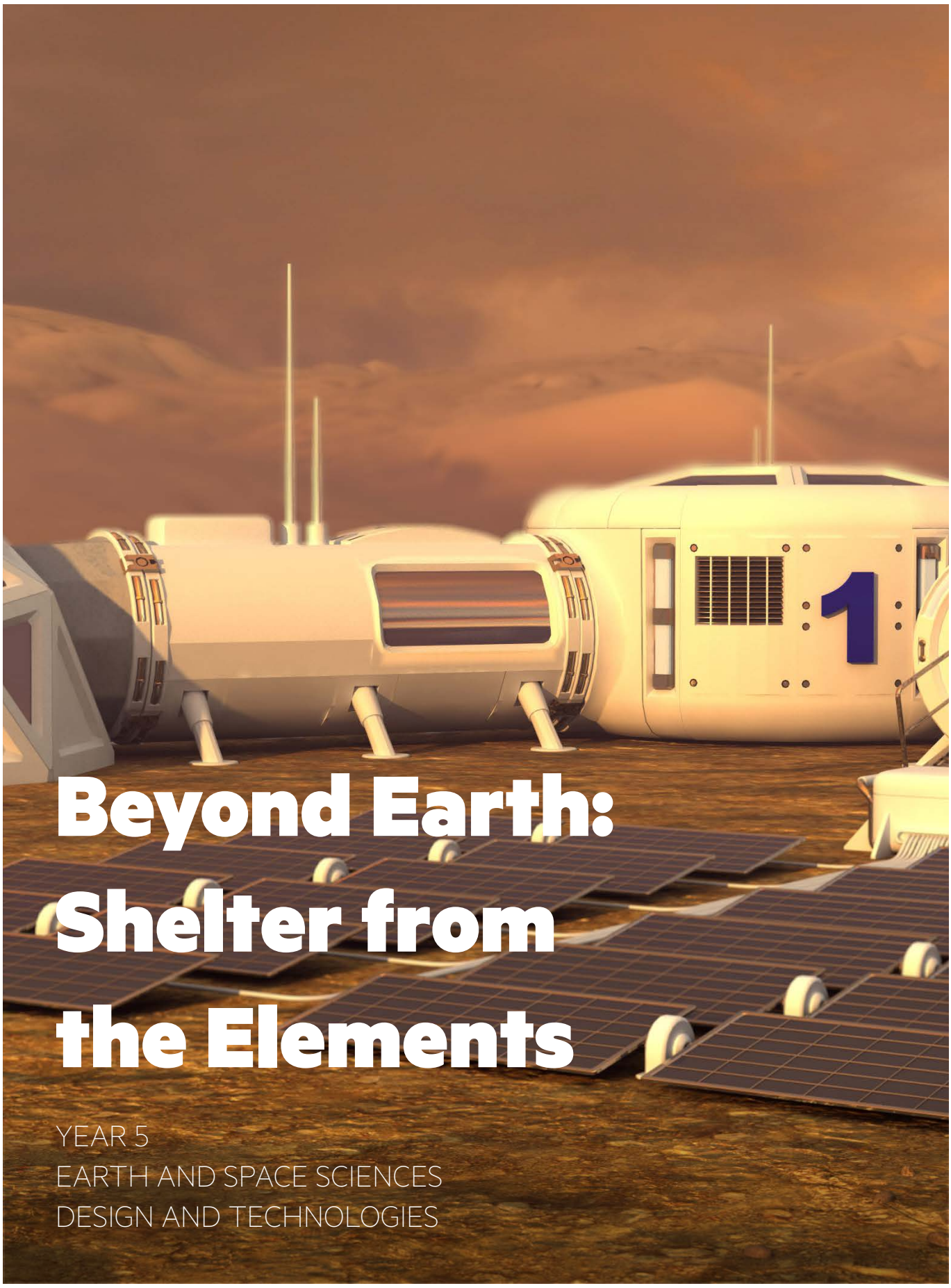

Beyond Earth: Shelter from the Elements

YEAR 5
EARTH AND SPACE SCIENCES
DESIGN AND TECHNOLOGIES

QGC | FUTUREMAKERS | QUEENSLAND MUSEUM NETWORK | Queensland Government

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.

QUEENSLAND MUSEUM NETWORK

Queensland Government

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

This teacher resource is produced by Future Makers, a partnership between Queensland Museum Network and Shell's QGC business, with support from the Australian Research Council and other parties to ARC Linkage Project LP160101374: The University of Queensland, Australian Catholic University Limited and Queensland Department of Education.

EVALUATE

Beyond Earth: Shelter from the Elements

Teacher Resource

In this activity, students develop a shelter to protect humans from the hostile conditions on other planets. Students should draw on their existing scientific understanding (for example, conductors and insulators), along with their understanding of the conditions of their chosen planet, to complete this activity. You may provide a selection of materials for students to choose from (e.g. foam, plastic, foil, metal, wood, glass), or students could select and source their own materials.

When constructing their shelters, students may wish to consider:

- Temperature and insulation
- Protection from radiation
- Protection from weather and the elements
- Living in low or high gravity
- Length of a day on the planet, and how to deal with prolonged light or darkness

Students may choose different methods to test their designs. For example, if the planet has high gravity students could investigate if their shelter will withstand pressure. A hairdryer and thermometer could be used to heat the shelter and investigate insulation. Students could spray their shelters with water to see if they leak or place materials in a dilute acid to see if it would withstand acid rain.

You may extend this activity by asking students to develop a settlement and describing not only how humans will survive, but how they could be self-sufficient (for example, accessing oxygen, water and food, or how they could access resources and travel to the planet with enough equipment to survive and solve future problems). For background research, students may wish to investigate how spacesuits are designed.

Teachers could also ask students to research and develop travel brochures to encourage people to travel to the chosen planet.

Curriculum Links

Science

YEAR 5

Science Understanding

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

Light from a source forms shadows and can be absorbed, reflected and refracted (ACSSU080)

Science as a Human Endeavour

Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE081)

Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083)

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 (ACSIS086)

Decide variables to be changed and measured in fair tests, and observe measure and record data with accuracy using digital technologies as appropriate (ACSIS087)

Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate (ACSIS090)

Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multi-modal texts (ACSIS093)

Design and Technology

YEAR 5 AND 6

Design and Technologies: Knowledge and Understanding

Investigate characteristics and properties of a range of materials, systems, components, tools and equipment and evaluate the impact of their use (ACTDEK023)

Design and Technologies: Processes and Production Skills

Critique needs or opportunities for designing, and investigate materials, components, tools, equipment and processes to achieve intended designed solutions (ACTDEP024)

Generate, develop and communicate design ideas and processes for audiences using appropriate technical terms and graphical representation techniques (ACTDEP025)

Select appropriate materials, components, tools, equipment and techniques and apply safe procedures to make designed solutions (ACTDEP026)

Negotiate criteria for success that include sustainability to evaluate design ideas, processes and solutions (ACTDEP027)

Develop project plans that include consideration of resources when making designed solutions individually and collaboratively (ACTDEP028)

General Capabilities

Critical and Creative Thinking

Generating ideas, possibilities and actions

Reflecting on thinking and processes

Beyond Earth: Shelter from the Elements

Student Activity

- **Investigate** the conditions of the planet you have chosen to colonise and compare these with the conditions on Earth.
- **Design** a shelter that will allow people to survive on this planet. Consider the properties of various materials in your design.
- **Create** a model of your shelter.
- **Test** the effectiveness of your shelter by simulating conditions with materials on Earth. What could you use to test the effectiveness of your shelter?
- **Refine** your shelter to improve on the original design.
- Present your shelter and results to the class.

1. Record the conditions that your shelter will need to withstand based on the conditions of your chosen planet.

2. Brainstorm the advantages of different construction materials in the given conditions

3. Draw a labelled diagram of your shelter, including reasons for design and selection of materials.

4. Test the shelter and record the results in the PMI Chart below.

Plus	Minus	Interesting

5. Recommend future changes that could improve the effectiveness of the shelter.
