Amazing adaptations at Sydney Zoo

Teacher Toolkit

Stage 3 - Adaptations

OUTCOMES CONTRIBUTED TO:

ST3-4LW-S

GE3-1

GE3-2

Welcome to the Sydney Zoo Teacher Toolkit

Our vision is to secure a sustainable future for wildlife through making connections between your students and our animals.

'Bringing Nature into a classroom can kindle a fascination and passion for the diversity of life on earth and can motivate a sense of responsibility to safeguard it'.

Sir David Attenborough

What is in this toolkit:

- Syllabus-linked pre-visit activities
- Resources for guided and self-guided visits to the Zoo to ensure your students get the most out of their visit
- Post-visit, syllabus-linked class project
- Links to provide further information

Resources required to best use this toolkit:

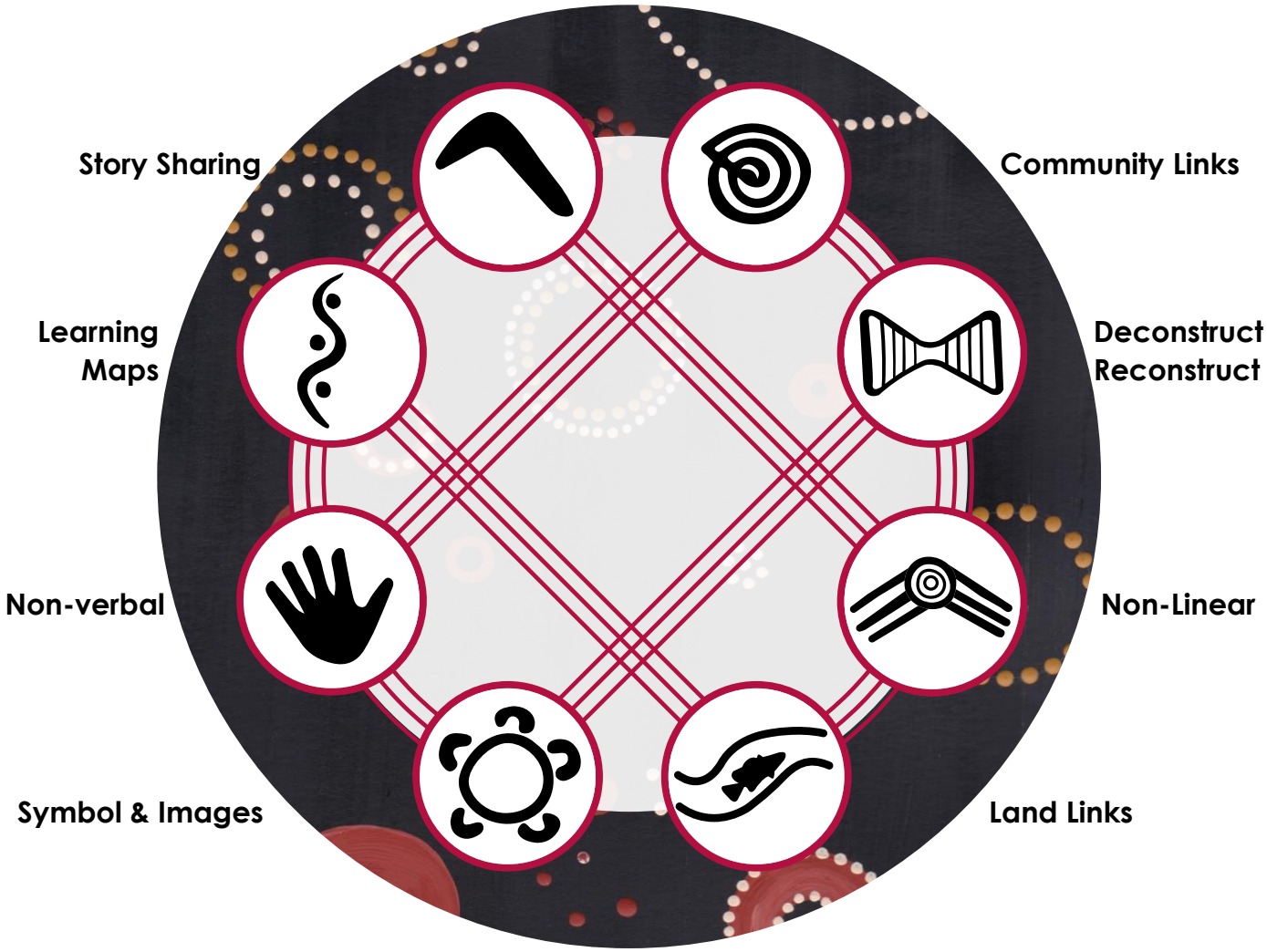
- Computer and screen or smartboard
- Internet access
- Access to playground/outdoors area where possible

Sydney Zoo acknowledges the Darug nation, their people, past, present and their future generations.

Outcomes and content

Stage	Outcomes	Content
Stage 3	**Science and technology** ST3-4LW-S	**Adaptations of living things** **Inquiry question:** How do the structural and behavioural features of living things support survival? Students: • describe adaptations as existing structures or behaviours that enable living things to survive in their environment (ACSSU043) **SciT** • describe the structural and/or behavioural features of some native Australian animals and plants and why they are considered to be adaptations **ComT SciT**
	Geography GE3-1	• students discover the diverse features and characteristics of places and environments
	GE3-2	• students investigate connections Australia has with other countries
	Sustainability	• Students will develop an awareness of sustainable practices, careful and responsible management of natural resources to ensure that they are available for future generations. Actions that support more sustainable patterns of living require students to participate critically and act creatively in determining more sustainable ways of living.
	Civics and citizenship	• Students will develop their awareness about environmental issues, the human impacts on wildlife and be encouraged to be an active global citizen to help solve the problems facing wildlife

Aboriginal Pedagogy
8Ways of Learning



TELL A STORY. MAKE A PLAN.
THINK AND DO. DRAW IT. TAKE IT OUTSIDE.
TRY A NEW WAY. WATCH FIRST, THEN DO.
SHARE IT WITH OTHERS

From the 8Ways website https://www.8ways.online/

Sydney Zoo has developed this lesson package with a focus on Aboriginal Pedagogy for delivery of all content. Context for each lesson is provided in the lesson plans.

Recommended pre-visit lesson outline

Location & Duration	Outcomes & 8Ways	Learning Activity	Resources
Classroom 60 minutes		8Ways context- explain to students that a learning map is a way to map their journey through the topic. Students can place goals and main ideas in their learning map to show the knowledge and skills they will be obtaining through activities on the way. It is a visual representation of a learning journey.	
	8Ways **Learning Maps**	**During this topic students will learn about** • structural and behavioural animal adaptations • the threats to wildlife and their habitats • how to take action to protect wildlife **Learning intention** We are learning to identify and explain adaptations of living things. **Success criteria** We can find and gather information about the adaptations of living things. We can identify and describe examples of adaptations of living things. **LESSON 1** **Animals and their adaptations** Animals have specific features which enable them to survive in the environments they live in. These features have evolved over time in response to changes in the environment. They can be structural or behavioural and are referred to as adaptations. Examples of structural features of animals could include: • Body coverings eg. scales, fur, hair, moist skin, feathers • Bone structure or lack thereof • Nails, claws, spikes, or horns • Arms, legs, or tail • Eyes, nostrils, or mouth Examples of behavioural features of animals could include: • Hunting in a pack • Being nocturnal (active at night) • Running away or hiding from predators • Nesting • Making vocalisations or body movements to warn or attract others **Activity 1.1** **Brainstorm** as a class • What are adaptations? • What are some examples of adaptations that students already know? (e.g. pouch of wombat rear facing to avoid filling with soil when burrowing) • What is a structural adaptation? • What is a behavioural adaptation? **Students create a learning map** to summarise what they will be learning about eg animals, structural features, behaviour, habitats, survival, conservation actions.	Whiteboard, butchers paper **Activity sheet** 'Learning map'

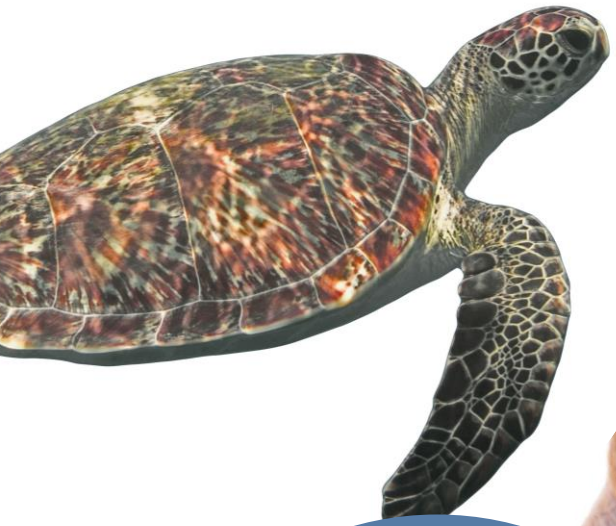
Learning map

Create a **map** of all the things you will be **learning**, it can include drawings, words and sentences. It may have a start and finish or be a mind map of all the ideas you will be learning about.

Optional pre-visit 'adaptations' lesson outline

Location & Duration	Outcomes & 8Ways	Learning Activity	Resources
Classroom 60 minutes	ST3-1WS-S ST3-4LW-S	8Ways context, deconstructing the idea of adaptations and approaching the relationship between habitat and adaptation from their own perspective.	
	8Ways **Deconstruct/ Reconstruct**	**LESSON 2** **Activity 2.1** **Comparing Tortoises and Turtles** Students use the Activity Sheet 'Land or Sea?' to research and label the main adaptations that separate the tortoise and the turtle and make them specialised to live in their separate habitats – the land and the sea.	Whiteboard, butchers paper **Activity sheet** 'Land or Sea?'
	8Ways **Non-linear**		
	8Ways **Non-verbal**	**Discuss** with students that the way an animal looks and behaves is to ensure survival. The bodies and behaviours of each species will adapt/change over a long time (hundreds, thousands or millions of years) as those with the most suitable features survive to pass those features on. **Activity 2.2** **Adaptations** Bilbies have adaptations to help them survive in the desert. These include physical adaptations but also behavioural. Physical adaptations are listed on the activity sheet 'Adaptations'. Students are to list 4 of them in the table, then think of any possible behavioural adaptations for example: - Nocturnal (to stay out of the heat of the day) - Dig and stay in burrows underground in the heat of the day **Adaptations and habitats** Students are to allocate each animal to one of the 3 habitat options. (answer: tiger and frog to rainforest, lion and giraffe to savannah grasslands, sea turtle to beach). And justify their choice. Students may research the animals if needed. **Model this activity for the students and get them to think from different angles.** • Look at the habitat the animals live in and what it provides • Look at the animal itself and determine what body parts are used for survival • Do habitats and animals interact with one another? If habitats change what happens to the animals? Do they change too? • Animals and plants are adapted to suit their environment or they do not survive. **Activity 2.3** **Rainforest Bilby** Students now understand the adaptations a Bilby has to survive in the desert. But what if the environment changes over time? How will the Bilby's body adapt and change over many generations? E.g. potentially longer limbs and claws to help climb, shorter snout and ears to make it easier to fit through dense foliage.	**Activity sheet** 'Adaptations'

Land or Sea?



One of these animals is adapted to live on land and one is adapted to live in the water.

Put a title on each image 'Turtle' and 'Tortoise'.

Label each image with the adaptations that help them to survive in their habitat.

Research some features of tortoises and turtles and correctly label their adaptations e.g. feet, flippers and shell on the correct image.

Are they well suited to their environments?

Adaptations

Below is a bilby in his perfect habitat – the Australian desert. He has big feet to hop on sand, large claws to dig in the sand, a big nose to help smell and catch insects and big ears to hear with and cool it down in the heat of the day.

You can see the physical adaptations, but what are the behaviours that are adapted to help survive in the desert?

Physical adaptation	Behavioural adaptation

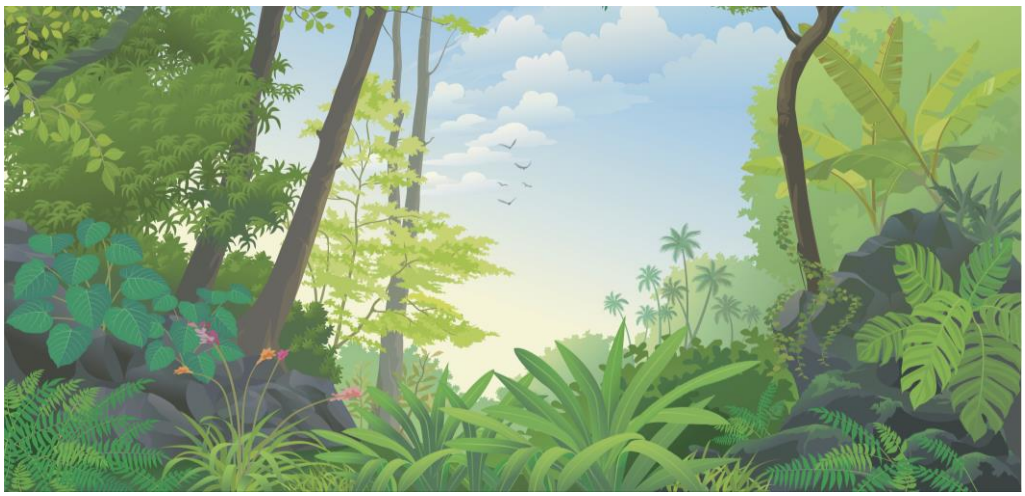
Adaptations and habitats

Cut out the animals and glue them into their habitats.

Here are 3 habitats, a rainforest, a beach and savannah grasslands.

Answer these questions on a separate page:

Which animals belong in which habitats? Why? What adaptations do they have that make them suited to that environment?



Adaptations

The Bilby comes from a desert habitat – imagine that over time, more trees grow and more rain falls. Eventually (over a very long time) the desert becomes the rainforest you see below. How would the Bilby adapt (change) over many generations to suit the different environment?

Stick your desert bilby somewhere on this page then draw a new version of a 'rainforest bilby' with new adaptations.

Optional pre-visit 'adaptations' lesson outline

Location & Duration	Outcomes	Learning Activity	Resources
Classroom 60 minutes	GE3-1 GE3-2	Students learn about the central African country Burundi and the critically endangered population of chimpanzees that call Burundi home.	

Learning intention
We are learning to identify the features of Burundi and its connections to Australia

Success criteria
We can find and gather information about Burundi and compare these with Australia.
We can find and gather information about how

- students discover the diverse features and characteristics of places and environments
- students investigate connections Australia has with other countries

Success criteria

LESSON 3

Activity 3.1

Chimpanzees
Create a class KWL Chart.
In the first column list or draw what you **know** about chimpanzees.
In the second list or draw what you **want to know** about chimpanzees.
Leave the last column blank for what you have learned and fill in after your Sydney Zoo excursion.

Resources: Whiteboard or Smartboard

Chimpanzees of Burundi
Burundi is home to the Eastern Chimpanzee. It is estimated that there are as few as 450 individuals left. The once plentiful forests of central Africa are now fragmented and degraded. Land clearing for agriculture, human development and mining has restricted chimpanzees into small pockets of forest. This has forced chimpanzees into close proximity with people increasing their risk of being hunted for bushmeat or taken for the illegal pet trade.

Resources: Burundi | History, Geography, & Culture | Britannica

Activity 3.2

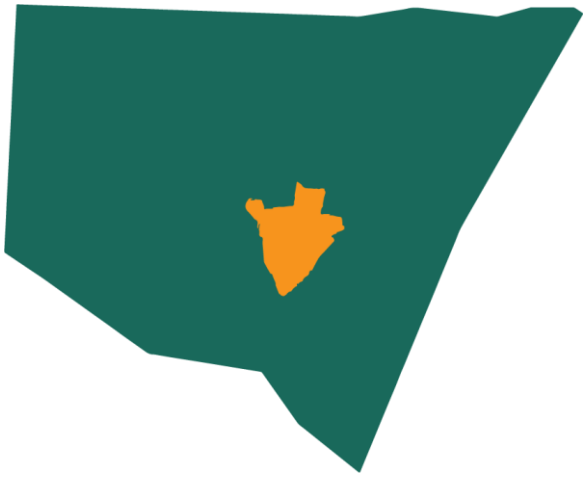
Where in the world is Burundi?
Conduct research and use the worksheet 'Burundi and NSW' to compare the two areas.

Resources: Burundi and NSW worksheet

Explore how much forest cover has been lost in Burundi. Using the Global forest change map resource – search 'Burundi' and look at the geographical location of Burundi compared to regions of Australia.

Resources: Global forest change map

Burundi and NSW



Burundi is a small nation in central Africa. You can see it here compared to the size of NSW. Create a basic profile comparing the two places. Expand on this on separate pages if you need to.

	NSW	Burundi
Climate/Typical weather		
Habitat type(s)		
Native animals		
How do people use their environment? Eg. agriculture		
Area		

Visiting Sydney Zoo

Take your students on a self-guided adventure or book a workshop at Sydney Zoo! Students will discover some of the amazing adaptations of living things and take a deep dive into the life of the charismatic chimpanzee.

Download and print the Stage 3 Activity Booklet 'Amazing Adaptations' to support student learning while visiting Sydney Zoo.

Pre-visit checklist:

- Pre-visit activities
- Behaviour expectations of students while visiting Sydney Zoo
  - Students must always be accompanied by a teacher
  - Follow instructions of your teacher and zoo staff
  - Take only photographs and memories, leave only footprints and smiles
  - If you get lost, find a staff member in uniform and tell them you need help
  - Have a lot of fun and ask lots of questions!
- Ask students to prepare low waste/waste free lunches if possible. We love seeing the students' being low waste/waste free – please brag about this to us
- Wet-weather preparation if the forecast is not favourable (some of our animals love wet days so don't worry about them hiding away)

Upon arrival::

- Send one staff member to check-in at Group Bookings desk - assemble classes with other staff members
- Enjoy your visit with us and please ask any staff for assistance if required
- Students must always be accompanied by a teacher

We recommend allocating small groups to adult supervisors. **Download** our '**survival guide for teachers**'

What is a low or no waste lunch?

- **Sourcing foods that have minimal or no packaging and using reusable containers to carry food.**
- **Bringing your own reusable drink bottle and refill it.**
- **Carrying your own reusable cutlery set.**

Examples

- Sandwiches - without clingwrap, they can stay fresh in a suitable reusable container or beeswax reusable wrap.

- **Fruit** - apples, bananas and mandarins are easy to eat and/or peel at school or the Zoo, the core and skin can go in the organic bins.
- **Nuts, dried fruit, biscuits, popcorn etc.** in a small reusable container, buy them in bulk to reduce packaging and put servings into small containers for snacks.

Optional post visit project lesson outline

Location & Duration	Outcomes & 8Ways	Learning Activity	Resources
This project may extend over several lesson, days, or weeks	ST3-4LW-S GE3-1 GE3-2	8Ways context: Brainstorming and creating a learning map of the process for project completion; breaking down each task and modelling for students; inspiring students creating and doing; approaching any problems with solutions; creating land links for students by taking their learning outside; sharing what they are doing with the wider community of school and Sydney Zoo.	
	8Ways **Learning maps**	**LESSON 5 – at school** **Learning intention** We are learning to identify and propose actions for chimpanzee conservation.	
	8Ways **Deconstruct/ Reconstruct**	**Success criteria** We can plan and put into action simple practices to contribute to the survival of wild chimpanzees.	
	8Ways **Community link**s	**5.1 Activity** **Chimpanzee survival** Download the Sydney Zoo digital book 'Hope for chimps'. • Read the story of Flora and wild chimpanzees in central Africa. **5.2 Activity** Design a poster to educate your school community on the threats to chimpanzees in the wild. **5.3 Activity** Using the steps outlined in 'Hope for chimps' organise a mobile phone collection drive at your school or community group. Use the 'Hope for chimps project' document to organise ideas and plan out logistics. More information and school resources can be found at https://sydneyzoo.com/education/were-calling-on-you/	'Hope for Chimps' digital book

Hope for chimps project

Where will your campaign be displayed in your school?

How will you communicate your campaign?

Steps to collect phones

Equipment needed

Resources needed

Responsibilities – who does what?

What is your launch date?

Word bank

Word	Definition
Aboriginal and/or Torres Strait Islander Peoples	Aboriginal Peoples are the first peoples of Australia and are represented by over 250 language groups, each associated with a particular Country or territory. Torres Strait Islander Peoples are represented by five major island groups, and are associated with island territories to the north of Australia's Cape York which were annexed by Queensland in 1879. An Aboriginal and/or Torres Strait Islander person is someone who: • is of Aboriginal and/or Torres Strait Islander descent • identifies as an Aboriginal person and/or Torres Strait Islander person, and • is accepted as such by the Aboriginal and/or Torres Strait Islander community(ies) in which they live.
adaptation	The process of change by which a species becomes better suited to its environment.
built environment	The manufactured artefacts and surroundings that provide the setting for human activity.
characteristics	A set of distinguishing aspects (including attributes and behaviours) of a living thing, object or material. The characteristics of living things are often used to classify them and might include how they move or reproduce. When discussing materials the characteristics are the qualities used by humans to determine their use and the way people work with them. They might include colour, hardness and opacity.
classification	A category into which something is organised.
climate change	A long-term change in regional or global climate patterns eg annual precipitation, frequency of weather events.
climate graph	A graph showing average monthly temperature (by a line) and precipitation (by columns) for a location.
climatic zones	Refers to areas of the Earth that have similar temperatures. The major zones are hot, temperate and polar and are generally demarcated by lines of latitude. Within each zone there are different climates because of the effects of the distribution of continents and oceans and the circulation patterns of the atmosphere and oceans.
conclusions	An opinion or judgement based on evidence.
Country/Place	Country is a space mapped out by physical or intangible boundaries that individuals or groups of Aboriginal Peoples occupy and regard as their own. It is a space with varying degrees of spirituality. Place is a space mapped out by physical or intangible boundaries that individuals or groups of Torres Strait Islander Peoples occupy and regard as their own. It is a space with varying degrees of spirituality.
cultural groups	People belonging to or identifying with a nationality, ethnic group, religion or social group with a distinct culture.
culture	The customs, habits, beliefs, social organisation and ways of life that characterise different groups and communities.
designed solution	A product, service or environment that has been created for a specific purpose or intention as a result of design thinking, and design and production processes.
diversity	Differences that exist within a group, for example, age, sex, gender, gender expression, sexuality, ethnicity, ability/disability, body shape and composition, culture, religion, learning differences, socioeconomic background, values and experiences.

Word bank

Word	Definition
environment	The living and non-living elements of the Earth's surface and atmosphere. Where unqualified, it includes human changes to the Earth's surface eg croplands, planted forests, buildings and roads.
features	The tangible elements of a place or environment.
field sketches	Annotated line drawings created to record features of an environment during fieldwork activities.
investigate	Carry out a systematic or formal inquiry to discover and examine information.
investigation	A scientific investigation is a systematic inquiry applying the processes of planning a course of action, safely manipulating tools and equipment in collecting and interpreting data, drawing evidence-based conclusions and communicating findings.
landscape	A landscape is an area, created by a combination of geological, geomorphological, biological and cultural layers that have evolved over time eg riverine, coastal or urban landscapes.
natural environment	An environment in which humans do not make significant interventions, for example ocean environments or national parks.
natural resources	Resources provided by nature. Resources can be classified as renewable, non-renewable and continuous. Also known as environmental resources.
natural vegetation	The vegetation that has evolved in an area over time.
perception	People's assessment of places and environments.
seasonal calendar	The classification of the weeks or months of the year into seasons eg spring, summer, autumn and winter, or wet and dry, or the classifications of Aboriginal cultures.
sketch map	A labelled drawing outlining the main geographical features of a place.
small-scale map	A map showing a large area of the Earth's surface with little detail eg world map where one centimetre on the map scale represents a large distance on the land.
sustainable	Supporting the needs of the present without compromising the ability of future generations to support their needs.
weather	The condition of the atmosphere at a point in time eg temperature, humidity.

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