



INCREDIBLE POLLINATORS

Explore Micro Worlds and watch videos on Asian honey bees. Answer the questions below.



- 1** What type of pollination is taking place in the video?

- 2** Based on the video, explain how bees find flowers and communicate the presence of flowers to other bees in the colony.

- 3** Approximately what percentage of human food production depends on pollination by bees?

%

- 4** State one threat to bee populations. Other than the example mentioned in the video, explain one other way a decline in bee populations can affect ecosystems.



DID YOU KNOW?



Singapore is home to over 130 bee species, including honey bees, solitary bees and stingless bees.



At Mandai, we build insect hotels using bamboo and natural materials to provide shelter for native insects such as bees.



What other insect pollinators can you spot in Micro Worlds?

Name: _____ Class: _____ Date: _____



MICRO WORLDS

MICROBES: SMALL HELPERS, BIG IMPACT

Explore the Human Microbiome Interactive Orbs and answer the questions below.

1 Most microbes are tiny, measuring less than the width of a hair.

2 Microbes aid digestion, produce vitamins and protect us from harmful germs. Based on the video, identify **two types** of microbes and explain how each helps keep us healthy.

Microbe:

Location in the body:

How do they keep us healthy:

Microbe:

Location in the body:

How they keep us healthy:

3 How might microbiome research change the way diseases are treated?



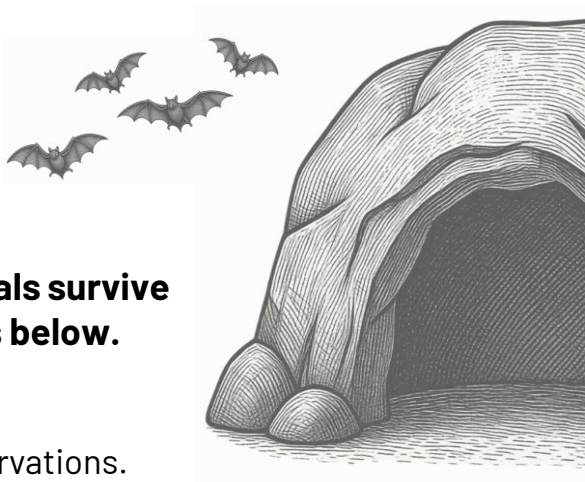
DID YOU KNOW?

A microbiome is a community of microbes living in the same environment. Humans, animals, plants, soil and even air have their own unique microbiomes that support healthy ecosystems.



CAVERN OF MYSTERIES

Investigate the tunnels to discover how animals survive in the cave ecosystem. Answer the questions below.



1 Complete the table below based on your observations.

Animal	Ecosystem Role	Adaptation(s) for Survival in the Cave Habitat
	Decomposer	
	Consumer	
	Consumer	

2 In a balanced ecosystem, nutrients are continuously recycled. Based on your observations, explain how the cave cockroach contributes to nutrient cycling in the cave ecosystem.

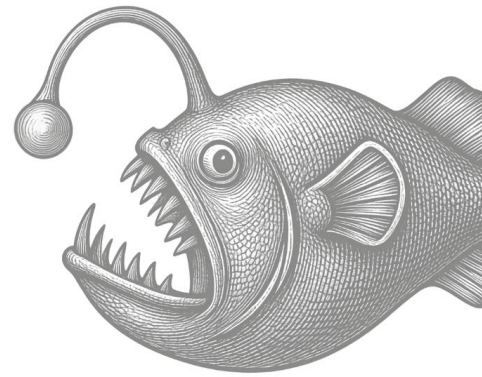


Cockroaches are Nature’s clean-up crew. Madagascar hissing cockroaches help reduce food waste at Mandai by feeding on selected animal leftovers.



DEEP SEA-CRETS

Dive into the deep sea and explore the interactive games. Answer the questions below.



1 One of the interactive games features a non-living material commonly found in our oceans. Explore the game and answer the questions below.

(a) What is the non-living thing?

(b) How much of this material enters the ocean each year?

**MILLION
TONNES**

(c) Explain how your answer in (a) can move through a marine food web and affect different organisms.

2 Biomimicry is the practice of learning from nature to solve human challenges and improve our quality of life. Search for either deep-sea creature on the right and identify one adaptation that inspired an invention or technology.



Tomopteris sp.



Atolla jellyfish

3 Why is it important to protect marine biodiversity? Use evidence from Questions 1 and 2 to support your answer.



Less than 20% of the ocean has been explored. Every year, scientists discover nearly 2,000 new marine species, each helping us better understand Earth's biodiversity and inspiring new scientific discoveries.



INFINITE WONDERLAND

THE SINGING FORESTS

Explore the Interconnected Tree to discover how rainforest animals communicate and survive across different forest layers. Answer the questions below.

- 1
- A healthy rainforest is filled with animal calls. Explore the interactive and identify the animal described by each sound or communication behaviour.

Animal	Sound or Communication Behaviour
	Loudest roar of any land mammal – its calls can travel up to 4 km through the forest.
	At night, males puff their throats and croak sharp calls, using sound and vibration to attract mates and warn rivals.
	Their song is so prized, singing competitions are held just to hear it.
	At night, they rub their wings to create calls to attract mates.

- 2
- The variety of animal calls reflects the biodiversity of a healthy rainforest. Explain how deforestation reduces this diversity and disrupts the rainforest ecosystem.



DID YOU KNOW?



Straw-headed bulbuls are **Critically Endangered** due to illegal trapping for their melodious songs.



Singapore is a global stronghold for straw-headed bulbuls, with Mandai Wildlife Reserve supporting up to 5% of the world's wild population.



At Bird Paradise, Mandai has successfully bred eight chicks.

INFINITE WONDERLAND

THE LIVING REEFS

Explore the coral reef ecosystem and the interactive games.
Answer the questions below.



- 1 Coral reefs provide essential resources for many marine organisms. Complete the sentence below.

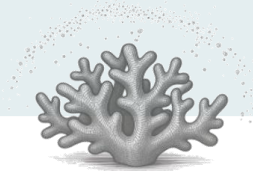
Coral reefs are vibrant underwater neighbourhoods, providing _____ ,
_____, and _____ for a _____ of all marine
life!

- 2 Marine organisms have adaptations that help them avoid predators or locate prey. Identify one example of each from the interactive games.

Avoiding Detection	Locating Prey

- 3 Every species plays a role in maintaining a healthy ecosystem. Identify the reef’s tiny clean-up crew, explain its role, and predict what might happen if its population declines.

DID YOU KNOW?



Once a year, millions of coral polyps release eggs and sperm at the same time. This synchronised spawning increases the chances of fertilisation and helps maintain healthy, genetically diverse coral populations.



BITDEER AI

EXTREME FRONTIERS

EXTREME SURVIVAL

Step into the simulations to experience life in extreme environments. Answer the questions below.



- 1
- Some animals have special adaptations to survive in extreme conditions. Explore the interactive and complete the table below.

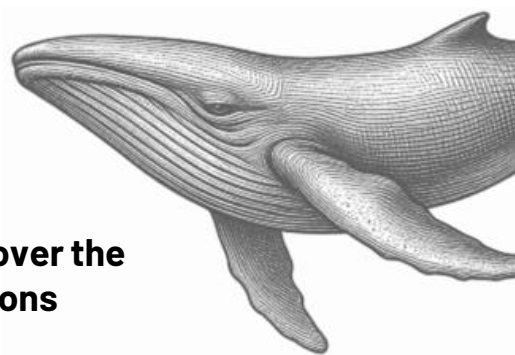
Animal	Adaptations for survival
	They use their _____ abilities to hunt for _____ at night in urban spaces.
	As sea ice melts due to _____, they shift from hunting _____ prey to _____ animals.
	To survive extreme desert _____ swings, they change _____ during the day to stay cool and bury themselves in the _____ at night to stay warm.
	Every winter, they fly at altitudes of over _____ metres to migrate to warm places. Their unique _____ system allows them to survive where _____ is scarce.

- 2
- Watch the video near the desert simulation. Explain how the darkling beetle supports the survival of the Namaqua chameleon and how their relationship demonstrates the importance of biodiversity.



DID YOU KNOW?

Humans can also cope with extreme environments through acclimatisation. Over generations, some populations may develop inherited adaptations.



GIANTS THROUGH TIME

Watch the show and journey through time to discover the giants of the past and present. Answer the questions below.

1 How much do you know about mass extinctions?

- (a) million years ago, a colossal asteroid impact caused the mass extinction of dinosaurs, paving the way for mammals to dominate.
- (b) Earth has experienced mass extinctions, each reshaping life on the planet.

2 We are currently living in the Cenozoic Era. Use the clue to identify an animal from this era that is now extinct and complete the information.

Clue: This animal used its muscular tail for support when standing on its hind legs, forming a “tripod” for better balance when reaching for higher vegetation.

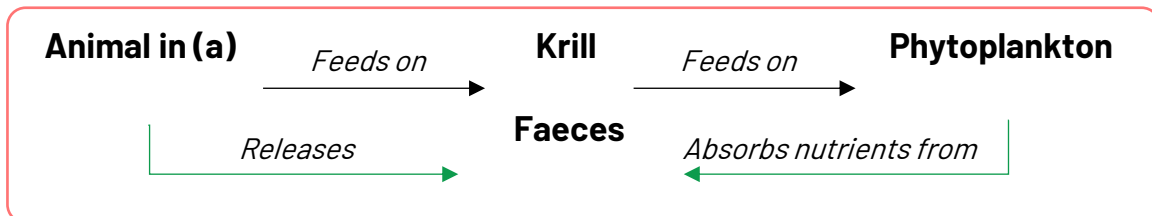
Animal name:

Reason for extinction:

3 Find the interpretive featuring the largest animal alive today.

- (a) Identify the animal and state how many million krill it can eat each day.

- (b) The diagram shows a nutrient feedback loop involving this animal.



Using the diagram, predict how a decline in its population might affect the marine ecosystem.
