



TARONGA  
**ZOO**  
SYDNEY

*For the Wild*



# STEM STUDENT ENRICHMENT DESIGN COMPETITION



# STEM ENRICHMENT DESIGN UNIT SNAPSHOT



## Identify & Define

Identify and investigate structural and behavioural adaptations

## Research & Plan

Research animals at the Zoo or in their own context and design an enrichment prototype.

## Produce & Implement

Bring the plan to life!  
Build and test the enrichment design.

## Test & Evaluate

Apply the Enrichment Design Checklist to check and complete the design.



## NSW CURRICULUM OUTCOMES

### STAGE 3

ST3-4LW-S – Examines how the environment affects the growth, survival and adaptation of living things.

ST3-1WS-S – Plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusion.

### STAGE 4

C4-CLS-01 – Cells and Classification.

SC4-WS-07 – Working Scientifically Problem-Solving.

TE4-PPM-01 – Engineering technologies and systems.

## UNIT & RESOURCES

(GOV SCHOOLS)



## STAGE 3 NEW CURRICULUM

ST3-DDT-01: Uses design processes to create, evaluate and modify designed solutions  
·Develop designs ideas to build a prototype using design criteria  
·Test, evaluate and modify the prototype to meet the design criteria

ST3-SCI-01: Uses evidence to explain how scientific knowledge can be used to develop sustainable practices  
·Observe behavioural and structural adaptations of plants and animals, and suggest how these may help them survive in their environment

## UNIT & RESOURCES

(NON-GOV)



# STEM ENRICHMENT DESIGN *Competition*

## YOUR TASK!

ZOO KEEPERS AND VOLUNTEERS AT TARONGA ZOO SYDNEY SPEND A LARGE AMOUNT OF TIME CREATING ENRICHMENT FOR THE ANIMALS IN THEIR CARE.

PUT YOUR DESIGN AND PRODUCTIONS SKILLS TO THE TEST BY SUBMITTING A NEW AND EXCITING ENRICHMENT DESIGN FOR ANIMALS FOUND AT TARONGA!

### WHAT IS ENRICHMENT?

Enrichment enhances animal environments within the context of the animals behavioural biology and natural history. Environmental changes are made with the goal of increasing the animal's behavioural choices and drawing out their species-appropriate behaviours, thus enhancing animal welfare.

1999 AZA Behavior Scientific Advisory Group

Enrichment is an important aspect of animal husbandry in zoos and tries to make life at the zoo as natural and stimulating as possible.

The purpose is to induce as near to natural behaviour as possible as well as promoting mental and physical activity.

Visit the [Wild Welfare website](#) to learn more.

There are five enrichment categories:

- Social
- Cognitive
- Physical habitat
- Sensory
- Food-related

Read more about each category [here](#)

### THE PROCESS

#### 1. IDENTIFY & DEFINE

Select one of the two animals below and use the stimulus information to familiarise yourself with their needs.



Echidna (short or long beaked)



Pygmy Marmoset

#### 2. RESEARCH & PLAN

It is important to have sound knowledge of the species' natural behaviours and physiology when developing an enrichment tool. Undertake further research about the animal as well as existing enrichment designs and materials before designing a device that will encourage natural behaviour as well as promoting mental and physical activity.

#### 3. PRODUCE & IMPLEMENT

Prototype or create your enrichment design.

NOTE: the enrichment object MUST be able to be added and removed from the animal's exhibit

#### 4. TEST & EVALUATE

Use the enrichment design checklist at the end of this document to ensure your design meets all the criteria.

DON'T FORGET TO USE THE CHECKLIST\*

Submit your design via our [Taronga website](#)  
ENTRIES CLOSE: FRIDAY 25 SEPTEMBER 2026  
AT 5PM (AEST)

### WINNERS

- The winning enrichment designs will be judged by a Zoo Keeper and Behavioural Specialist from Taronga Zoo Sydney.
- Winners will be contacted using the classroom teacher's details, via email.
- Chosen designers will receive FREE entry for their whole class to visit Taronga Zoo Sydney, or Taronga Western Plains Zoo meet the judges and observe their enrichment object being given to their chosen animal.
- Only one (1) winner will be selected per animal

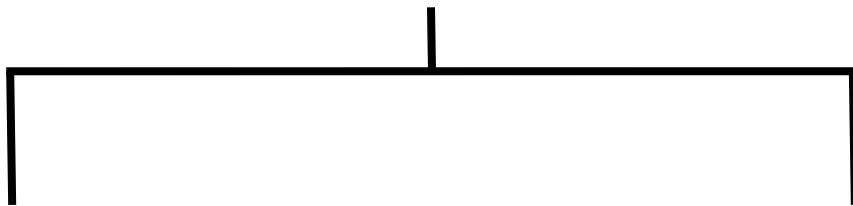
\*Checklist provided at the end of this document.



# STEM ENRICHMENT DESIGN *Competition*



## MEET THE ANIMALS



### ECHIDNA

*Tachyglossus aculeatus*



### PYGMY MARMOSET

*Cebuella pygmaea*



# ECHIDNA

(short or long-beaked)

*Tachyglossus aculeatus*




LEARN MORE ABOUT  
THE ECHIDNA

[DOWNLOAD FACTSHEET](#)



LEARN MORE ABOUT  
ECHIDNA BEHAVIOUR

[WATCH VIDEO HERE](#)



Hi! Did you know I have  
no teeth? I use my long,  
15cm sticky tongue  
to slurp up my food!

## ECHIDNA ENCLOSURE

Institute of Science and Learning, Taronga Zoo Sydney



## THE JUDGES!



Tarryn William Crow  
Senior Keeper  
Taronga Institute of  
Science & Learning,  
Taronga Zoo Sydney

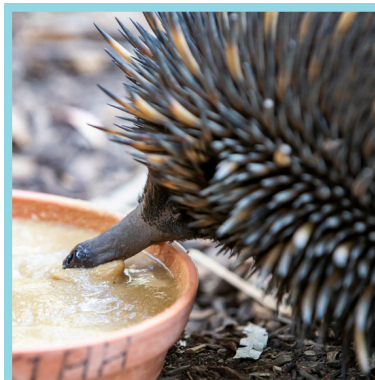


Brendan Host  
Behavioural Husbandry  
Supervisor  
Taronga Conservation  
Society Australia

## EXAMPLE OF AN ENRICHMENT DESIGN:



- Optional design detail: Allow for food such as echidna mix (porridge-like texture) to be added by keepers.



DON'T  
FORGET TO  
USE THE  
CHECKLIST

Hi! Did you know I am the world's smallest monkey!?



# PYGMY MARMOSET

*Cebuella pygmaea*



LEARN MORE ABOUT PYGMY MARMOSETS

[DOWNLOAD FACTSHEET](#)



LEARN MORE ABOUT PYGMY MARMOSET BEHAVIOUR

[WATCH VIDEO HERE](#)

## PYGMY MARMOSET ENCLOSURE

Institute of Science and Learning, Taronga Zoo Sydney



## THE JUDGES!



Katie Hooker  
Senior Keeper  
Taronga Institute of  
Science & Learning,  
Taronga Zoo Sydney



Brendan Host  
Behavioural Husbandry  
Supervisor  
Taronga Conservation  
Society Australia

## CHALLENGE

Design a naturalistic 3D-printed enrichment device that encourages natural behaviours that multiple pygmy marmosets can display at once.

### EXAMPLE OF CURRENT DESIGNS THAT ARE NOT SUCCESSFUL:



This design doesn't reflect the pygmy marmoset's natural habitat and the rings are too heavy for them to move and find food.



While made of natural materials, this design doesn't provide enough challenge or stimulation for the pygmy marmosets when finding food.



DON'T FORGET TO USE THE CHECKLIST





# STEM ENRICHMENT DESIGN Competition



## ECHIDNA CHECKLIST

### SAFETY:

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- Cardboard or paper products are free from wax, staples, glue, paint or plastic tape.
- The device (including fixings/attachments) will prevent animals from becoming entrapped or entangled.
- The items holes will not entrap body parts.
- The enrichment can be added and removed from the animal's exhibit easily.
- The size of the item is large enough that it cannot be swallowed by the animal.
- The enrichment item does not contain ingredients that may be toxic or pose an allergenic risk to the animal.
- The enrichment item is not likely to carry disease.

### CONSTRUCTION:

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- I have included ALL the measurements of the object (heights, length, width) and all the openings (diameter).
- I have included the weight of the object.
- The item is sturdy and durable.
- Parts are firmly secure and cannot be detached.
- The fixings and attachments cannot be ingested.
- The item is non toxic (including plant material).

### BEHAVIOUR AND FOOD:

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- The device has the ability for Keepers to include food from the animals daily food allowance (optional).
- The items can be cleaned to prevent disease transfer between usages (not single use).
- The item offers the echidnas the opportunity to display their natural behaviour and engage socially.

### DIGNITY AND RESPECT AND EXHIBIT AESTHETIC:

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- The enrichment item maintains Taronga's philosophies in displaying animals in a way that celebrates the nature of the species and promotes natural behaviour.
- The item is natural looking and compliments the exhibit design.



# STEM ENRICHMENT DESIGN *Competition* PYGMY MARMOSET CHECKLIST



## SAFETY:

---

- Cardboard or paper products used are free from wax, staples, glue, paint or plastic tape.
- The device (including fixings/attachments) will prevent animals from becoming entrapped or entangled.
- The items holes will not entrap body parts.
- The enrichment can be added and removed from the animal's exhibit easily.
- The size of the item is large enough that it cannot be swallowed by the animal.
- The enrichment item does not contain ingredients that may be toxic or pose an allergenic risk to the animal.
- The enrichment item is not likely to carry disease.

## CONSTRUCTION:

---

- I have included ALL the measurements of the object (heights, length, width) and all the openings (diameter).
- I have included the weight of the object.
- The item is sturdy and durable.
- Parts are firmly secure and cannot be detached.
- The fixings and attachments cannot be ingested.
- The item is non toxic (including plant material).

## BEHAVIOUR AND FOOD:

---

- The device has the ability for Keepers to include food from the animals daily food allowance (challenge).
- The items can be cleaned to prevent disease transfer between usages (not single use).
- The item offers the pygmy marmosets the opportunity to engage socially and offers enough choice

## DIGNITY AND RESPECT AND EXHIBIT AESTHETIC:

---

- The enrichment item maintains Taronga's philosophies in displaying animals in a way that celebrates the nature of the species and promotes natural behaviour.
- The item is natural looking and compliments the exhibit design.

# RESEARCH



Education



Animal:

Where in the world does it live?



Description of habitat:

Diet:

Structural adaptations:

Behavioural adaptations:



Animal:

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Description or image of the Zoo based exhibit?

Description or images of enrichment for this animal:



Animal:

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Any other information or images about your animal that you found interesting:







# EVALUATION



Education



Was your prototype successful?  
Explain why or why not.

Write down some problems with your design.

What modifications need to be made to your design to improve it further?

Create your NEW modified design:

# PITCH PLANNER



Education



What is the problem that you have created a solution for?

What is your company?  
Sketch a logo

Name of your product  
that you are pitching:

Three ways your design is  
more unique than others:

Images of your product:

What does your product do for customers? How does it work?

Future plan (next steps, how could you grow/change/modify product)?  
What would you do with the additional funding?