scitech

Earth Matters
Education Guide

for Early Primary (Years 1-3)
Version 1

Contents

How to use this guide 03

About Earth Matters 05

Pre-visit lesson 18

Tips for when you are at Scitech 26

Post-visit lesson 29

Further teaching and learning opportunities 35

How to use this guide

The memorable experiences that students (and teachers) gain from excursions can be a powerful tool for inspiring interest and creating “hooks” for engaged learning back in the classroom. This guide and its resources are designed to help teachers incorporate the themes, content and skills explored during an Earth Matters excursion at Scitech into their classroom teaching, before and after their visit.

The following is a recommended process for using the pre and post-visit resources for an Earth Matters excursion:

1. Read *About Earth Matters* and browse the range of Earth Matters experiences available across Scitech

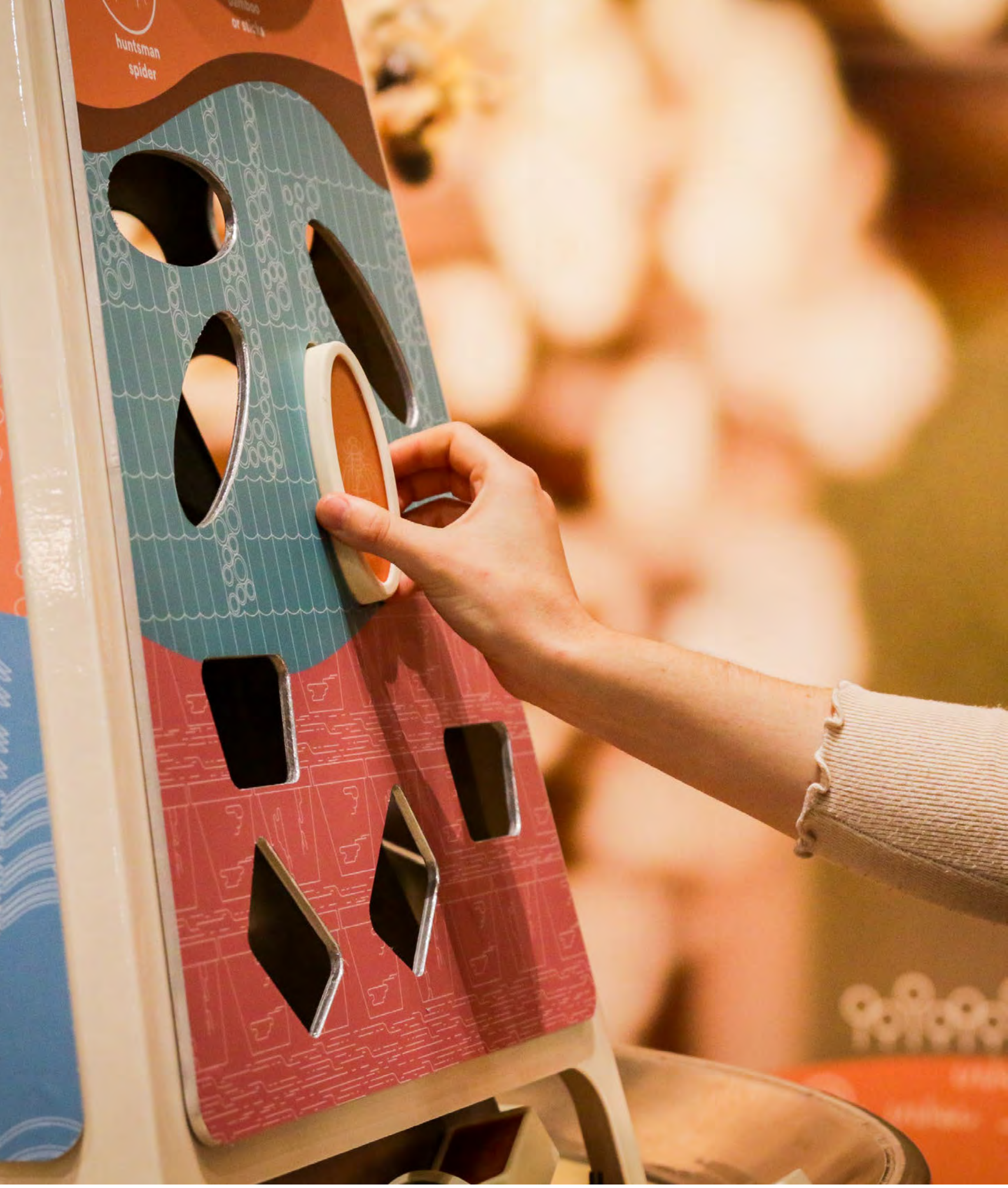
2. Review the *Pre-visit lesson notes* for teaching strategies and activities to prepare for your visit

3. Check the *Tips for during your visit to Scitech*

4. Review the *Post-visit lessons* to inform ways you can align an Earth Matters excursion to further classroom investigations and teaching

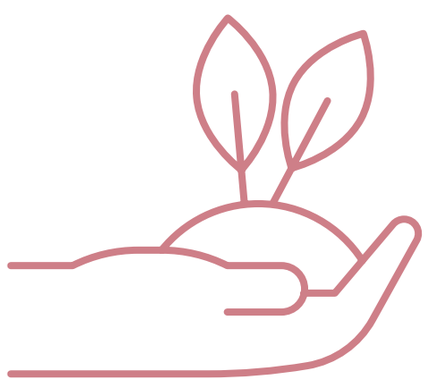
5. Choose the Earth Matters experiences across Scitech for your students and contact our Customer Services Team at **9215 0740** or **bookings@scitech.org.au** to make your booking

6. You may wish to see what other activities we have to offer you and your students by checking the *Further teaching and learning opportunities*



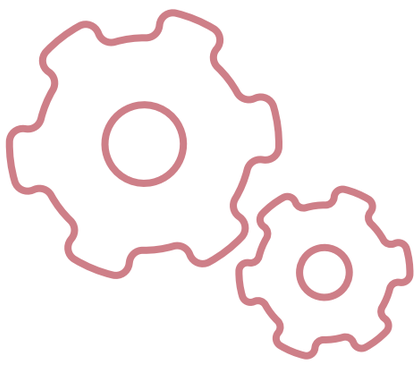
About Earth Matters

In Earth Matters, be inspired by the innovations and STEM solutions that will help us adapt our way of living for a more sustainable future.



Through a specially curated series of interactive and thought-provoking exhibits, shows and hands-on workshops, you are invited to dive deep into the science behind some of the changes we are seeing in our world, and experience how the smallest of actions can have a big impact on the world around you.

In nature, everything is connected – air, land, water and life. As you explore Earth Matters, look out for the connections along the way.



Solve complex challenges and bring your own ideas to life.

Earth Matters Excursion Experiences

There are several Earth Matters excursion experiences available for school bookings. Each has been designed to provide opportunities to explore cross-curricular priorities and build general capabilities across year levels.

Feature Gallery:
Earth Matters Guided Experience
60 minutes

Scitech's Earth Matters exhibition is a highly immersive, hands-on experience that explores the interconnection of human and natural systems, and the actions we can all take to ensure a better future for our planet. Our Science Communicators will prime learners to think like scientists and explore the relationships between living things and their habitats. Through new discoveries gained from engaging with exhibits, learners will be encouraged to consider everyday behaviours and their impact on the environment.

This experience supports learning in:

Science Understanding	• Biological Sciences • Earth & Space Science
Science Inquiry skills	• Questioning & predicting • Communicating
Science as a Human Endeavour	• Use & influence of science • Nature & development of science
HASS: Knowledge & Understanding	• Geography
Mathematics: Statistics	• Data representation & interpretation
Mathematics: Measurement & Geometry	• Using units of measurement
Mathematics: Number & Algebra	• Number & Place Value
Design & Technologies	• Technologies & society

Scitech Puppet Theatre: A Fishy Problem

30 minutes - Years K-2

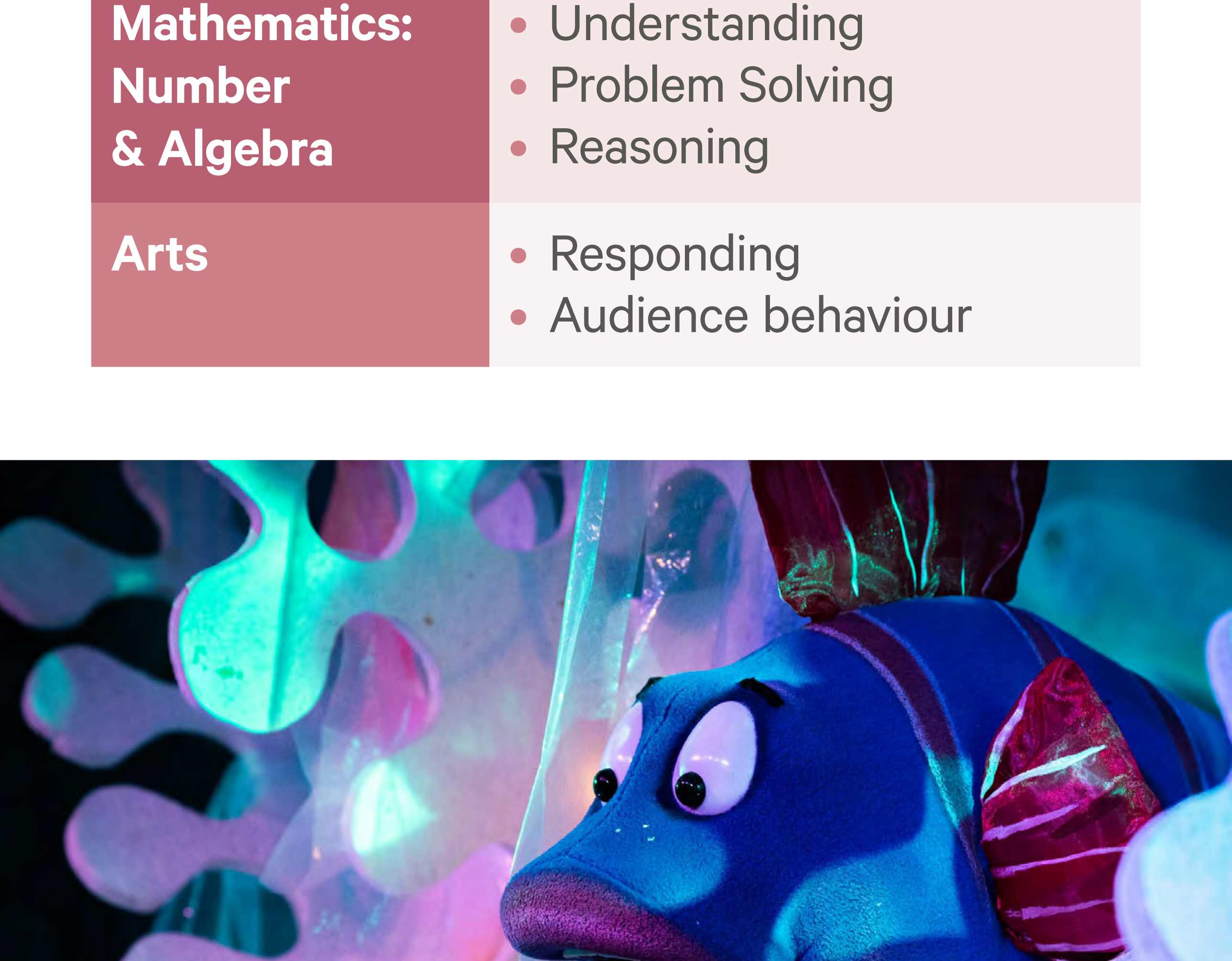
This introductory science show uses maths and logic as well as observation to solve problems. It also introduces young students to the concept of being an audience member.

Ursula the Hag fish has slimed the fish tank. Djildjit the blue fish and his friends are worried they won't be able to clean the tank before Ursula slimes it all over again. Help our fishy friends out of this slimy situation by working together to solve the problem.

Students are engaged by friendly puppeteers and puppets as they make predictions and use logic and maths to solve problems in this engaging and interactive show.

This experience supports learning in:

Science Understanding	• Biological Sciences
Science Inquiry skills	• Questioning & predicting • Communicating
Science as a Human Endeavour	• Use & influence of science
Mathematics: Number & Algebra	• Understanding • Problem Solving • Reasoning
Arts	• Responding • Audience behaviour



Scitech Planetarium: Habitat Earth

30 minutes - Year 3 and above

Discover how different species on Earth take part in complex relationships to create the ecosystems and food webs that are all around us. With stunning visualisations of the natural world, see the large-scale movements and activities of life on Earth and learn about humanities place in a global ecosystem.

This experience supports learning in:

Science Understanding	• Earth & Space Science • Biological Sciences
Science Inquiry skills	• Questioning & predicting • Communicating
Science as a Human Endeavour	• Use & influence of science
HASS: Knowledge & Understanding	• Geography

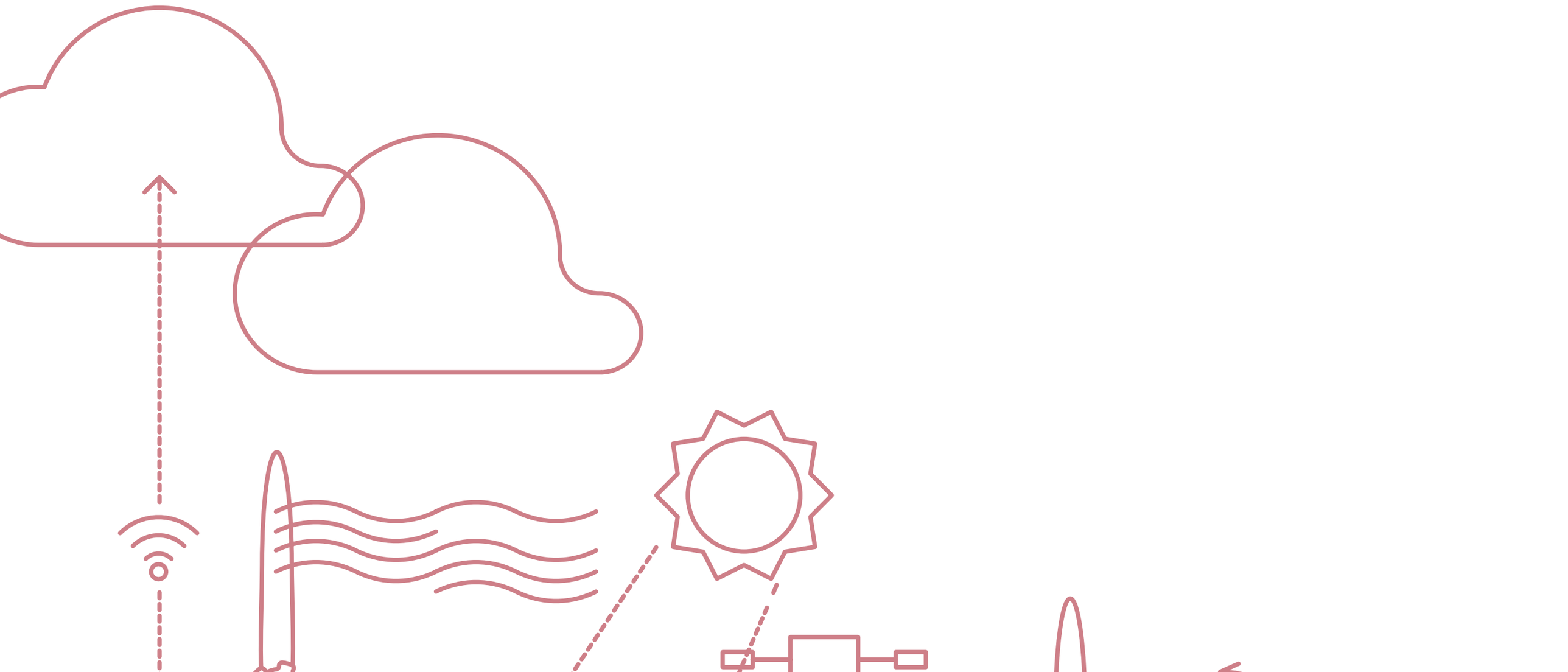
Chevron Science Theatre: Lightbulb Moments

30 minutes

How can we reduce the waste we create when generating electricity? Can we reuse our waste to power our world? Lightbulb Moments explores how scientists use creative problem solving to tackle these challenges. Join our energetic Science Presenters to discover some of the weirder ways we might power our world in the future and explore how we can make use of things we'd otherwise throw away. Students develop understanding of how to create new solutions and innovations through their own Lightbulb Moments.

This experience supports learning in:

Science Understanding	• Chemical Sciences
Science Inquiry skills	• Questioning & predicting • Communicating
Science as a Human Endeavour	• Use & influence of science • Nature & development of science
Design & Technologies:	• Technologies & society



Rio Tinto Innovation Central Tinkering Space: Rethink: Wind Turbine Challenge

60 minutes

In this hands-on tinkering workshop, students design, create and test their own prototype wind turbines.

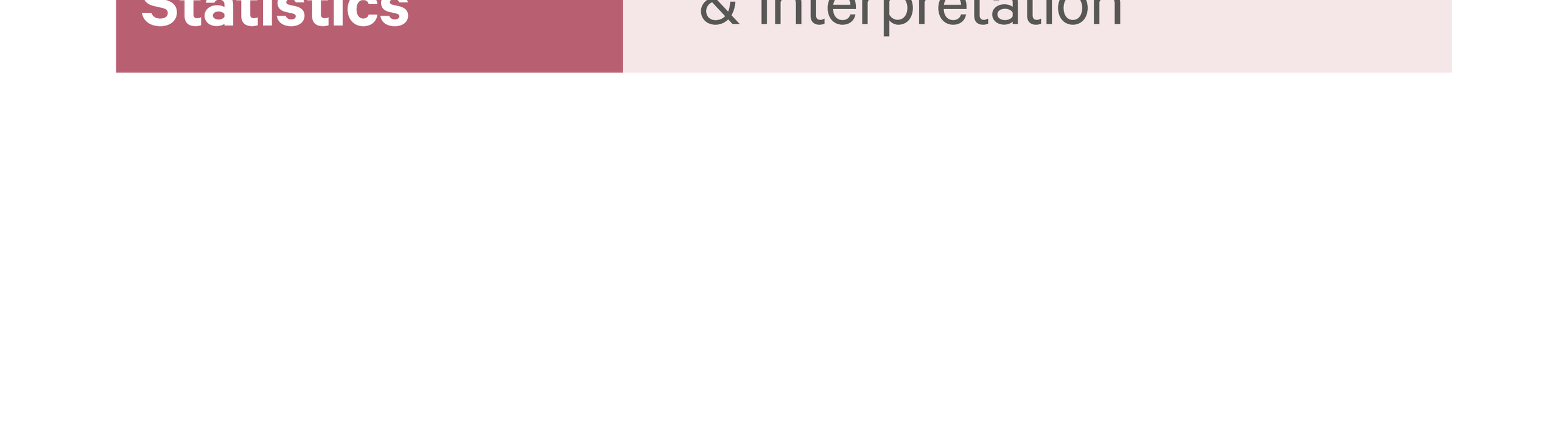
By using an innovation process, students will:

- explore and collaborate on solutions
- test their wind turbine using PocketLabs
- refine their wind turbine design to make it faster, stronger, or more effective.

Take the first step towards developing alternative and sustainable ways of generating electricity in the future!

This experience supports learning in:

Science Understanding	• Physical Sciences
Science Inquiry skills	• Use & influence of science
Design & Technologies: Knowledge & Understanding	• Technologies & society • Engineering • Principles & Systems
Design & Technologies: Processes & Production Skills	• Designing • Producing & Implementing • Evaluating • Collaborating & Managing
Mathematics: Statistics	• Data representation & interpretation



Pre-visit lesson notes

Aim – Engage prior knowledge on chosen topic, generate student questions to prepare for visit.

Below are a range of optional activities to help prepare your students for Earth Matters experiences and get the most out of your visit to Scitech. These activities aim to spark student curiosity around a chosen topic. Teachers can pair these activities with one (or more) of the outlined teaching strategies to help record student prior knowledge and elicit the use of inquiry skills such as questioning, observing and predicting.

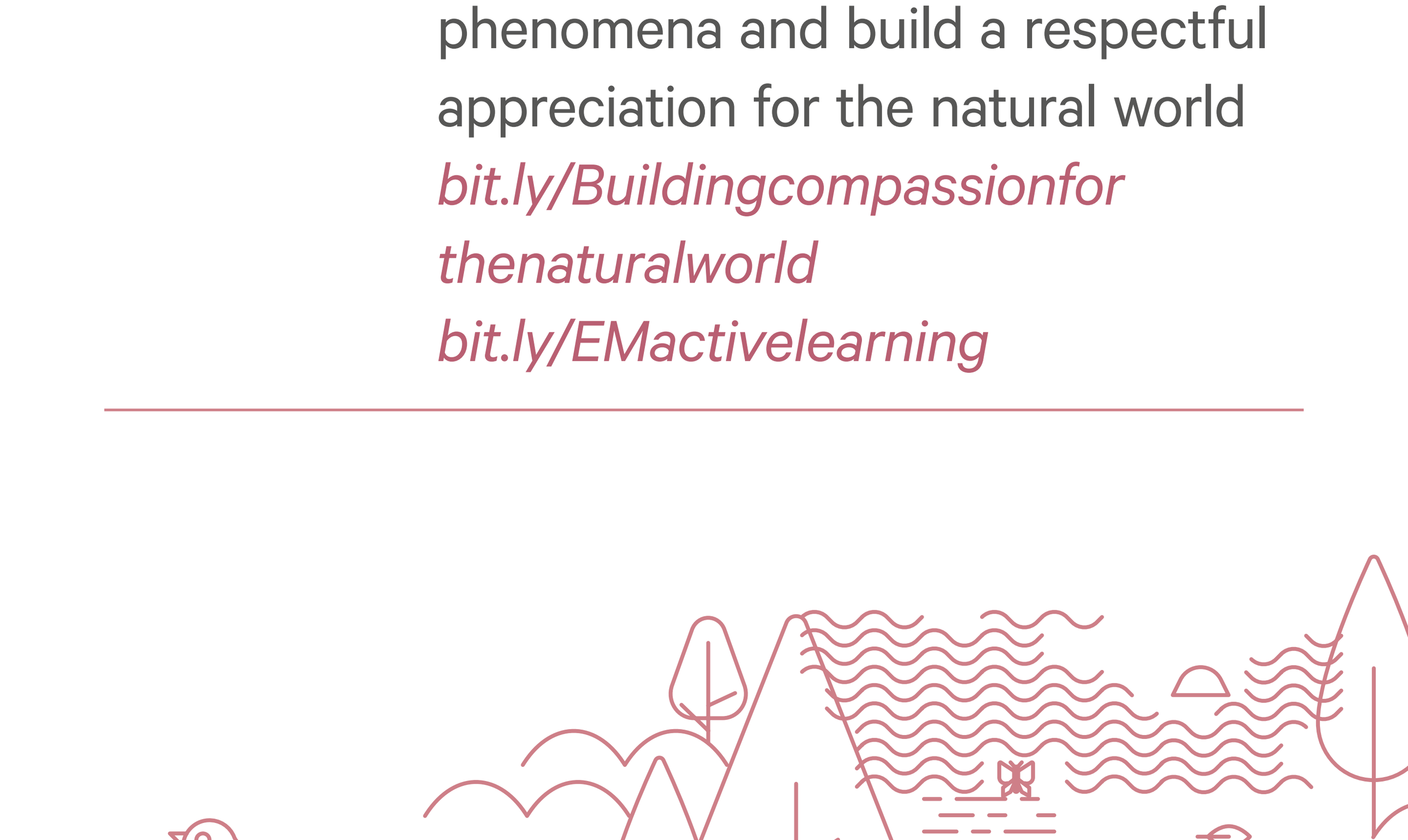
Some suggested **focus topics** that align to Earth Matters:

- Caring for local habitats
- Sharing the Earth's resources with all living things
- Biodiversity: recognising the range of different living things
- Human impact on the environment

Teaching strategies

KWL Chart	A whole-class or personal student chart that records what students Know, Wonder (or Want to know) and have Learned *bit.ly/EMKWLchart*
I see, I think, I wonder	A questioning routine designed to practice deep inquiry thinking *bit.ly/EMseethinkwonder*
Question starters	Scaffolds to develop questioning skills. Provide students with beginnings of both *open* and *closed* questions *bit.ly/EMQuestionstarters*

Taking photos	For teachers, taking photos can document behaviours, skills and assessable work. Photos taken by students can be used as their own evidence for discoveries
Class discussions	This resource outlines interactive teaching strategies for rich, meaningful class discussions *bit.ly/EMclassdiscussions*
Active learning	By engaging the senses, active (hands-on) learning in science can create memorable connections to phenomena and build a respectful appreciation for the natural world *bit.ly/Buildingcompassionfor thenaturalworld* *bit.ly/EMactivelearning*



Student activities

To access prior knowledge and spark curiosity.

Birds-eye view

Suggested teaching strategies:

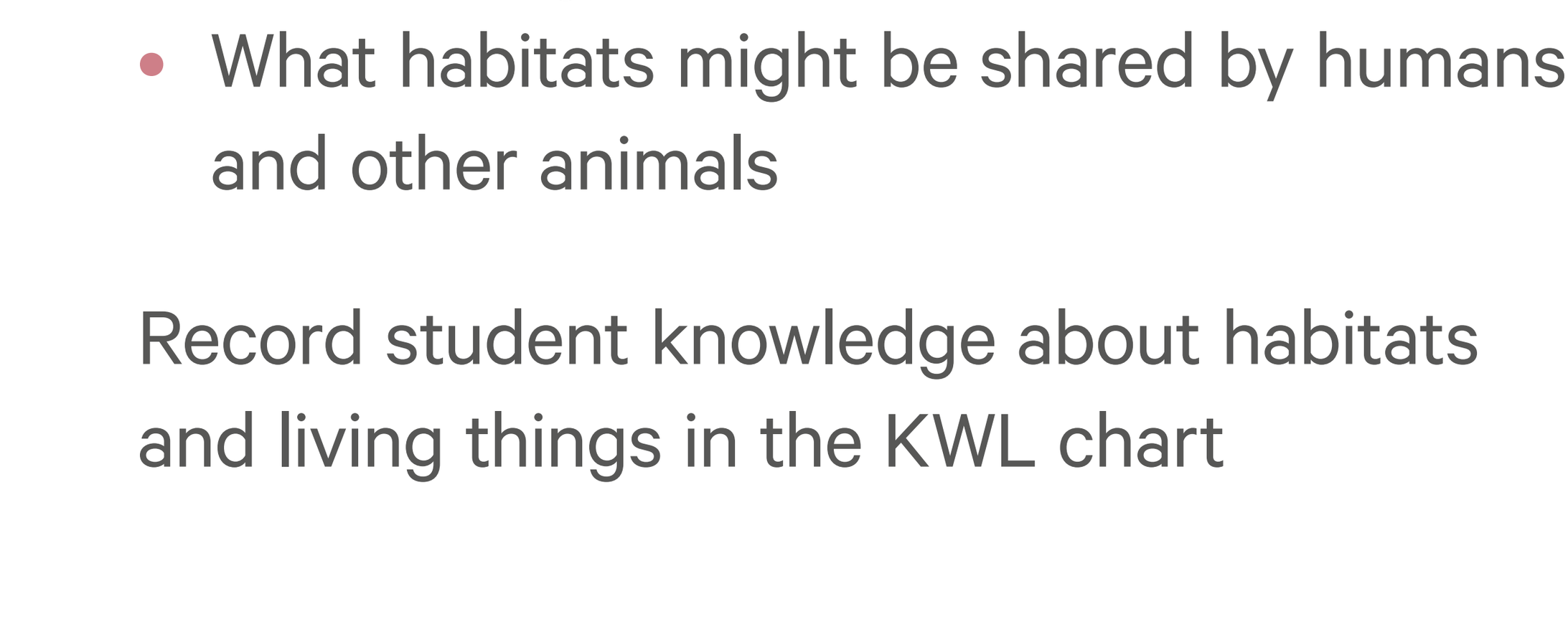
KWL chart, I see, I think, I wonder

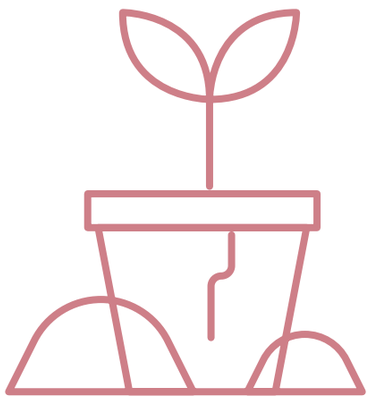
Students view a satellite picture of the school and surrounding area on Google Earth.

Encourage observations and predictions about:

- What they are seeing
- What living and non-living things may be found in the area
- What might have been there before the buildings
- What habitats might be shared by humans and other animals

Record student knowledge about habitats and living things in the KWL chart



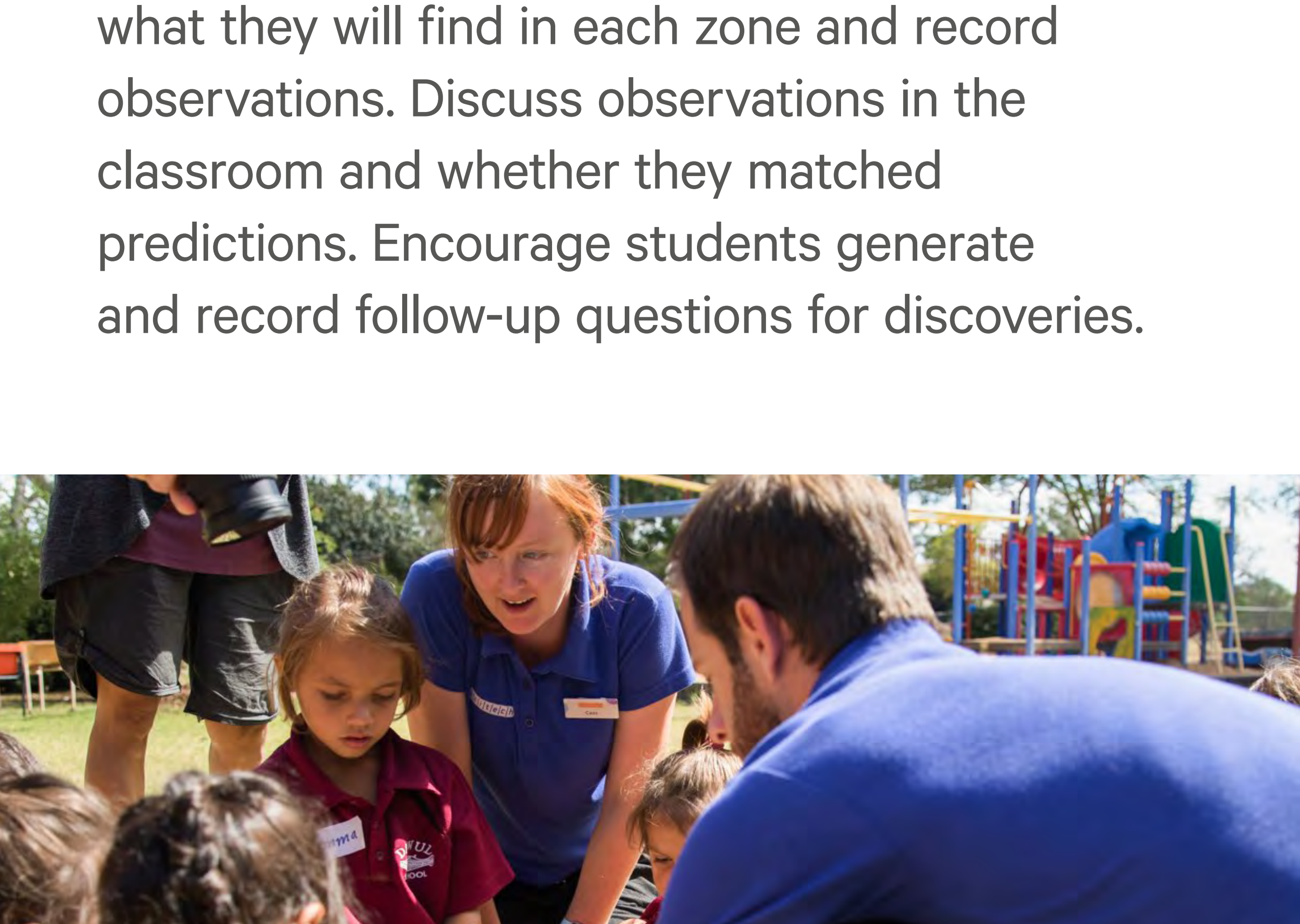


Schoolyard habitats

Suggested teaching strategies:

Taking photos, KWL chart, I see, I think, I wonder, Question starters, Active learning

Students explore different parts of the schoolyard. Before heading out, set up zones of different locations in the schoolyard for student groups to rotate through (e.g. lawn, garden bed, footpath, tree). Students make predictions about what they will find in each zone and record observations. Discuss observations in the classroom and whether they matched predictions. Encourage students generate and record follow-up questions for discoveries.



Questions for Scitech

Suggested teaching strategies:

I see, I think, I wonder, Question starters, Class discussion, KWL Chart

Show pictures of different habitats shared by people, other animals and plants. Prompt student curiosity about the image using the *I see, I think, I wonder* routine. Facilitate a class discussion around one of the focus topics. With the aid of Question Starters, students then generate and record their own questions to explore when at Scitech.

Tips for when you are at Scitech

Excursions to Scitech are filled with memorable experiences, discoveries and inspiration for students and teachers. While the day will be busy with structured learning activities in our gallery and theatre spaces, there will be many more spontaneous moments of curiosity and wonder to take advantage of and use back in the classroom. These are some strategies for making the most of those experiences.

01 Take photos and videos

We encourage you to document your student's learning and questions through photos and videos. These can be useful for post-visit activities and creating memorable "hooks" around a discovery. If you would like to photograph or film any of our Science Communicators, we ask that you please ask them before doing so.

02 Two stars and a wish

Ask students to record two new discoveries made at Scitech (stars) and something they would like to learn more about (wish).

03 Practise skills on the bus

Encourage students to make observations and predictions about the changing landscapes on the bus ride to Scitech. They may drive past natural features (such as lakes, bushland, rivers, beaches) which can prompt a discussion about habitats and natural resources.

04 Chat to our Science Communicators

Scitech's Science Communicator team have a deep knowledge about the underlying science behind our exhibits and shows. Many have professional and academic expertise in STEM careers. If you have a topic you wish to explore in detail or a focus for your visit, please talk to us and we will do our best to tailor your experience where possible.

Post-visit lesson notes

The following is a suggested sequence of lessons to build on your visit to Earth Matters.

The **Reflection activity** options aim to consolidate student discoveries made at Scitech and use these to inform the direction of future inquiry and student actions. The **Environmental Guardian** activities table presents an array of rich, curriculum-aligned lessons, activities and units of work that promote sustainable practices and an appreciation of our role in caring for nature.

Reflection lesson

Aim

Review activities from excursion to recall and further develop student-made discoveries and questions.

Look at photos from excursion. For each experience (e.g. puppet theatre, exhibit) begin by asking **recall-type questions.** This is to simply prompt memory of the experience. For example:

- In the puppet show, how did Djildjit and the other fish clean the tank?
- What did you do at this exhibit? How did it work?

Next, ask deeper reflection questions.

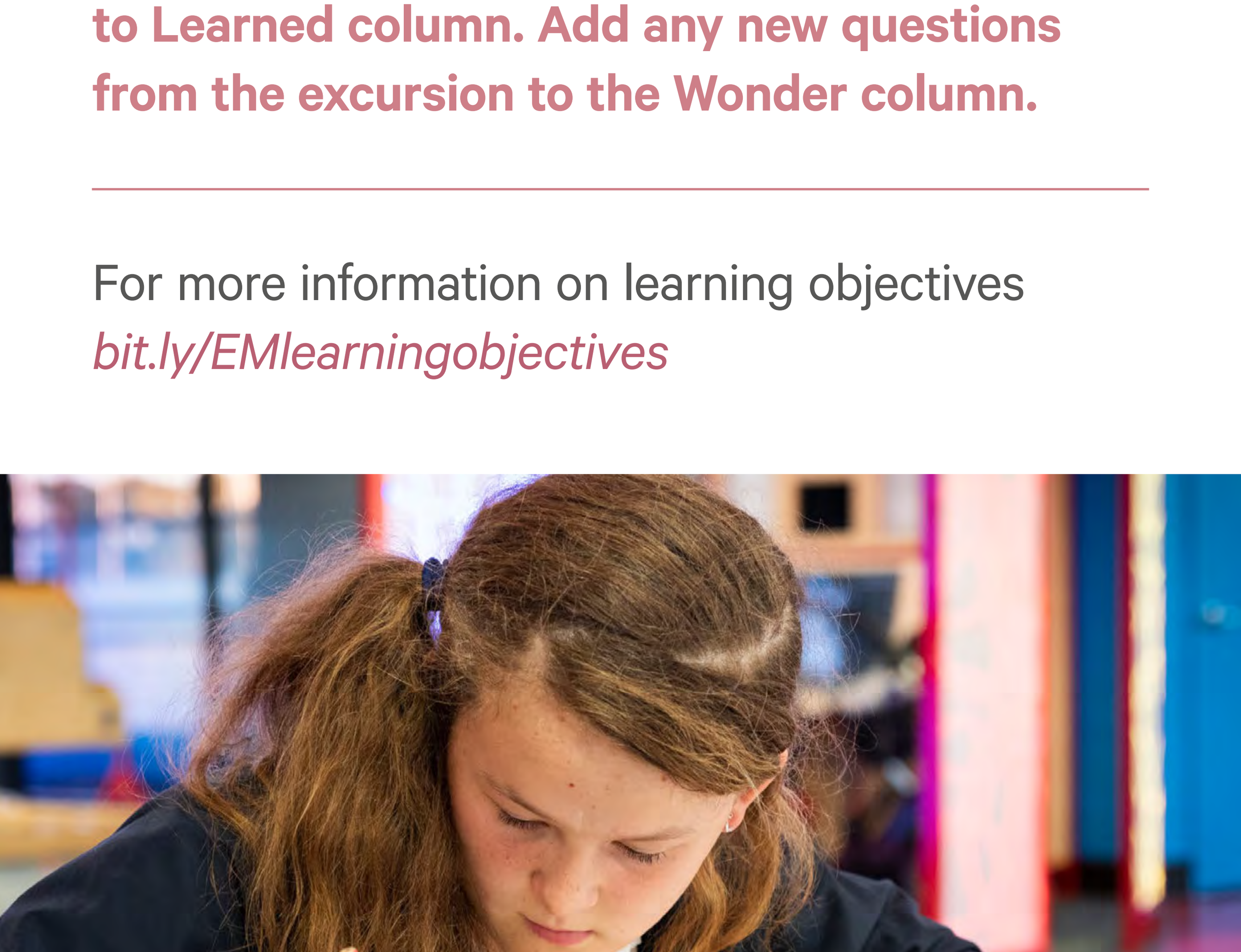
These questions aim to allow students to more deeply consider their discoveries and make links to other knowledge. Some examples:

- How did you figure out how that exhibit worked?
- Why do you think it was important for the fish to have a clean tank?

- Does that remind you of anything else you know?
- What did you find the most interesting?
- How might we use our discovery to help us?
- What would you like to learn about next?
- What did you do at this exhibit? How did it work?

Review KWL chart. Find out if any Wonder questions have been discovered and add to Learned column. Add any new questions from the excursion to the Wonder column.

For more information on learning objectives
bit.ly/EMlearningobjectives



Environmental Guardian activities

Aim

Build on understanding about the relationship between human and natural systems from Earth Matters. Empower students to be active in caring for the environment.

STEM Learning Project:
Every bird needs a home

This inquiry module of 4 activities explores how habitat loss affects biodiversity. Students design a solution to the problem of **How can we improve or create habitat at our school that will encourage local species of birds to visit, live and breed?** *bit.ly/STEMbirdshome*

STEM Learning Project: Animal rescue

This inquiry module of 4 activities explores how animal habitats can be disrupted by human activity. Students design a solution to the problem of **How can we design and make a model of a structure that animals can use to cross a road safely?** *bit.ly/STEManimalrescue*

Insect hotel

Construct an Insect hotel for the schoolyard or backyard. Observe insect populations over time and record data in a science journal. Variables to record include the variety of insects, number of each insect, preferred locations, or changing occupancy at different times of the day.

Growing Minds: Greening Communities

A suite of sustainability activities for students as well as actions for whole class or whole school to improve their environmental impact.
bit.ly/greeningcommunities

Join a Citizen Science project

These projects have real-world impact by encouraging everyday citizens to collect and compile data.

- Backyard Blitz
  bit.ly/backyardspeciesdiscovery
- Informing on native bees
  bit.ly/solitarynativebees
- Butterfly data collection
  bit.ly/butterflydatacollection
- Atlas of Living Australia
  bit.ly/atlasoflivingaustralia

A note on assessments

Learning during STEM activities can supplement data collected in traditional lessons during the semester, contributing to valid data for reporting. The graphic organisers and assessment strategies suggested in the resource are intended to act as a guide, to enable teachers to understand where students are in their learning.

Further information about the ways of assessing can be found at *bit.ly/waysofassesing*

Refer to the Western Australian Curriculum and Assessment Outline *k10outline.scsa.wa.edu.au* for further guidance on assessment principles, practices and phases of schooling.

Refer to the Judging Standards tool in the Western Australian Curriculum and Assessment Outline *bit.ly/judgingstandards* when reporting against the Achievement Standards; giving assessment feedback; or explaining the differences between one student's achievement and another's.

Further teaching and learning opportunities

Scitech provides a range of learning opportunities for both teachers and students outside of a visit to the Science Centre.

STEM Learning Project Climate Council

These resources aim to generate students' interest, enjoyment and engagement with STEM. Each module will support teachers to teach STEM in an integrative way from Kindergarten to Year 12 and have been developed with input from Western Australian school teachers.

education.wa.edu.au/resources-for-educators

Scitech professional development for teachers

Our interactive STEM workshops can be booked by your school or network, and be delivered at Scitech or onsite.
scitech.org.au/educators/professional-development/

STEM resources for teachers

Our STEM resources include DIY Kits to build STEM engagement in students and educators through WA curriculum-aligned experiences. Plus, we even have our own science news channel, Particle.
scitech.org.au/educators/education-resources/

Statewide incursions

Let us bring Scitech to you. Everything can be transported straight from our HQ into your classroom.
scitech.org.au/educators/incursions/

scitech

scitech.org.au

GOVERNMENT OF
WESTERN AUSTRALIA