

QUEENSLAND
MUSEUM
NETWORK

PRESENTS

World
Science
Festival
Brisbane

IT'S LIVE!
in Queensland

TEACHER RESOURCE
YEARS 5-8
ADEPT ADAPTATIONS



FEATURING

CIRI CITY
BRISBANE

brisbane
ECONOMIC DEVELOPMENT AGENCY

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ART VS. SCIENCE

STEM-literacy is fundamental in a world increasingly saturated with advertising and mixed messages from the media. Having basic scientific literacy helps us to navigate some very practical questions, like: how can we trust vaccines, should we use energy-saving lightbulbs, and why is it important to be healthy?

Science should be shared with everyone, in an accessible and clear manner. Why is this important? Well, it gives us a sense of wonder and curiosity, encourages us to find better ways of doing things, and it help us look after ourselves and our planet.

One way of making science accessible, is by presenting it in creative ways, like the artists who participated in [Curiosity Brisbane 2022](#). As you engage with these public artworks, what will you discover about science, about yourself, or about the state of the planet?

ADEPT ADAPTATIONS

In order to survive, living things need to adapt to threatening environmental factors, altering their external or internal features. If the living thing cannot adapt, it faces extinction. Scientists use information they observe to make predictions about how living things used to be, and how they might change in the future. This kind of knowledge helps us make good decisions about our planet now. What kind of future can you imagine for Australian animals? What will they look like in fifty years? Or five thousand years? Will they continue to adapt as their natural environments shrink and change? Use your imagination and creativity as you explore these questions and more in this resource.

FEATURED ARTWORKS

Alinta Krauth. *CurioCreatures*

Kellie O'Dempsey. *Soft-body Adapters*

CURRICULUM LINKS

This resource is aligned with [Australian Curriculum](#)ⁱ, Visual Arts, Years 5-8 and includes reference to [Australian Curriculum](#)ⁱⁱ, Science, Years 5-8.



- 1 Acknowledging Place**
Carol McGregor
- 2 Soft-body Adapters**
Kellie O'Dempsey
- 3 CURIOCIITY EcosysTEAMs**
Dalby South State School
- 4 TIMEE22**
Isis District State High School
- 5 Luminous Threads**
Kirsten Baade
- 6 CurioCreatures**
Alinta Krauth and Jason Nelson (EphemerLab)
TRAIL Collect all 15 across South Bank, the Goodwill Bridge and Queen Street Mall
- 7 City Symphony**
QMF and Textile Audio
TRAIL Visit all four sites across South Bank and Brisbane CBD
- 8 Self-talk is our superpower!**
Blackall Range Independent School
- 9 Cooyinnirra in Flames**
Boonah State High School
- 10 93% Human / Breathwork**
Helen Pynor
- 11 Baidam Tithuyil**
Brian Robinson
- 12 In the Air**
Priscilla Bracks & Gavin Sade
(Music: Greg Jenkins and Gavin Sade)
- 13 AmphiSonic**
Panos Couros
- 14 The Wandering Birds Have Returned to the River (Even Bernice)**
Seth Ellis and Michelle Vine
Guest creators Lota State High School
- 15 The Origins of Art I and II**
Maria-Fernanda Cardoso
- 15 DE-CAY-dence**
Donna Davis
- 15 Communing With Robots**
Peter Thiedeke
- 16 Sounding Tides**
Erik Griswold and Rebecca Cunningham
- 17 OHCE/ECHO**
Georgie Pinn
Guest creators MacGregor State High School
- 18 MIRAGE PROJECT [iceberg]**
David Burrows and Australian Antarctic Program
TRAIL Visit all 10 locations throughout Streets Beach

Wednesday 9 – Sunday 13 March

- 19 Dinosaur Discovery**
Presented with Brisbane Urban Environmental Education Centre
- 19 Reef Creature Coding Challenge**
Presented with Great Barrier Reef Marine Park Authority
- 20 Protect Our Coral Reefs**
Presented with CoralWatch
- 21 Stellar STEM**
Presented with PFi Aerospace
- 21 Coding with CodeMonkey**
Presented with Junior Engineers
- 21 Energy in Motion – STELR Program**
Presented with Australian Academy of Technological Sciences and Engineering

Saturday 12 – Sunday 13 March

- 24 It's Rocket Science**
Presented with It's Rocket Science
- 24 Stargazing**
Presented with Brisbane Astronomical Society
- 25 Marble Run Madness**
Presented with Make & Meld
- 26 ImmunoKru: A Cancer Art Gallery Exclusive**
Presented with Excite Science
- 26 Butterflies, Bees and Other Insects**
Presented with Butterfly & Other Invertebrates Club Inc.
- 26 Fungi Count**
Presented with FungiMap and QuestaGame
- 26 Addiction Neuroscience and Obesity**
Presented with Translational Research Institute
- 26 Science for Citizens**
Presented with Australian Citizen Science Association
- 26 Radiation Exploration**
Presented with Queensland branch of the Australasian Radiation Protection Society
- 26 Beneath the Streets**
Presented with Urban Utilities
- 27 Race to Escape**
Presented with Robogals Brisbane
- 27 The Young Entrepreneurs Hub**
Presented with BOP Industries

- 21 Science of Tunnelling and Future Brisbane**
Presented with Cross River Rail Delivery Authority
- 22 Design and Fly a Virtual Aircraft**
Presented with Cool Aeronautics Australia
- 22 Professor Tech's Awesome Introduction to Extended Reality**
Presented with The Create Lab by Professor Tech
- 23 Micromelon Robotics Automation Challenge**
Presented with Micromelon Robotics
- 23 Innovation in Science Ideation**
Presented with Australian School of Entrepreneurship
- 23 Become a Young Scientist**
Presented with The University of Queensland

- 27 Achieving a Circular Economy**
Presented with Steam Powered Kids
- 27 Augmented Reality Games**
Presented with Ardacious
- 27 Robotics**
Presented with Young Engineers Brisbane North
- 27 Catchment Curiosities**
Presented with Brisbane Catchments Network
- 27 The Science of Movement**
Presented with Australian Catholic University
- 27 Finding Ink the Famous Octopus!**
Presented with Plastic Oceans Australasia
- 27 The Future of Health**
Presented with QIMR Berghofer
- 28 Get Buried!**
Presented with LUSY
- 28 Soil: Life's Foundation**
Presented with Soil Science Australia, Queensland Branch
- 28 Understanding Earth Science**
Presented with Geological Society of Australia
- 28 Building Sustainable and Biodiverse Gardens**
Presented with Natura Pacific Pty Ltd

- i1 Information Tent**
- i2 Information Tent**
- i3 Information Tent**

CONTENT DESCRIPTIONS

Visual Arts, Years 5 and 6	
ACAVAM115	Develop and apply techniques and processes when making their artworks
ACAVAM116	Plan the display of artworks to enhance their meaning for an audience
Visual Arts, Years 7 and 8	
ACAVAM119	Develop ways to enhance their intentions as artists through exploration of how artists use materials, techniques, technologies and processes
ACAVAM120	Develop planning skills for art-making by exploring techniques and processes used by different artists
ACAVAM121	Practise techniques and processes to enhance representation of ideas in their art-making
ACAVAM122	Present artwork demonstrating consideration of how the artwork is displayed to enhance the artist's intention to an audience

STEM LINKS

Science, Years 5 and 6	
ACSSU043	Living things have structural features and adaptations that help them to survive in their environment
ACSSU094	The growth and survival of living things are affected by physical conditions of their environment
ACSUS231, ACSIS232	With guidance, pose clarifying questions and make predictions about scientific investigations
ACSIS093, ACSIS110	Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multi-modal texts
Science, Years 7 and 8	
ACSSU111	Classification helps organise the diverse group of organisms
ACSIS124, ACSIS139	Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge
ACSIS133, ACSIS148	Communicate ideas, findings and evidence based solutions to problems using scientific language, and representations, using digital technologies as appropriate

GENERAL CAPABILITIES

Knowledge, skills, behaviours and dispositions:



intercultural understanding



critical and creative thinking



personal and social capability



information and communication technology
(ICT) capability

LEARNING OBJECTIVES

Students are learning:

- to explore and experiment with various media, using the elements and principles of art
- how artists use collage to imagine biological adaptations
- how artists use animation as a way of communicating science concepts
- how own and others' viewpoints are represented within artworks

SUCCESS CRITERIA

Students will be successful when they can:

- interpret and use shape, colour, composition and movement to express feelings, places and things
- demonstrate purposeful experimentation with 2-dimensional mixed-media and digital media
- discuss the purpose of the artwork and the use of visual arts elements, using vocabulary to label, categorise, describe and explain
- reflect on 'adaptations' and how these are affected by time, human and environmental factors

TEACHING NOTES

TIMING

5 x 1-hour sessions

MATERIALS

- Internet connection and access to image sites and video player
- device for taking animation frames (i.e., smart phone, tablet, or digital camera) and tripod - overhead document cameras are the best option, if available
- animation software (PowerPoint will suffice)
- masking tape
- materials for collage: magazine or printed images of various animals, paper in various colours and textures, including A3 paper or surface for scenes, scissors, glue or split-pin/paper fasteners
- black liners (6mm or smaller), HB pencils, watercolour paints, soft water colour brushes, A4 paper, water, paper towels. Optional materials: coloured cellophane
- Optional: photocopier machine, colour-printer

HOW TO USE

Students view featured artworks in situ, prior to completing these activities. Notes have been added to extend learning for Years 7 and 8, and activities can be modified for remote learning.

To enrich this experience, Queensland Museum STEM [learning resources](#) may be used concurrently in other learning areas. Creating a free account means you can save, sort, manage and share your favourite collection items (audio and video, collection items, events, fact sheets, images, learning resources, loan kits, etc.).

Suggested resources:

- [Fantastic Features: Teacher Resource](#) (Biology, Technology, Years 5, 6, 8, 9)
- [Flight Club: Teacher Resource Book](#) (Biology, Physics, Years 5, 6, 7)
- [Creature Features](#) (Biology, Years 5, 8)
- [Staying Alive: Australian Animal Adaptations](#) (Biology, Year 5)
- [Backyard Explorer](#) (Science, ICT, Years 6, 7, 8, 9)

LEARNING ACTIVITIES

LESSON 1 & 2: WHAT IS ADAPTATION?

Inquiry question

- How and why do animal adaptations occur?

Preparation

- Print a class set of [Appendix A: Evidence and adaptations](#) table (or students may draw their own)
- Prepare collage materials.

Introductory activities

- After viewing the two feature artworks, discuss the following:
 - o What strange or absurd animal features do you remember?
 - o What do you think the artists were trying to communicate?
- View the film, [Teacher Resource: Dr Paul Oliver, Senior Curator of Vertebrates](#) ⁱⁱⁱ and ask each student to take note of one way that a bird has physically adapted and for what reason. Share responses as a class.

Learning activities

- Distribute the handout to each student and explain that scientists make predictions about living things based on their features. In this activity we will make predictions about:
 - o Habitat – what type of environment does the creature inhabit? Consider the climate, altitude, remote or domestic nature of the habitat.
 - o Movement – how does the creature move around? How many limbs does the creature have, does it have an articulated body, does it look aerodynamic or heavy and sluggish?
 - o Diet – what does the creature eat? What ‘tools’ does the creature have that would allow it to catch or attract food? Does it require a high-energy diet? Is it a large creature that requires a lot of food?
 - o Predators – who would the creature’s predator/s be? Does the creature have any physical defence mechanisms which would help it stop or avoid predators?

- Students collect images of animals and animal features, and may also add additional hand-drawn features or features found online. Use scissors to arrange the animal features into a new, hybrid creature (use features from at least three animals). *Do not glue or attach.* Think of a name for your creature and write the name on the handout. Leave the creature and handout on your desk.
- Students walk around the classroom with a pen and add an observation or question to at least ten other creatures.
- Students may either:
 - o Make a comment about the creature’s habitat, movement, diet or predators. They must list both the prediction and evidence. For example, a prediction may be that the creature’s food source exists at a height, and the evidence may be that the creature has an elongated neck.
 - o Ask a question about the creature, based on its feature/s. For example, I see your creature has a soft body, short legs and no wings, how does your creature evade predators? Or, your creature has very large eyes, does this mean they are nocturnal?
- Students create a quick sketch of their creature to remember their arrangement and glue their feedback into their visual diaries alongside this.

Extension activities

- Make further adaptations to solve the questions raised by peers.
- Students write a short adaptation story or storyboard about their creature, including the creature’s classification, appearance, habitat, behaviour, food, life cycle and any other interesting facts.

LEARNING ACTIVITIES

LESSON 3: CURIOUS CREATURES

Inquiry question

- How do artists create artworks which pose questions or make predictions?

Preparation

- Display images of the feature artworks via a projector as students enter the classroom.
- Prepare collage and drawing/painting materials.

Introductory activity

- Read the following statements out loud.

It is documented that the first vertebrates recorded in fossils were animals that looked like fish and had respiratory gills. Reconsidering our ancestors' transition out of the water and onto the land through the lens of the climate crisis, this work imagines a new biological adaptation where ocean life metamorphose from marine creature into human.

Kellie O'Dempsey (Soft-body Adapters)

What will the wildlife around Brisbane look like in thousands of years? Which creatures will survive and what are their stories? CurioCreatures imagines fantastical and mysterious future cryptozoological creatures that might one day roam the streets of Brisbane and Australia, as long as humans allow them to evolve and thrive in changed environments.

Alinta Krauth & Jason Nelson (CurioCreatures)

- As a class, brainstorm a list of factors which may act as a catalyst for adaptation, including those mentioned in the statements above (rising ocean levels, shrinking/changing living environments).

Learning activities

- Working in pairs, students choose one creature from the previous lesson to further develop and choose a factor, circumstance or event from the list that will act as a catalyst for adaptation.
- Each student should complete a quick sketch of their creature in their visual diary and add annotations (labels) which describe the features that have adapted and explains why.
- Using the collage materials provided and referring to the *CurioCreatures* and *Soft-body Adapters* artworks, students work with their partner to create their creatures (between A6-A5 size). Students may choose to include hand-drawn or painted elements, printed images, photographs from home, etc.
- Once complete, display creatures and facilitate a group discussion about each adaptation story.
- Collect the collages and photocopy them prior to the next lesson.

Extension activities

- Leaving features separate or using split-pins rather than glue will result in moveable body parts and a more successful/complex animation.

LEARNING ACTIVITIES

LESSON 4: ADAPTATION CATALYSTS

Inquiry question

- How are scientific ideas, concepts or theories communicated using arts elements and principles?

Preparation

- Provide each pair with at least one, colour photocopy of their creature to ensure they have a back-up (if the body parts are separate, copy them separately).
- Prepare materials to create animation elements: collage and drawing/painting materials, including A3 surface for creating an environment (if you are using a flat surface rather than a sheet of paper, students should create elements to include in the scene).

Learning activities

- In pairs, students will finalise their adaptation story, design and create an environment/habitat for their creature. Depending on skill and available time, students may either:
 - o write a script to narrate or add as titles to the animation which explains the catalyst, or
 - o create artistic elements which communicate the catalyst. For example:
 - red cellophane over the scene may represent rising heat
 - blue cellophane may represent rising sea-levels
 - a human hand entering the scene may represent poaching or other interference with the environment
 - elements that increase or decrease in number or scale may represent changes to food sources.
- Students work in pairs to complete all elements of their animation, including their creature, any secondary characters, environment and other features.
- Assist students as they work.

- Ensure all elements are named. Leave any painted or glued elements flat to dry in a draft free zone, making sure they are kept separated from each other and away from other possible disturbances. It will be helpful to store small pieces of paper in a plastic sleeve or document wallet.

Extension activities

- Students revisit their painting once it has dried, adding crosshatching or stippling with permanent fine art markers to add dark values and tone.
- Students add textural or 3D elements to their environments, noting their justification in their visual diary.

LEARNING ACTIVITIES

LESSON 5: AN ANIMATED STORY

Inquiry question

- How do artists communicate stories or messages using moving images?

Preparation

- Provide each pair with a charged device for taking photographs and a flat space to create their animation, at least A2 in size and free of disturbances or hazards.
- Ensure each pair is prepared with all elements of their animation and adaptation story completed.

Learning activities

- Complete a stop-motion animation which communicates your creature's adaptation story. Students will get the best results if they complete this technique in one lesson.
 1. Secure the A3 environment in a flat, stable position using masking tape, and point the camera looking down at the environment, so that it takes up most of the frame. Make sure the camera remains still from that point onwards.
 2. Arrange the creature onto the environment in its starting position. Looking through the camera lens, ensure only wanted elements are within the frame (no hands, scissors, etc.). Take a single photograph.
 3. Move the creature and any other environment elements by a small increment. Take a photograph. *The smaller the movements, the more photographs required, but better the result.*
 4. Repeat Step 3 at least twenty times, or until your creature has moved into the centre of the frame. It will help to have one team member moving the elements and the other looking through the camera and taking photographs. *Some apps, such as iMotion or Stop Motion Studio, have a helpful setting which shows you the previously taken frame at a low opacity in the viewfinder. This is especially helpful if animation elements are moved accidentally, or frames require re-shooting.*

5. Introduce the adaptation catalyst, adding or removing elements to the environment/frame in small, incremental movements and taking a single photograph after each movement. If you have chosen to include printed/hand-written titles, ensure these remain in the frame for at least twenty photographs so that they can be read.

- Keep all animation elements in case frames need to be re-shot.
- Upload photographs onto a computer or device and using animation software, place them along a timeline. *There are many online tutorials which demonstrate how to use Microsoft PowerPoint to create a stop-motion animation.*
- Add any text, narration, sound effects, music or digitally drawn elements to strengthen your adaptation story.
- Export the animation into a suitable format to be shared or viewed by others.

Extension activity

- Add a call to action or caution for the audience. Use sound or visual effects to increase emphasis and emotional impact.

APPENDICES

APPENDIX A: EVIDENCE AND ADAPTATIONS

Living things have features and behaviours that help them survive in their environment. We call these adaptations.

Look at the features of your creature to answer the following questions:

Your creature's name:		
	Prediction	Evidence
Habitat		
Movement		
Diet		
Predators		
Questions		

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ENDNOTES

- ⁱ Australian Curriculum, Assessment and Reporting Authority (ACARA) (2019). *Australian Curriculum, Visual Arts, 2019*. Available at: <https://www.australiancurriculum.edu.au/f-10-curriculum/the-arts/visual-arts/>
- ⁱⁱ Australian Curriculum, Assessment and Reporting Authority (ACARA) (2019). *Australian Curriculum, Science (Version 8.4), 2019*. Available at: <https://www.australiancurriculum.edu.au/f-10-curriculum/science/>
- ⁱⁱⁱ Queensland Museum Network (2019). *Teacher Resource: Dr Paul Oliver, Senior Curator of Vertebrates* [STEM Video series]. Available at: <https://learning.qm.qld.gov.au/resources/1568369/stem-video-year-5-and-6-adaptations-and-the-environment-dr-paul-oliver>