

It's Alive: Conditions on Earth

YEAR 5, 6, 7
BIOLOGICAL SCIENCES
EARTH AND SPACE SCIENCES



QGC

FUTUREMAKERS



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Future Makers

Future Makers is an innovative partnership between Queensland Museum Network and Shell's QGC business aiming to increase awareness and understanding of the value of science, technology, engineering and maths (STEM) education and skills in Queensland.

This partnership aims to engage and inspire people with the wonder of science, and increase the participation and performance of students in STEM-related subjects and careers — creating a highly capable workforce for the future.

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Cover image: Thomson River channel country after good rains. QM, Gary Cranitch.

EXPLORE – EXPLAIN

It's Alive: Conditions on Earth

Teacher Resource

Life has adapted to survive in the specific conditions found on Earth; but what are the conditions that enable life to survive on Earth?

The distance between the Earth and the Sun and the mass and temperature of the Sun are critical in sustaining life. The Earth is located in the 'Goldilocks Zone' – the habitable zone around a star where the temperature is not too hot and not too cold. This temperature allows water to exist as a liquid and provides the perfect conditions for the existence and survival of life on Earth. However these conditions are not all constant; some differ across the globe and are always changing.

In this activity, students will investigate and measure the conditions of their planet. They will explore temperature and gravity, specifically the temperature of the environment, the weight of 2L of water and how high they can jump. Students will also discuss how some conditions on Earth are constant, while other conditions regularly change, and how living things have adaptations to survive these changes.

This activity can be organised around the room as stations. Students move between the four stations in groups, and then complete the KWL (Why does life exist on Earth when we have not found life on other planets?) to synthesise their learning.

Station 1:

Temperature

Station 2:

Weight of Water (gravity)

Station 3:

Jump Height (gravity)

Station 4:

Needs of Living Things Brainstorm

Concluding activity:

KWL (Why does life exist on Earth when we have not found life on other planets?)

Curriculum Links

Science

YEAR 5

Science Understanding

The Earth is part of a system of planets orbiting around a star (the sun) (ACSSU078)

Living things have structural features and adaptations that help them to survive in their environment (ACSSU043)

Science Inquiry Skills

Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks (ACIS086)

Decide variables to be changed and measured in fair tests, and observe measure and record data with accuracy using digital technologies as appropriate (ACIS087)

Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multi-modal texts (ACIS093)

YEAR 6

Science Understanding

The growth and survival of living things are affected by physical conditions of their environment (ACSSU094)

Science Inquiry Skills

Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks (ACIS103)

Decide variables to be changed and measured in fair tests, and observe measure and record data with accuracy using digital technologies as appropriate (ACIS104)

Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multi-modal texts (ACIS110)

YEAR 7

Science Understanding

Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the sun, Earth and the moon (ACSSU115)

Science Inquiry Skills

Measure and control variables, select equipment appropriate to the task and collect data with accuracy (ACIS126)

Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on evidence (ACIS130)

Communicate ideas, findings and evidence based solutions to problems using scientific language, and representations, using digital technologies as appropriate (ACIS133)

General Capabilities

Numeracy

Using measurement

Using spatial reasoning

Critical and Creative Thinking

Analysing, synthesising and evaluating reasoning and procedures

Cross-Curriculum Priorities

Sustainability

The biosphere is a dynamic system providing conditions that sustain life on Earth (OI.1)

It's Alive: Conditions on Earth

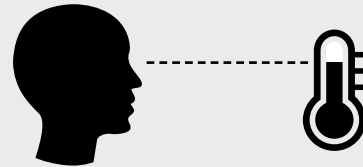
Student Activity

Record the conditions of your planet.

Temperature

1. Place a thermometer outside in the shade.
2. Leave the thermometer for two minutes.
3. Record the temperature below.

TIP: When reading a thermometer, ensure your eyes are level with the measurement – looking from an angle can cause **parallax error** where the measurement appears different to the true value due to the angle of view.



4. Is the temperature on Earth always the same? Why/why not?

5. Is the temperature on other planets the same as Earth? Why/why not?

Weight of 2L of Water

1. Place a 2L bottle on a scale and tare the scale.
(If you do not tare the scale, to find the weight of the water you will need to subtract the weight of the 2L bottle from the total weight.)
2. Using a large measuring cylinder, pour 2L of water into the bottle. Remember to keep your eyes level with the measurement to avoid parallax error.
3. Place the full bottle on the scale and measure the weight. Record the weight below.

4. Is the weight of 2L of water on Earth always the same? Why/why not?

5. Would 2L of water weigh the same on other planets? Why/why not?

Weight vs. Mass

Mass is the amount of matter in an object.

Weight is the amount of force acting on the mass due to gravity.

If you were on the Moon, there is less gravity than on Earth so you would weigh less, but your mass would be the same.

Floating in space your mass would be the same as on Earth and the Moon, however there is zero gravity. Can you calculate your weight in space?

Jump Height

1. Stand with your side to a wall.
2. With your feet flat on the ground, reach the arm closest to the wall as high as possible.
3. Mark the highest spot you can reach using chalk on your fingers or tape.
4. Place chalk or tape on your fingers again. From the same standing position, jump and touch the wall at the highest point of your jump.
5. Try three jumps and record the average.
6. Subtract your standing reach from your jumping reach to get your vertical jump.



Average Jump Height

Name:	Jump 1	Jump 2	Jump 3	Average
Jump Height (cm)				

7. Was your jump height approximately the same each time? Why/why not?

8. Would your jump height be different if you were standing in another location on Earth?

9. Would your jump height be the same on other planets?

Living Things

1. What do living things need to survive?

Survival in Different Environments (KWL)

1. Why does life exist on Earth when we have not found life on other planets?

What I know :	What I wonder :	What I learned :