faith answer different questions:
Dr. Francis Collins: ["I don't see a conflict" between science and faith](#) - YouTube



REFLECT AND WRAP UP | 15 MINS

Discuss

- Have you ever felt overwhelmed with awe and wonder, when looking at or experiencing something in the natural world? What was it? Why did you feel awe? Did you link your awe to something bigger, like God?
- What do you think of Francis Collins' ideas that God has used evolution, and the Big Bang, to develop life on earth?
- Back to our big question: **Does science make it hard to believe in God?** What do you think?

If you haven't, watch the video about Francis Collins and find out what he thinks.

Sing

The DNA song (see lyrics on the next page)

Pray

(see suggested prayer on the next page)

The DNA song

To the tune: 'Our lighthouse', the Rend Collective Rend
Collective - My Lighthouse (Instrumental) - YouTube:

When you made us before we were born,
You wove us together, until we were formed.
Millions of letters you twisted in strands,
We're written in the palm of your hands (woah-woah)
We're written in the palm of your hands.

Your language is called DNA
Made of four letters: GCTA
Totally Awesome, Creator God
We praise you, our amazing Lord (woah-woah)
We praise you, our amazing Lord

You made us, all unique
We're sophisticated,
Awesomely created.
And we can, do so much:
Speak, sing, write and giggle,
Run, play, kick and wriggle.
Tha-a-a-a-ank you God.
Tha-a-a-a-ank you God
Tha-a-a-a-ank you God
Thank you, God!

We've got thousands of genes in each cell,
we're one of a kind and uniquely combined.
8 billion people but you know us all well:
When you made me, you had ME in mind (woah-woah)
When you made me, you had ME in mind.

You made us all unique
We're sophisticated,
Awesomely created.
And we can, do so much:
Speak, sing, write and giggle,
Run, play, kick and wriggle.
Tha-a-a-a-ank you God.
Tha-a-a-a-ank you God
Tha-a-a-a-ank you God
Thank you, God!

You used science, to create us.
You have made us all unique.
(4x)

You made us all unique
We're sophisticated,
awesomely created.
And we can, do so much:
Speak, sing, write and giggle,
Run, play, kick and wriggle.
Tha-a-a-a-ank you God.
Tha-a-a-a-ank you God
Tha-a-a-a-ank you God
Thank you, God!

(lyrics by Petra Crofton)

Pray

Dear Father,

Thank you for the beautiful songs in the Bible.

For the Psalms that praise your name and show us more about creation.

Thank you that those writers were so honest about when life was hard for them.

Please help us to pray to you when life is hard for us. Help us too, to see the beauty in creation even when we struggle.

Thank you, God for making us awesome – thank you for our bodies, organs and cells.

Thank you for DNA and making every person in the world unique.

Thank you that we can explore with our senses – smell, taste, touch, sound and sight.

We pray for those who can't use all their senses.

Help us, together, to make sense of the world, learning from each other.

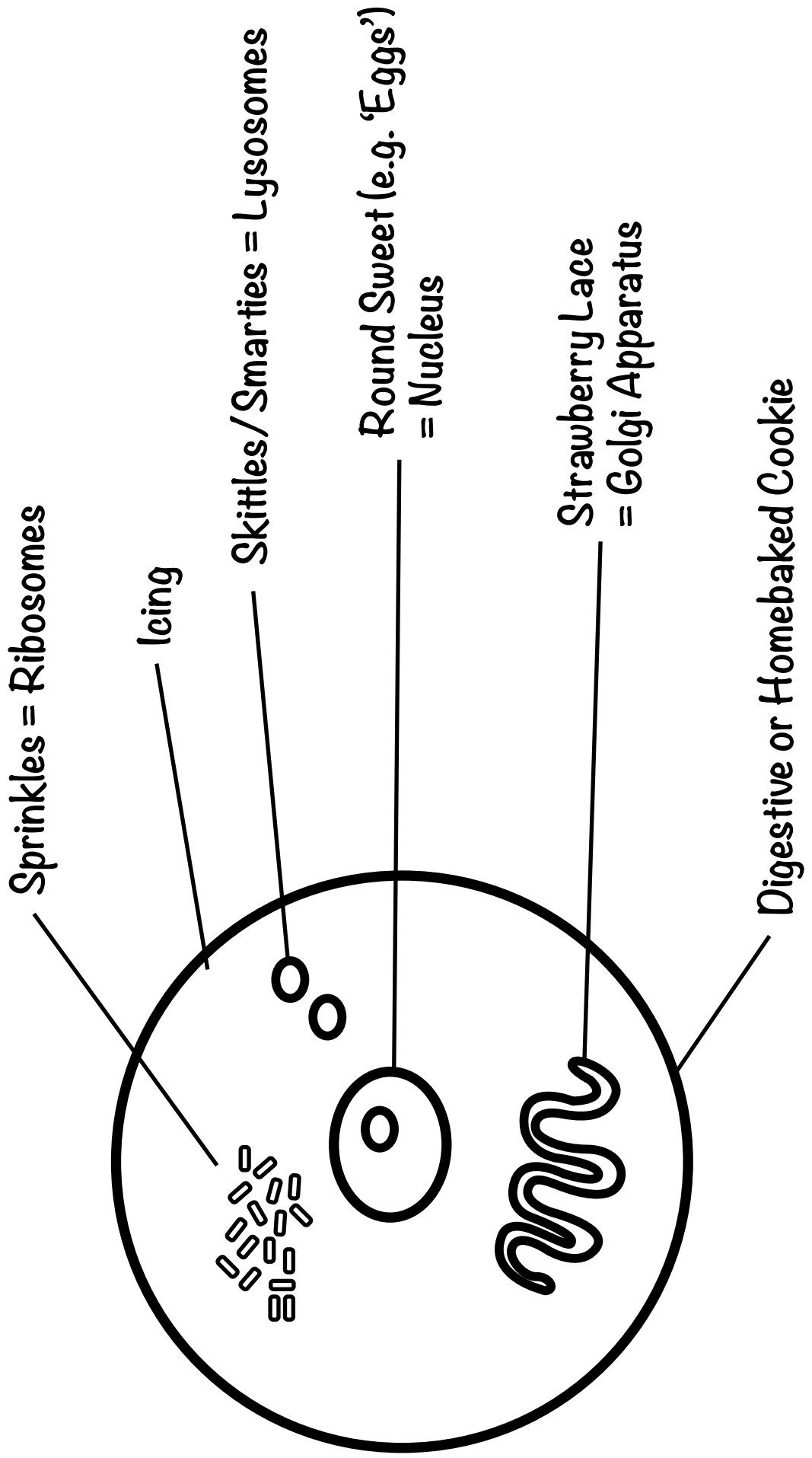
Thank you for scientists who find it easier to believe in you as they discover more about the universe.

Thank you that you show yourself to us when we study the world.

Thank you for the awe and wonder we feel when we look at everything you have made.

Amen.

Cell Cookie



Session 5



Does science solve all our problems?

GATHER | 10 MINS

Jigsaw

S

You will need: a jigsaw (with pieces that firmly fit together).

- Ask the children to put a jigsaw together. How do they get on?
- What's the difference between a bag of loose pieces of jigsaw and a complete puzzle? What 'structure' do you create when you complete a jigsaw?
- Ask them to gently lift the completed jigsaw. Does it hold together?

Today we are going to look at viruses and their 'missiles', called 'spike proteins'. A spike protein is a bit like a puzzle piece that clings onto our healthy cells when it attacks your body. Covid-19 has spike proteins and scientists often compare these with shape-shifting lock picks. They can change their shape to cling onto the proteins on the surface of our cells. This spike protein sticks the virus onto our cells, so the virus can get in and infect the cell. That's why Covid-19 spread so quickly!

SHARE THE WORD | 10-30 MINS

Today we're asking the question: **Does science solve all our problems?**

Let's look at a Bible story where Jesus was answering a big question and told a story about a man who had a big problem – a rather bad situation.

A read and share idea

WE

Project and share the story presentation, see p.41

Invite children to mime the story as you tell it. You could assign parts for the robbers, the traveller, the priest, the Levite and the Samaritan, and the innkeeper.

Discuss

- What is this story about?
- What is remarkable about the three people who passed the wounded man?
- What does the Samaritan do and why?
- Did you notice what Jesus says to the listeners? What is the lesson for them, and for us?
- What is important when we want to love God with everything we have? How can we express our love for God when we look at the state of the world around us? When we see a neighbour in need?



Luke 10:25-37 The Good Samaritan

One day someone asked Jesus how he could please God. Jesus said to him, 'What are the most important things?' The man answered, 'To love God and to love our neighbour as ourselves.'

'Well done!' Jesus said. 'If you do those things, you will please God. You will be very close to him.'

Then the man said, 'But, who is my neighbour?'

So Jesus told this story:

One day a man was travelling on the road from Jerusalem to Jericho. Suddenly robbers jumped out from behind some rocks. They attacked the man, beat him up, took all his possessions, even most of his clothes and left him for dead.

As he lay at the roadside, another traveller came hurrying along. It was a priest from the Temple in Jerusalem. He looked at the man, but he didn't stop. If he stopped and touched him, he wouldn't be able to serve God in the Temple that day. He hurried on by.

A little later someone else came hurrying along. It was a Levite, someone who helped with the services at the Temple. He looked at the man, but he didn't stop. If he stopped and touched him, he wouldn't be able to serve God in the Temple that day. He hurried on by.

After a while another traveller came hurrying along. It was a Samaritan. Now the Jews did not like Samaritans and Samaritans did not like Jews. The Samaritan looked at the man and he stopped. The Samaritan went over to the man who had been beaten up by robbers. He poured oil on the hurting places and bandaged his wounds. He gently lifted him onto his donkey and took him to an inn. He asked the innkeeper to look after the injured man until he was well enough to go home. The Samaritan gave the innkeeper some money and said if it cost any more, he would pay him next time he came past.

Jesus then turned to the man who had asked him the question and said: 'I wonder who was neighbour to the man who was attacked and robbed?' I wonder what you think? (Pause to let the children answer)

Because the Good Samaritan loved his neighbour, even though he was his enemy, he showed he loved God too.

The Good Samaritan showed love to the man who was attacked and robbed, even though he was his enemy. His love was like God's love — God loves everyone.

Going further (ages 9+)

- Think of the state of the world: viruses spreading, the climate crisis and how life on earth is suffering. Could we see the suffering world as the wounded man? How should we react? Like the priest and Levite, or like the Samaritan?
- How do we do this practically? Share examples and ideas.
- Thinking about the story, does science solve all our problems?
- Can science solve a problem like the situation of the wounded man in the story? What (else) do we need to solve such a problem? (Science may offer solutions, but we need compassion and love to motivate people to get involved and solve the problems. Science can't resolve conflict or make people kind.)
- Have you got other examples of problems that science will never be able to solve?

EXPLORE AND RESPOND | 20-60 MINS

Select activities based on your group age and size, time and resources.

The Covid-19 virus

Today we will be looking at viruses, and what science can do to help us stay healthy and combat these viruses.

Show this short video to introduce the concept of viruses:

What is a Virus? Dr Bionics

Cell soldiers and the war on pathogens

Imagine... you live in a big castle, with a massive moat, several drawbridges, a very thick castle wall and knights and archers defending the castle against intruders. Think of the thickest castle wall ever made, in 1503. It measured 32 feet or 10 metres thick.

At the same time, inside the castle, it's busier than central London or New York City. Small robots are transporting all sorts of things via train – and metro lines, there are thousands of books with information propped up against the castle wall. All the information in the books needs to be right: if the robots detect any errors, they correct them straight away. At the same time, lots of food is being cooked and distributed in the large castle kitchen, which is busy 24/7.

Does this sound strange? Straight out of a fairytale? Well, the castle is very much like a... human cell!

The 'robots' are real: they are called **proteins**. There are thousands of different types of proteins in every body cell, each with specific tasks. Proteins are super important – without them, we would not survive. And the knights and archers? They are cell **soldiers** which defend the castle cell against invaders, like viruses and harmful bacteria (pathogens, with a fancy word). These cells are **immune cells**, with names like 'T'- and 'B' cells.

It's hard work, running and defending a cell. Most of the time, the soldiers are successful. But sometimes they need a little help. This is why we need medicines to heal our cells and jabs (vaccines) to make sure we don't get infected. Scientists are working very hard to make new pills, potions and jabs all the time!

Did you know? Cells split all the time, producing a new, **identical cell**. This is how creatures grow. Also, when cells die, new cells are formed.

1 Draw your own cell castle **WS**

You will need: paper, pencils/felt tips, some pictures of human cells and castles for inspiration: [Human cell diagram](#) and [The immune response: a cellular war](#)

Include protein robots and cell soldiers.

Discuss **WE**

- Are all bacteria bad? Why/why not?
- What about viruses?

Explain that there are millions of different viruses and bacteria all around us. Most bacteria in our own bodies are very good for us, but some, called pathogens, can make us very ill. Viruses can be very deadly, but without them, life wouldn't last for more than another 36 hours. Certain viruses are vital for life to survive. These 'good viruses' are called **phages** and they kill harmful bacteria that attack our bodies.

- How can we get rid of bad bacteria?
- And viruses?

Explain that we are targeted by viruses and bacteria all the time. We can vaccinate people to prevent them from getting ill when targeted. If we want to make someone with a bacterial infection better, we can try antibiotics to kill the bacteria. We have been using antibiotics for almost 100 years now.

- Alexander Fleming discovered penicillin, the first ever antibiotic, in 1928 – and the name 'antibiotic' was made up in 1942. However, a lot of bacteria have found ways to avoid being killed by antibiotics and are now immune. We need to keep finding new antibiotics! Or... use 'good viruses' (phages) to beat bad bacteria!

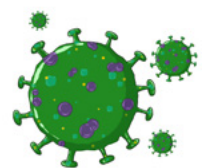
More recently, teams from all over the world worked very hard to combat Covid-19. They developed amazing vaccines. We will learn about this more in a moment!

Viruses and bacteria come in all sorts of colours, shapes and forms. Check it out on [Pinterest](#). **Further information:** [Science for Kids: Bacteria and Germs](#) and [Biology for Kids: Viruses](#) and: [Why the world needs viruses to function - BBC Future](#)

Which is your favourite?

2 Make a Coronavirus monster (craft) **S**

You will need: play dough, clay or a batch of papier mâché (a paste mixed from glue, water, and flour, applied to newspaper strips) to shape a round or oval virus monster. Provide paint and brushes and large cocktail sticks and small pompoms or balls of clay to create a 'spike-like' Corona monster.



Explain a bit more about what the Corona (Covid-19) virus looks like and what it does. Invite the children to make a 3D model of the virus, adding eyes and a mouth, so it looks like a monster. For more information about the virus and monster images, see [The ultimate kids' guide to the new coronavirus](#)

3 Virus Tag

ES

You will need: space to run or move around freely without obstacles. Outside might be best.

In this game of tag, the 'It' person has the virus. When the 'It' person tags someone, they also become 'infected with the virus'. Now both people are 'it', and they try to tag others, who will also become 'infected' and should start tagging others. The last person who is not infected is declared the winner and can be 'It' for the next round.

This illustrates how viruses are spread. Remind children, that viruses are not all spread through touch. Covid-19 was spread through airborne droplets.

Extension One person (perhaps a leader) is able to give a 'vaccine', show this by tracing a small x on the back of a hand with your finger. If a person has been given the vaccine, they are immune to being tagged two times. On the third time, they are tagged they will succumb to the virus. To keep it interesting, only give out one vaccine per minute, so not all the children are vaccinated at the same time.

Discuss

- How easy was it to get infected with the virus?
- Once a few people were infected, what happened?
- Did you feel protected by the vaccine?
- Was it fair who got the vaccine?
- What might happen if everyone playing was vaccinated?

4 Debate

WE

Split the group into two. Give each group one of the two statements and background information. The group needs to come up with arguments why their statement is the real cause of the outbreak. During a short debate, facilitated by a leader, each group needs to defend their viewpoint. Discuss at the end with everyone which group was the most convincing and why. Let each child vote for cause 1 or 2.

Going further (ages 9+)

- Where did Covid-19 come from? That's a great question! And we are going to explore and discuss this.
- Scientists and politicians have been debating this since the outbreak in Wuhan, China, late 2019. Nobody knows the exact origin of Covid-19, and there have been two main theories:

1) Could it have escaped from a lab nearby, where the virus was kept – even though it was 'locked' behind several doors and people could only go near it in protective clothes? Accidents happen...

2) Perhaps it moved from wild animals to humans? When this happens, a virus or illness is called zoonotic ('zoo-oh-NAU-tic). Interestingly, the people who caught Covid-19 first had been at a market that sold live, wild animals like civet cats and pangolins. Traces of Covid-19 were found there, so perhaps those animals had caught it first? Corona viruses are often found in bats, which have lived with them for so long that they are not bothered. In fact, they often help one another and have evolved and survived together for hundreds of years. But when such a virus jumps onto another species, that species isn't prepared, and the virus can make it sick or even kill it.

- Viruses often only spread from their original hosts, wild animals, to pets or humans when these host animals don't have enough space to live, so they move closer to human habitation. This happens for instance when people cut down forests.
- Viruses can also spread when wild animals, such as pangolins, carry the virus and are caught in the wild and sold in cities, like on the wet market of Wuhan. Pangolins are endangered and the wildlife trade is a huge problem from a nature conservation and a health point of view.

The theory of viruses spilling over from wild animals to humans is accepted by most scientists. This indicates that the natural world is under threat.

Question: Should we consider the planet as the wounded man? What do you think Jesus wants us to do? How can we be 'good Samaritans' to the world, and everything in it? Can you come up with a practical, creation care action point?

MEET A SIGNIFICANT SCIENTIST | 10 MINS

Project and share the scientist's profile, see p.47



Kizzmekia Corbett

Born in the United States of America in 1986.

Kizzmekia Corbett is our last, but not least, significant scientist. Kizzy is an African American biologist. Her chemistry teacher said that Kizzy was the brightest child she had taught in 30 years. At university, Kizzy started to study viruses and other pathogens. She discovered how they make us ill and how to develop remedies and vaccines. Early in her career, Kizzy worked with sick children in Sri Lanka and then later, in 2014, she conducted many very complicated experiments to understand proteins in Corona viruses. Kizzy was one of the main inventors of a very important Covid-19 vaccine. She has also helped many people to learn to trust the vaccine and goes out into deprived areas to inspire young people. Kizzy is a Christian and is passionate about giving back to the world, using her faith and intelligence.

VIDEOS

You may want to watch one of these videos, depending on the ages and abilities in your group.

(ages 9+): Preparing for a Pandemic: [Dr. Kizzmekia Corbett - YouTube](#) (mainly about the science behind the vaccine, but she mentions she's a Christian)

[Lead COVID-19 scientist Kizzmekia Corbett to join Harvard Chan School faculty - YouTube](#) (about Kizzy being a role model – but doesn't mention her faith)

[The Story Behind the First COVID Vaccination with Dr. Kizzmekia Corbett and Dr. Sandra Lindsay - YouTube](#) (about the pandemic and the vaccine development as well as being a role model for the young, female and underrepresented backgrounds – prayer is mentioned by Kizzy's colleague)

REFLECT AND WRAP UP | 15 MINS

Discuss

- Thinking about what you learned today, how do you feel? (Worried, hopeful, etc.) Be sensitive that many children may have had difficult experiences during Covid, or may not want to talk about it at all.)
- Back to our big question: **Does science solve all our problems?** What do you think?
- Remember the situation of the wounded man in the story. What was the problem and what was needed to help him?
- Science can offer us solutions, but we need to choose to get involved with compassion, love and kindness. How do you think God or faith helps us with these sorts of problems?

Sing

Our bodies are wonderful (see lyrics on the next page)

Pray

(see suggested prayer on the next page)

Our bodies are wonderful

To the tune: 'Our God is a Great Big God'.

Backing track: [Great Big God 1 \[Backing Track\]](#)
([youtube.com](#))

(chorus 1)

*Our bodies are wonderful;
Our bodies are oh-so-cool;
Our bodies have many tools
To fight illness, aches and pains.*

It's God who equipped us well;
Gave us our soldier cells:
(they're jam-packed with organelles)
'Killer Ts' and 'Helper Bs'.

(verse 1)

When viruses attack us
Or bacteria invade,
Our soldier-like immune cells
Come always to our aid!

And all cells, they work together,
to fight pathogens and pain;
God uses them to heal
a broken leg or swollen vein.

(chorus 1)

*Our bodies are wonderful;
Our bodies are oh-so-cool;
Our bodies have many tools
To fight illness, aches and pains.*

It's God who equipped us well;
Gave us our soldier cells:
(they're jam-packed with organelles)
'Killer Ts' and 'Helper Bs'

(verse 2)

Our cells are just like spaceships,
or perhaps like submarines;
With thousands of small 'robots'
working hard, called proteins.

And all cells, they work together,
to fight pathogens and pain;
God uses them to heal
a broken leg or swollen vein.

(chorus 2)

*Our bodies are beautiful;
Our bodies are oh-so-cool;
Our bodies have many tools
to fight illness, aches and pains.*

God cares when we are unwell;
God heals and restores our cells;
God also helps scientists
To make medicines and jabs.

(repeat:)

...To make medicines and jabs.
...To make medicines and jabs.

(lyrics by Petra Crofton)

Pray

Dear God,

Thank you for our beautiful world, which is so precious.
Open our eyes to the needs of the world.

Please give us energy, good ideas and time to make your
world a healthy place.

Please help us to work well with others too.

Please help us to look after those who are ill because of
viruses.

Bless scientists who invent new medicines and vaccines.

Thank you for them.

Please heal your world and all its creatures and habitats.

Help us to be loving, kind and compassionate.

Help us to inspire others to care for people and the rest
of your creation.

Give us courage and hope.

Amen.

Job 38:1-7,34-41 God answers Job

Job asked God some questions and the Lord answered Job, speaking out of a mighty whirlwind.

God said, 'Who is this, who talks about my plans but doesn't really understand? Prepare yourself, Job; I will ask you a series of questions; Do you dare to reply? Where were you when I laid the **foundation of the earth**? Tell me, if you are wise.

Here's an easy one – Who measured the **dimensions of the globe**?

Who wound the **equator** around it?

Who determined the earth's place in the **solar system**?

Or set its **orbit** round the sun while all the **stars** sang together for joy accompanied by angels?

Can you – Job – call out to the **clouds** causing **rain** to flood down on you?

Can you make **lightning** bolts crack? Do they report to you saying, "Here we are"?

Who puts wisdom into **human beings**, or gives their minds understanding?

Who, in their cleverness, knows the **clouds**? Who can tilt them, pouring down **rain** from heaven to put an end to **drought** and water the **hardened earth**?

Tell me, Job, can you hunt like a **lioness**, to feed her hungry **cubs** who crouch in their **dens**, or lie waiting in the bushes?

What about the **raven**? Who provides for its **chicks** when they cry to God for food?



John 6:15-21 Jesus walks on water

Because of all the miracles he had performed, the people wanted to make Jesus their king. They weren't going to take no for an answer, but this wasn't God's plan, and so Jesus went away from the crowds. There was a mountain beside the Sea of Galilee and he went there by himself.

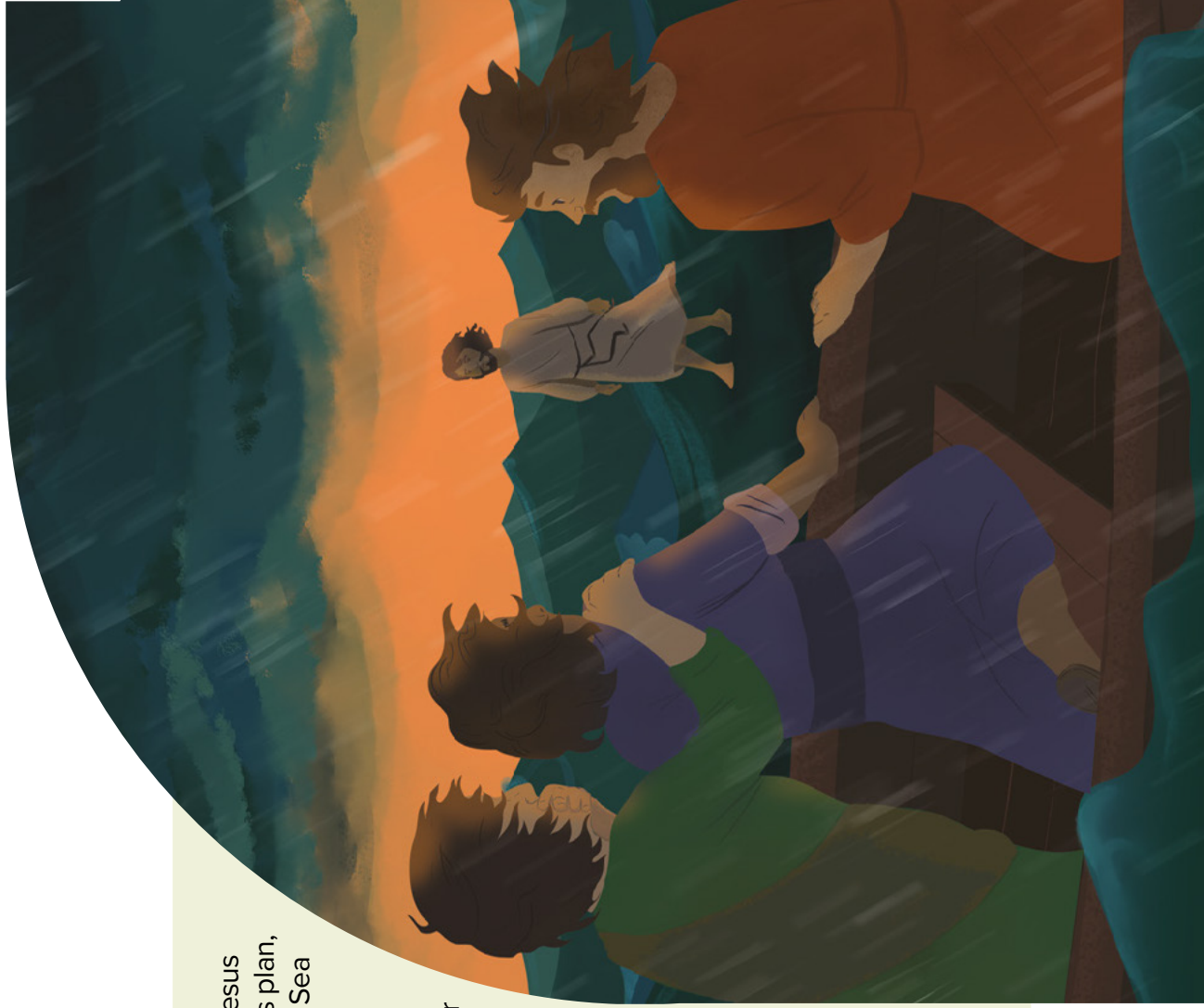
Now, the disciples had been expecting to meet up with Jesus, but when it got dark, they decided to get into a boat and cross the lake. They headed for Capernaum, the town where Jesus was based.

As the disciples rowed, the wind picked up, until conditions were stormy. The surface of the water became choppy and dangerous, but still they kept on their way.

After rowing for three or four miles, the disciples looked out and saw a figure approaching them, walking on the surface of the lake. Naturally, they were terrified, not sure what they were seeing.

'Do not be afraid,' the figure said. **'I am Jesus.'**

Frightened that the storm might harm their friend, the disciples wanted Jesus to join them in the boat, but immediately, and miraculously, they found that they had reached their destination.



Judges 6:36-40 Gideon tests God

Gideon didn't think much of himself. He was an unimportant member of an unimportant clan, a young man who did the chores his father gave him. Gideon didn't think he was strong and he certainly didn't think of himself as a warrior. His people, the Israelites, had been defeated by the Midianites and had been hiding in the mountains for seven long years. Gideon felt ordinary and unimportant. He wished there was someone strong who would fight the Midianites.

Then God's angel appeared to Gideon. "The Lord is with you, mighty warrior. God wants you to set the Israelites free." Gideon was shocked. He was so shocked that he needed proof. He said, 'God, if you really want me to free Israel from the Midianites, you'll have to give me a sign.'

Then Gideon took a fleece of wool and laid it out on the floor. 'If the fleece is wet with dew tomorrow morning, but the ground around it is dry, I'll know you truly will use me to defeat the enemies of Israel,' he said. The next morning the ground was dry, but the fleece was full of enough water to fill a washbasin. Still, Gideon wasn't convinced. 'I need one more sign,' he told God. 'Don't be angry, but let's switch things around. This time, if the fleece stays dry, but the ground is wet, I'll know you think I'm the man to lead your people.' That night, although dew settled on the ground, Gideon's fleece remained bone-dry.



Psalm 19 Wonder at God's creation

The heavens announce the glory of God;
The skies proudly shout, 'See all that God's made!'
Nothing can silence their speech every day;
'God knows everything!' The night-sky displays.

They don't use voices; they don't speak in words;
Strain hard as you can, there's nothing to hear;
Yet all through the earth their voices ring out,
And their praises resound in every ear.

Just take a look at the bright rising sun,
Eager as a groom on his wedding day;
All round the globe watch him circle with joy,
Nothing can hide from his heat on the way.

The body revives in the sun's warm rays,
So God's perfect law gives life to the soul;
A fool is made wise, by following God's rules;
A straightforward path that's trusty and whole.



The heart rejoices, for God's law is right;
Yes! All God's commands are light to the eyes;
Lasting forever, they're righteous and true;
Following them you'll be holy and wise.

God's law: what competes? What else could compare?
Silver or gold? Not diamonds or rubies.
Finer than money and more wholesome too;
God's law is sweeter than tasting honey.

What warns us away from doing things wrong?
How should we behave to earn a reward?
How do we know that we've made a mistake?
We learn from the law, the law of the Lord.

Keep me pure, O God, and innocent too.
Don't let my dumb pride tell me what to do;
You're my redeemer, my shelter and rock;
Let my words and thoughts be pleasing to you.



Luke 10:25-37 The Good Samaritan

One day, someone asked Jesus how he could please God. Jesus said to him, 'What are the most important things?' The man answered, 'To love God and to love our neighbour as ourselves.'

'Well done!' Jesus said. 'If you do those things, you will please God. You will be very close to him.'

Then the man said, 'But, who is my neighbour?'

So Jesus told this story:

One day a man was travelling on the road from Jerusalem to Jericho. Suddenly robbers jumped out from behind some rocks. They attacked the man, beat him up, took all his possessions, even most of his clothes and left him for dead.

As he lay at the roadside, another traveller came hurrying along. It was a priest from the Temple in Jerusalem. He looked at the man, but he didn't stop. If he stopped and touched him, he wouldn't be able to serve God in the Temple that day. He hurried on by.

A little later someone else came hurrying along. It was a Levite, someone who helped with the services at the Temple. He looked at the man, but he didn't stop.



If he stopped and touched him, he wouldn't be able to serve God in the Temple that day. He hurried on by.

After a while another traveller came hurrying along. It was a Samaritan. Now the Jews did not like Samaritans and Samaritans did not like Jews. The Samaritan looked at the man and he stopped. The Samaritan went over to the man who had been beaten up by robbers. He poured oil on the hurting places and bandaged his wounds. He gently lifted him onto his donkey and took him to an inn. He asked the innkeeper to look after the injured man until he was well enough to go home. The Samaritan gave the innkeeper some money and said if it cost any more, he would pay him next time he came past.

Jesus then turned to the man who had asked him the question and said: 'I wonder who was neighbour to the man who was attacked and robbed?' I wonder what you think? (pause to let the children answer)

Because the Good Samaritan loved his neighbour, even though he was his enemy, he showed he loved God too.

The Good Samaritan showed love to the man who was attacked and robbed, even though he was his enemy.
His love was like God's love — God loves everyone.





Georges Lemaître
Born in 1894 in Belgium.

Georges was very curious and loved science, and he also loved God. He became a priest in the Roman Catholic church AND a brilliant scientist. He was kind, modest and very brave. As a young soldier, he fought in the First World War and received a special medal for his bravery. Georges was very good at maths and physics and enjoyed studying the cosmos (space and the universe). After a while, he discovered something new and amazing: that the universe had started from a single, extremely hot and heavy point. He also discovered that we can calculate this point in time, namely nearly 14 billion years ago, and that the universe has been expanding ever since. The explosion that marked the beginning of the universe is now called the Big Bang. However, at the time, many scientists including Georges' good friend Albert Einstein initially disagreed with this theory.

Georges Lemaître remained a committed Christian and worked for the Roman Catholic Church, including the leader of the church, the Pope. Georges was very clear: science and faith don't conflict. However, it's best not to mix up science and theology: theology is the study of God and religion, so it explores different things and questions to science.

Georges Lemaître



Isaac Newton

Isaac Newton
Born in England in 1642.

Isaac had a tough time as a child, but soon became a 'polymath', someone who knows a lot about lots of types of science. He was also a theologian, someone who studies God. Isaac's most famous discoveries include the law of gravity and the three 'laws of motion', which describe the relationship between objects, forces and movement. Each child around the world will learn about these laws at school! They are relevant all the time, as they describe gravity and movement in the entire universe. They even confirmed the theory that planets move around the sun, and that our sun (and not the earth) is at the centre of our solar system. Isaac Newton discovered lots about light too, developed the telescope, and invented 'calculus', the mathematical study of ongoing change.

Isaac also studied the Bible and wrote about how to best interpret it. He warned people against seeing the universe as just 'mechanical' and said that God was behind it all: "So then gravity may put the planets into motion, but without the Divine Power (God) it could never put them into such a circulating motion, as they have about the sun". Isaac Newton was one of the most significant scientists of all times and his scientific discoveries and laws kickstarted a new era: the Enlightenment.

Mary Anning
Born in 1799 in England.

From a young age, Mary went out fossil hunting along the Dorset coastline with her dad. When she was 12, Mary discovered and identified the first ichthyosaur fossil. She found several plesiosaur and pterodactyl as well as fish fossils, which have helped scientists piece together the history of life on earth.

Mary had a tough childhood: her family was very poor, and she didn't go to school. And, more than once, she narrowly escaped death, including during her fossil finding adventures.

Until just over 200 years ago, fossils were just interesting pieces of rock; Mary's father collected prehistoric squid fossils and sold them to curious tourists as 'devil's fingers' (belemnites) and 'snake stones' (ammonites). Mary sold fossils to keep her family fed, but also loved reading scientific texts about palaeontology.

Mary contributed a lot to science, with her knowledge and writing, and very detailed drawings of fossils. But, in the nineteenth century, it was still very hard for women to be acknowledged as scientists. Eventually, Mary became a respected fossil specialist, and palaeontologists from all over the world visited her in Dorset.

Mary was a very faithful Christian and lived a life full of kindness and integrity, despite all the hardships she had to overcome. Her discoveries made a VERY important contribution to how people saw the history of life on earth, both the extinction of species and the development of new life forms. Until 1820 most people believed that God had made everything in the universe in six days, right at the beginning of creation, and that everything had always stayed the same. They thought that ideas about extinction and evolution of species would go against God's creation of a perfect world. Mary and other palaeontologists showed a different view, that evolution was part of God's plan.





Francis Collins

Francis Collins

Born in the United States of America in 1950.

Francis studied medicine and genes (DNA), the 'code' in our cells that work like an instruction book for our bodies. He has made lots of important discoveries, including ones that help treat serious illnesses, and led the biggest project ever about the genetic code in our cells, called the Human Genome Project. He has advised several American presidents on national health and science. Francis loves music, plays in a rock band and his wise proposals helped society a lot during the Covid-19 pandemic.

Francis Collins is a Christian and has written many books about science and faith. He even set up an organisation called BioLogos, to help people understand that Christianity and science can work well together, and that God can work through evolution. Francis Collins became a Christian as a doctor and believes that God created the world through evolution.



Kizzy Corbett

Kizzmekia Corbett

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Whizz! Bang! Wow! Holiday Club

Exploring God
through science and
technology



Venue:

Dates:

Time:

To register:



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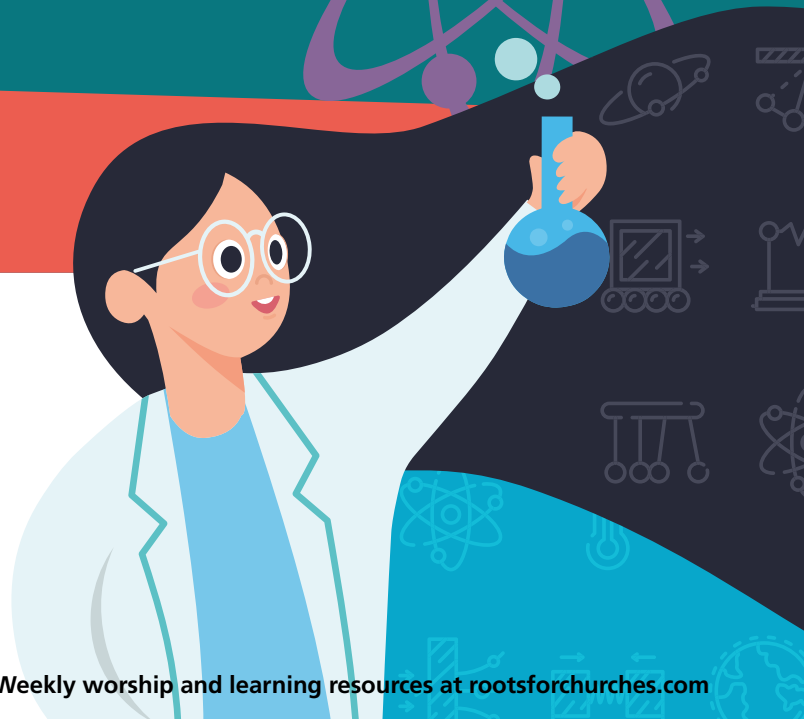
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