P6 Lesson Study on Teacher-Led AI-Supported Learning of Adaptations

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40TH ASEAN COUNCIL OF TEACHERS + KOREA CONVENTION

NAVIGATING OUR FUTURE
STEERED BY TEACHERS;
ANCHORED IN RELATIONSHIPS;
PROPELLED BY AI

22–25 OCTOBER 2026 · D'MARQUEE, SINGAPORE

Overview

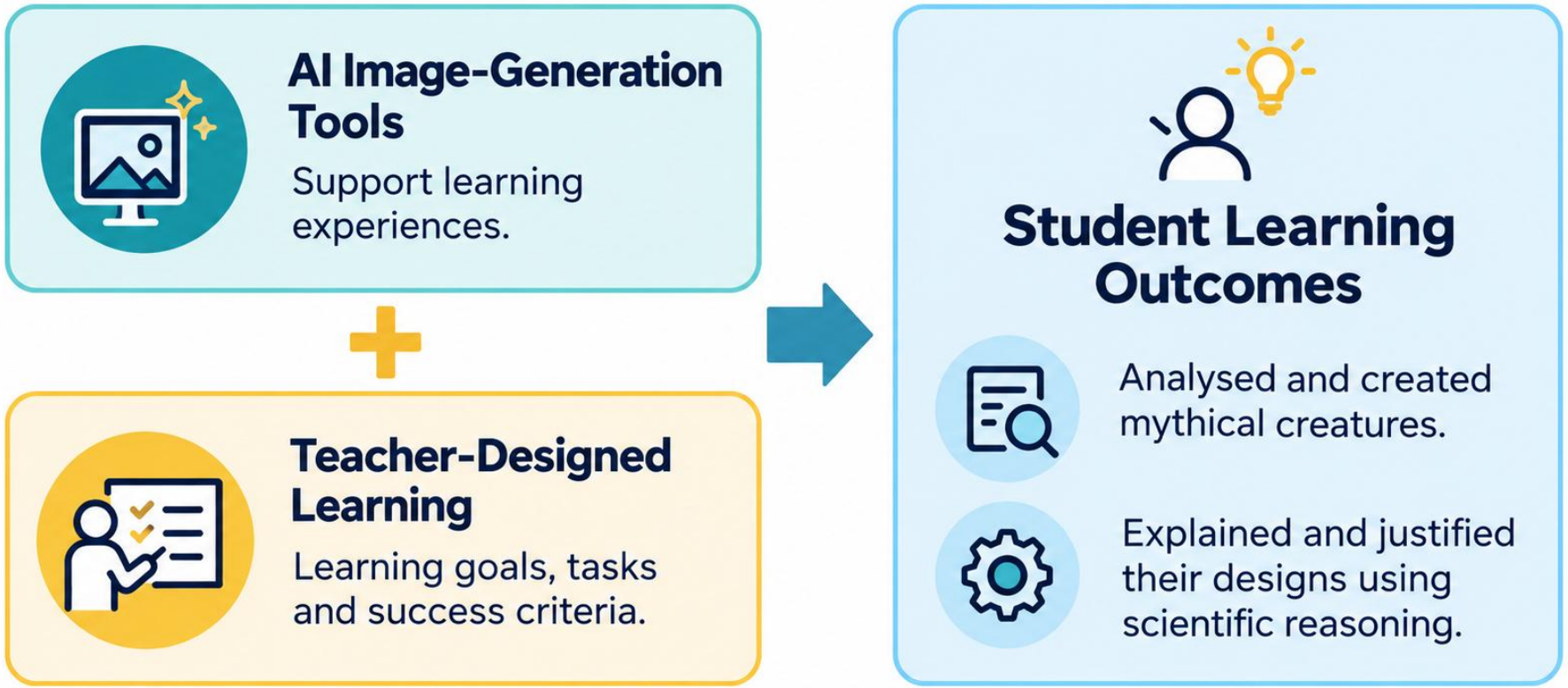
Synopsis

Lesson Study :

How intentional teacher-designed use of AI tools can deepen Primary 6 students' understanding of adaptations in living organisms.

Students learn to explain how structural and behavioral adaptations support survival for organism

AI-Supported Learning, Guided by Teachers



Teacher-Led Inquiry Cycle

AI **enhances,** rather than directs, the learning process.

Findings :

- student engagement,
- clearer explanations,
- and stronger ability to apply concepts

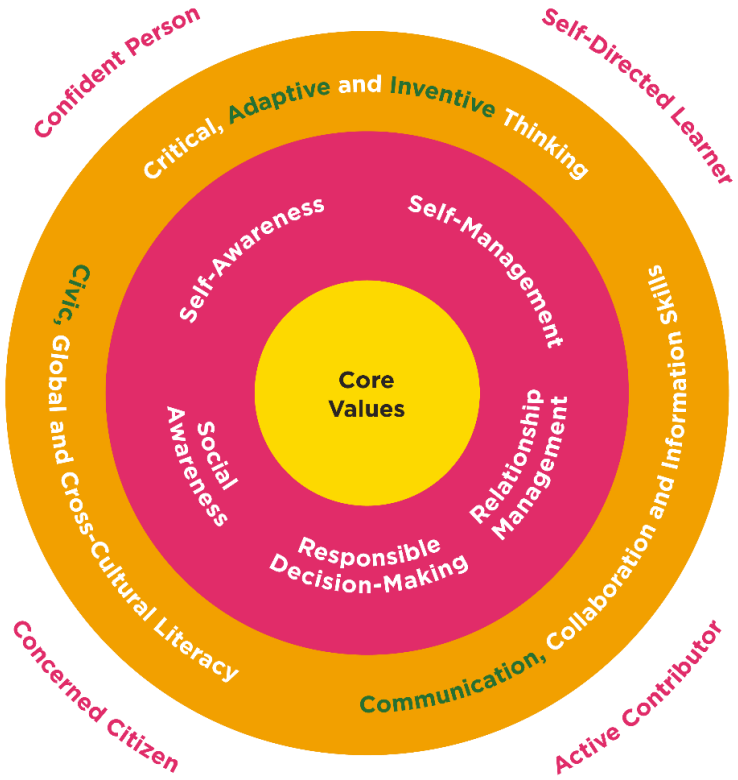
Students developed key competencies e.g.

- collaboration,
- critical thinking and inventive thinking.

1. Context & Introduction

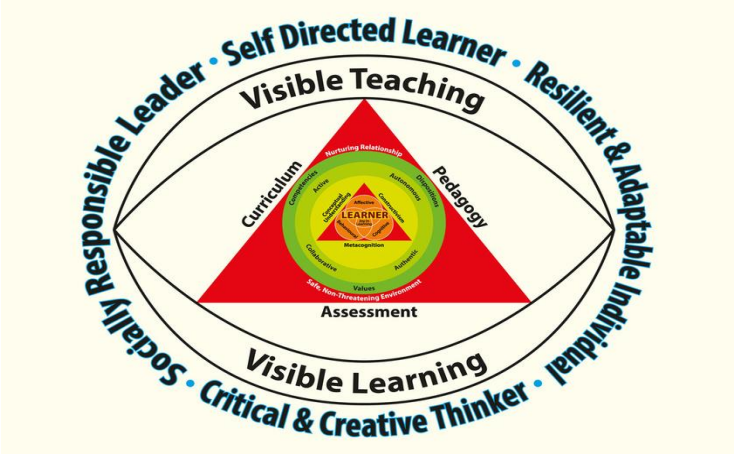
Aim of Lesson Study:

- deepen students' understanding of adaptations
- enhance student engagement and deepen conceptual understanding by integrating AI tools
- foster e21CC competencies (collaboration and critical , adaptive & inventive thinking)



2. Rationale and Literature Review

Theoretical Frameworks



Constructivist Learning Theory (Piaget, Vygotsky)

Learning is most effective when students actively construct knowledge through exploration and collaboration.

Metacognition and Conceptual Understanding (Flavell, 1979)

Encouraging students to reflect on their learning process enhances deep learning and problem-solving.

Self-Determination Theory (Deci & Ryan, 1985)

Empowering students with autonomy, competence, and relatedness increases motivation and engagement.

3. Objectives and Intended Learning

Fostering Conceptual Understanding:

1. Identify structural and behavioural adaptations in different organisms.
2. Explain how these adaptations help organisms survive in specific habitats.
3. Establish connections between adaptation types and their functions.

Development of e21CC:

1. Collaboration:
Work in teams to analyse adaptations and present findings.

2. Critical, Adaptive & Inventive Thinking:
Evaluate case studies and suggest adaptations for survival in given environments.

4. Learning Design and Approach

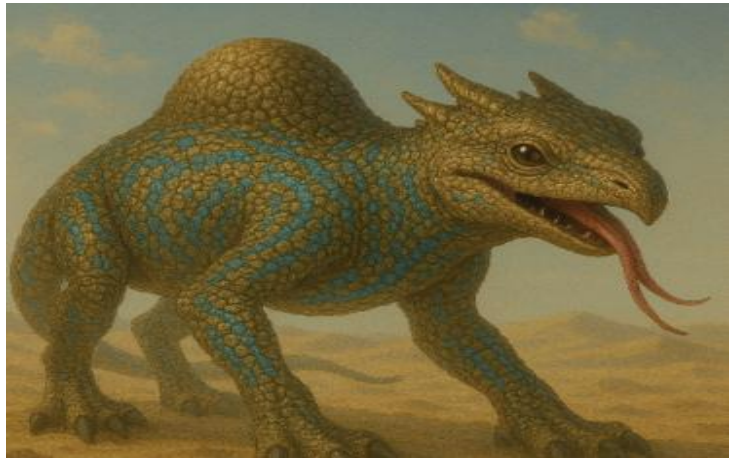
Timeline

Lesson Design (3 weeks)
Lesson Enact-ment (6 weeks)
Discussion of Findings (1 week)
Celebration of Students' Efforts

Lesson Design

- Using AI image generator (ChatGPT), create mythical organisms for case studies
- AI Prompts designed to include the adaptations based on habitats
- Upload images on Student Learning Space (SLS) and include guiding questions for group activity

chat GPT Generated images



5. Implementation and Enactment

Enactment

Enduring Understanding:

"What functions do structural and behavioural adaptations serve in helping the animals survive in the habitat?"

Application and Analysis

A

AI-Powered Case Study:
Analyze an AI-generated creature in a given habitat and determine its adaptations and purpose, based on the description of adaptations.

B

Collaborative Discussion, Applying Critical, Adaptive and Inventive Thinking:
Students give input on peers' responses, focussing on structural and behavioural adaptations in the different environmental conditions.

C

Critical, Adaptive and Inventive Thinking Challenge:
Students design a fictional creature, giving details on its structural and behavioural adaptations, and tasks peers to guess the environment of creatures.

6. Assessment and Evidence of Learning

Students' Learning

Reflection :
Students document how their understanding evolved and self-assess their critical thinking skills and understanding of topic.

Expected Student Outcomes

Enhanced Student Understanding: Stronger grasp of how adaptations contribute to survival.

Increased Engagement: SLS AI tools integration promotes interactive learning.

Stronger e21CC: Collaboration and critical thinking in problem-solving.

Adaptation_A Consolidation

1 HR

Adaptations are characteristics that enhance an organism's ability to survive and reproduce in its environment. These adaptations can be structural, such as the long neck of a giraffe that allows it to reach high leaves, or behavioural, like the migration of birds to warmer climates during winter. Understanding these adaptations helps us appreciate the intricate relationships between organisms and their habitats.
In this module, we are learning to :
1) identify structrural and behavioural adaptations in different organisms
2) explain how these adaptations help the organisms survive in the given habitat
3) connect the type of adaptation to their function

ITT1

See | Think | Wonder | View All

What do you observe about this organism?

QABYL AYDEN BIN MOHAMMAD TAUFIQ
Response · 0

i see a polar bear like creature that has webbed feet and has horns

JOSHUA LIM KAI JUN
Response · 0

White fur, small ears, webbed feet, sharp claws, horns

HO RUI HENG
Response · 0

i see some whits fur,webbed feet and some horns on the organism.

B. Frostrex

Learning Outcome(s)

Subject and Level

Subject	Level
Science	Primary 6

1-1 of 1

1. Read the paragraph about the Frostrex.

"The Frostrex lives in a snowy and icy world. Its thick, double-layered fur keeps it warm—an outer layer to block the cold and a softer undercoat to trap heat. Underneath, a thick layer of fat, called blubber, helps it stay cozy even in freezing weather.

The Frostrex's wide paws, covered in fur, make walking on snow easier and keep it from sinking. The webbed toes help it swim if needed. Sharp, curved claws give it a good grip on ice and help catch prey. Its small, round ears help save heat, and its long snout warms the cold air before it reaches the lungs. To blend in with the snow, its fur is white.

The Frostrex is strong and muscular, able to move through deep snow with ease. It often travels in small groups to share warmth and hunt more successfully. During the day, when it's a bit warmer, the Frostrex hunts for food.

At night or when the weather gets worse, it digs into the snow to make a cozy den. Sometimes, it even hibernates during the coldest months to save energy. When food gets too hard to find, the pack moves to places where it's a bit warmer and easier to survive.

The Frostrex is tough, smart, and built to live in the harsh, snowy wilderness!"

2. Find the adaptations described.
3. Decide if each one is a **structural** adaptation (a body part or physical feature) or a **behavioural** adaptation (an action or behaviour).
4. Complete the table.

Description | Behavioural / Structural | Purpose | View All

thick, double-layered fur

EDDA YEO

Description

EDDA YEO
Response · 0

thick fur to keep warm

Behavioural / Structural

EDDA YEO
Response · 0

structural adaptation

Purpose

EDDA YEO
Response · 0

to keep the organism warm in the cold weather

LEE ZHI YI JOVONE

Description

LEE ZHI YI JOVONE
Response · 0

Its thick, double-layered fur keeps it warm—an outer layer to block the cold and a softer undercoat to trap heat

Behavioural / Structural

LEE ZHI YI JOVONE
Response · 0

Structural

Purpose

LEE ZHI YI JOVONE
Response · 0

To keep the animal warm in harsh winter weather

C. The Dune Drakon

Learning Outcome(s)

Subject and Level

Subject	Level
Science	Primary 6

1-1 of 1

The **Dune Drakon** is a mythical reptilian-mammalian hybrid that thrives in the harsh desert.

It has:

- Scaly, reflective skin
- Hump-like fat storage on its back (similar to a camel)
- Elongated, clawed limbs with wide, padded feet
- Body markings that glow faintly at night
- A long, forked tongue that senses vibrations in the air
- Venomous fangs and a sharp beak
- Gills-like nasal slits

In addition,

- It is active at night.
- It hides in the sand or under rocks.
- It reduces activity in the day.
- It licks dew, eats moisture-rich prey.
- It hides and waits for prey instead of chasing.
- It spreads wings to release heat.

ITT1

Structural Adaptation | Purpose of Adaptation | View All

Choose one STRUCTURAL adaptation mentioned in the description text of Dune Drakon

EMMA AMELIA BINTE MOHAMMAD ZAMRI

Structural Adaptation

EMMA AMELIA BINTE MOHAMMAD ZAMRI

Response · 0

Venomous fangs and sharp beak

Purpose of Adaptation

EMMA AMELIA BINTE MOHAMMAD ZAMRI

Response · 1

To kill prey easier

ITT2

Behavioural Adaptation | Purpose of Adaptation | View All

Choose one BEHAVIOURAL adaptation mentioned in the description text of Dune Drakon.

PEREIRA BETHANY-JEAN THERESA

Behavioural Adaptation

PEREIRA BETHANY-JEAN THERESA

Response · 0

- It hides and waits for prey instead of chasing.

Purpose of Adaptation

PEREIRA BETHANY-JEAN THERESA

Response · 0

So that it can sneak up on its prey instead of wasting energy to chase after the prey.

7. Student Learning and Outcomes

STUDENTS' WORK

D. Create Your Own Creature

Learning Outcome(s)

Subject and Level

Subject	Level
Science	Primary 6

1-1 of 1

In this section, you will be given the chance to create your own creature, by working together with your classmates.

You and your team's mission is to **create your own fictional creature** that has special adaptations to help it survive in a specific environment. But here's the twist — **you will not tell your classmates the environment** your creature lives in... they have to guess it!

Consider both structural adaptations, which are physical features of the creature, and behavioural adaptations, which are the ways the creature acts to survive in its environment.

For example, a creature might have long legs for running fast (structural) and might hunt at night to avoid predators (behavioural). After creating your creature, think about its habitat and how its adaptations help it thrive there. Share your creature with your classmates, who will guess the habitat based on the adaptations you describe.

Instructions for Creation

Follow these guidelines as you and your team create the creature.

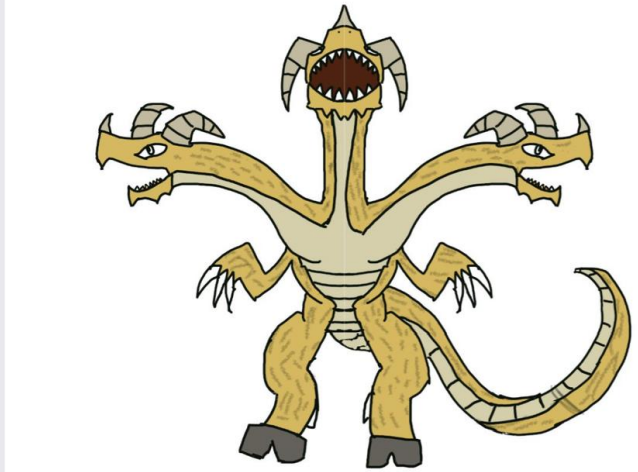
1) What is your creature called? What does it look like?
Give your creature a creative name and describe its size, shape, and special features.
2) List **at least 3 body parts or physical features** your creature has.
Explain how each one helps your creature survive.
3) List **at least 2 behaviours** your creature uses to survive in its environment.
4) Draw your creature and upload its image in the box below.
Label at least 3 of its important features.
5) Let your classmates guess the habitat and get them to tell you why they say so
To be filled in by your peers after your presentation.

I think this creature lives in a: _____

Why? _____

structural adaptation
-long legs to run fat and catch prey
-venomous fangs to poison the prey
-strong claws to have a firm grip on the prey
Behavioral adaptation
-hunts a t night to avoid predators
-hides and waits for prey instead of chasing
-spreads its wings to release heat

Thick Shaggy Fur
Insulates its body against subzero temperatures, like a polar bear's coat.
Icy Horns and Spines
Made of dense, frost-coated bone used for defense and breaking through ice layers.
Massive Clawed Feet
Provide traction on slippery ice and help dig into snow to create dens.
Blizzard Camouflage
Its white-gray coat blends into snowy landscapes, making it nearly invisible during storms.
Cold-Blooded Metabolism
It can slow its heart rate and enter a semi-hibernation state during food shortages.
Snow Burrowing
Digs deep into snowbanks or glaciers to rest and hide from threats.
This creature is called the Frostthorn Wyrm



This is a mythical creature that goes by the name King hydra. Its three heads make hunting food more successful and can get sight of even the tiniest movement of their prey. Its padded hooves make walking easier, with talons at the back to stab prey. It's long tail not only can be used for balance, but as protection from predators.

NEW SPECIES FOUND!

6D SCIENTISTS HAVE DISCOVERED NEW SPECIES...

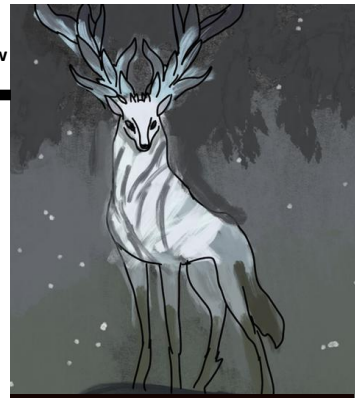
WHERE IN THE WORLD?

Help the 6D scientists identify the habitat of these new species.

FROST DEER

This half deer half bird hybrid can hide its wings to look weak.
Its glowing horns can attract its prey.
Its fur helps to keep warm, and the small ears helps it lose heat slowly in its environment. It will fight in front of its target mate and hide its wings to attract prey.

Habitat : _____



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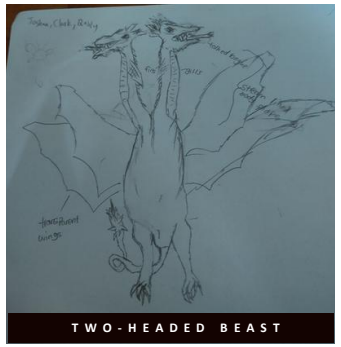
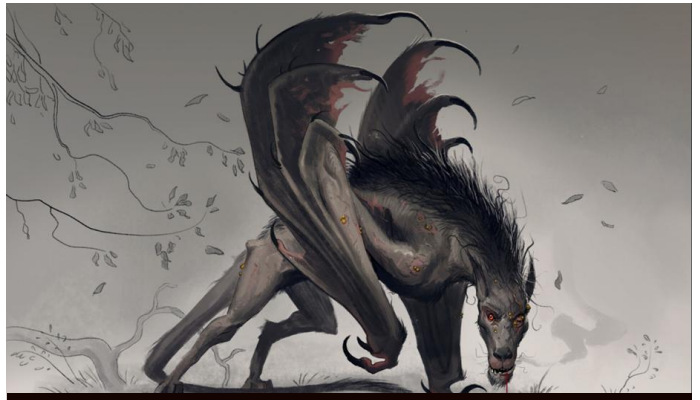


TWO-HEADED BEAST

TWO-HEADED BEAST

Structural adaptations of the beast include having a streamlined body shape, gills and fins. It uses its strong tail to constrict its prey and dark colour to blend into the surrounding. It travels in groups for more successful hunts, and echolocation to find its prey. It also has the ability to make its own burrow to rest.

Habitat : _____



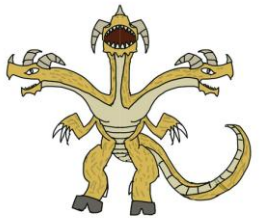
DRACO WILD

WHERE IN THE WORLD?

DRACO WILD

Draco Wild's long legs can run fast to catch prey. Its venomous fangs are able to poison its prey in seconds, making it the most terrifying predator. Its strong claws have a firm grip on the prey. Its behavioural adaptation includes hunting at night to avoid being detected by its prey. It hides and waits for prey instead of chasing, a clever way to conserve energy. It spreads its wings to release heat to the surrounding.

Habitat : _____



THE KING HYDRA

The King Hydra's three heads make hunting food more successful and it can get sight of even the tiniest movement of their prey. Its padded hooves make walking easier, with talons at the back to stab prey. Its long tail not only can be used for balance, but as protection from predators.
Habitat : _____

WHERE IN THE WORLD?

ZHA'THIK

ZHA'THIK
Zha'thik is as big as a magelodon. it is one of the fastest creature in its habitat.
It breathes through its gills. Its red eyes to lure prey in the dark. it has a streamlined body and strong fins to swim fast.

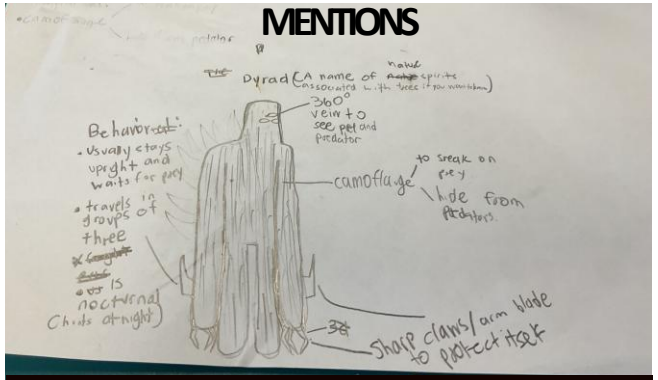
Habitat :
_____

FROSTTHORN WYRM

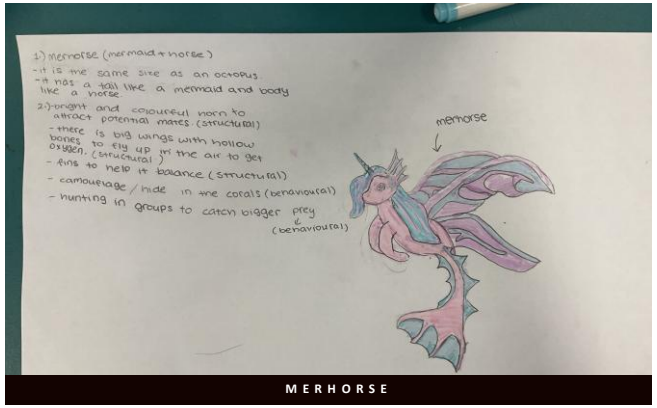
Its thick shaggy fur insulates its body against subzero temperatures.
Its icy horns and spines, made of dense, frost-coated bone used for defense and breaking through ice layers. Its massive clawed feet provide traction on slippery surfaces and help dig into surfaces to create dens.
Its white-gray coat blends into the surrounding, making it nearly invisible during storms. Interestingly, it can slow its heart rate and enter a semi-hibernation state during food shortages. Its burrowing ability enables it to dig deep into surfaces to rest and hide from threats.

Habitat :
_____

WHERE IN THE WORLD - OTHER WORTHY MENTIONS



DYRAD



MERHORSE

STUDENTS' REFLECTION

What I Have Learned

ITT

Question 1 | Question 2 | Question 3 | View All

DOWNLOAD RESPONSES

What is something **new** I learned about adaptations?

TOH JUN ONN JAYVEN
Response · 0

I learned that all adaptations have a purpose and what the purpose is

WONG JIE XIAN MATTHEW
Response · 0

there are two different types of adaptation

PI ZWEL WIN
Response · 0

Every adaptation helps the animal survive in its habitat

MUHAMMED FIRASH BIN MUHAMMED...
Response · 0

There are specific body parts and behaviors to survive in some areas

JOVAN TAN YONG XI
Response · 0

There are different ways that animals behave as an adaptation

DHIYA NYLA ARISSA BINTE SHEIKH AB...
Response · 0

i have learnt that every adaptation has a purpose.

ITT

Question 1 | Question 2 | Question 3 | View All

DOWNLOAD RESPONSES

What do I understand **better now** about how organisms survive?

CHUA YI HENG, AYDEN
Response · 0

I understand that animals have structural adaptations and behavioural adaptations which each has a purpose to ensure its survival. Eg:
Camels: They have a hump like storage on its back to store its supplies and feed on it when travelling longer distances so as to not die of starvation.

LIM MINHAO
Response · 0

adaptactions are very important

WONG JIE XIAN MATTHEW
Response · 0

They adapt based on the environment

What I Have Learned

ITT

Question 1 | Question 2 | Question 3 | View All

DOWNLOAD RESPONSES

What helped me understand this topic better?

PI ZWEL WIN
Response · 0

My science journal

RIFAL ELHAN BIN MUHAMMAD RIZAL
Response · 1

When mrs Ganesan gave us projects like in section d and when she breaks doewn the topic into groups

WU JIAYI MIRABEL
Response · 0

i understand by doing the creature creating

CHENG ZHI XUAN TRICIA
Response · 0

Mrs Ganesan breaking the topics into different parts afterwards helping us understand by stitching the different parts together helping us understand further

NUR INSYIRAH BINTE MUHAMMAD RI...
Response · 0

the topics that are being broken into different parts

JATHAN ANG ZHE YI
Response · 1

Learning about real examples, like the Dune Drakon in the desert and frostrex in the Arctic, helped me understand this topic better. These examples showed me how animals have different adaptations to survive in hot or cold places. It also helped that the information was explained in simple words I could understand.

MIKHAIL D'ANGELO BIN MUHAMMAD ...
Response · 0

the activities that our class did (eg,Padlet,etc).

WONG JIE XIAN MATTHEW
Response · 0

The types of adaptation

CHUA YI HENG, AYDEN
Response · 1

Each adaptation has a purpose for its survival and that each and every animal has an adaptation to ensure its own survival made me understand adaptations better.

8. Findings and Impact

What did we actually see?

STUDENTS GO FROM :

IDENTIFYING → EXPLAINING → APPLYING

Stronger conceptual connections

Students increasingly articulated that adaptations have a purpose and support survival in particular environments.

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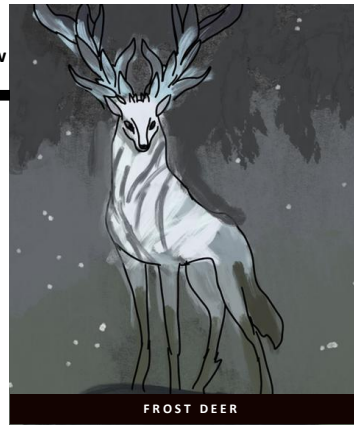

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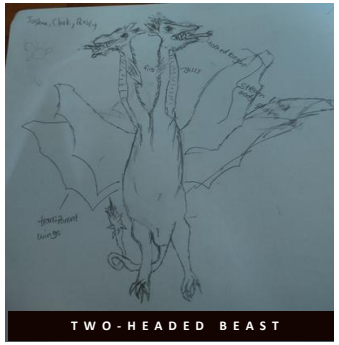

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Habitat : _____

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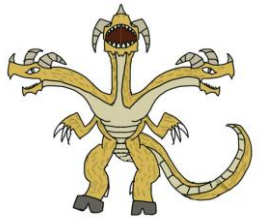

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Habitat : _____

Greater application of knowledge

Students used structural and behavioural adaptations to design fictional organisms and infer habitats—requiring them to apply concepts in a new context.

Learning became more visible

Students' observations, explanations, peer responses and reflections are captured, giving teachers access to thinking.

The integration of AI and SLS supported more interactive learning and students' understanding of the relationship between adaptations and survival.

Quote:
"Every adaptation helps the animal survive in its habitat."

9. Reflection and Professional Learning

What did we learn as teachers?

- Start with the lesson design, not the tool.
- AI can create possibilities—but pedagogy creates the enduring understanding for students.
- Making students' thinking visible matters.

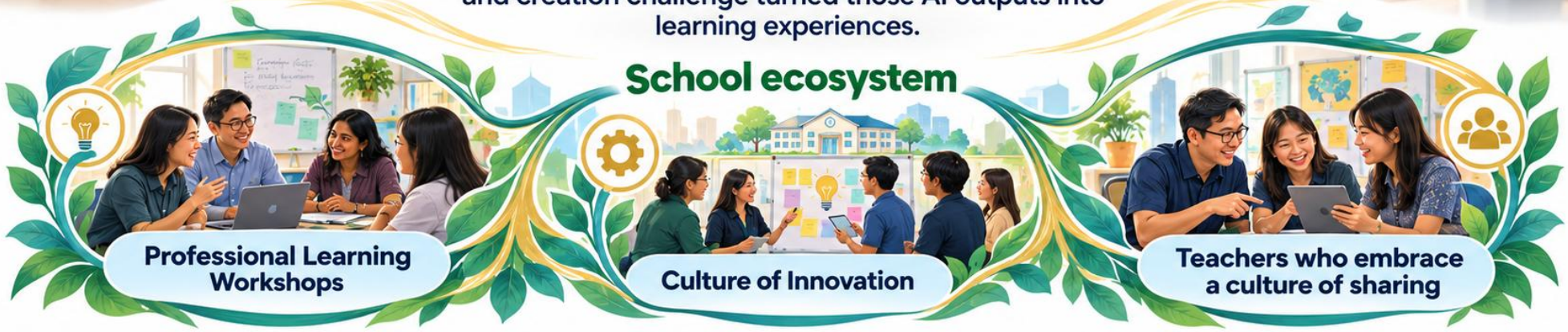
Start with the learning, not the tool.

The AI-generated creatures were useful – removing reliance on students' prior knowledge and requiring them to reason from evidence.

AI can create possibilities— but pedagogy creates the learning.

The teacher-designed questions, tasks, peer discussion and creation challenge turned those AI outputs into learning experiences.

School ecosystem



Making students' thinking visible matters.

Teachers given a window into students' emerging understanding, misconceptions and explanations, allowing the lesson to move beyond

"Did they complete the task?" towards

"How are they thinking?"

10. Implication and Future Directions

What we propose...

PURPOSE BEFORE PROMPT

Identify the conceptual learning first. Then decide whether AI adds value.

AI AS PROVOCATION, NOT ANSWER

Use AI to generate situations, representations or questions that students must investigate.

4 principles

THINKING BEFORE CREATING

Require students to explain, justify, compare or evaluate before/alongside producing an AI-supported artefact.

MAKE THINKING VISIBLE

Use SLS or other digital spaces to capture students' reasoning, reflection and peer feedback—not just their final products.

How can the learning from the Lesson Study inform future practice?

The question is not :
"How can we use AI in this lesson?"

The better question is :
"What can students understand or do better because AI is purposefully designed into this learning experience?"

Without the AI-enhanced design	With the AI-enhanced design
Identify adaptations	Explain the purpose of adaptations
Study familiar animals	Reason about unfamiliar organisms
Give an answer	Justify an answer
Consume information	Analyse and create
Produce a final response	Make thinking visible through SLS
Teacher sees the product	Teacher sees the learning process

11. Conclusion

Purposeful usage of AI creates opportunities for students to

1) apply scientific concepts,
2) think critically and creatively,
3) collaborate with others, and
4) make their understanding visible.

When teachers remain the learning architects, and AI is purposefully integrated to support delivery, students achieve deeper understanding and more meaningful, future-ready learning science.

40th (ACT+1) Pre-Convention Concurrent Session Feedback Form for 22 Oct

Q & A

Thank You!