KRONOSAURUS KORNER
RICHMOND OUTBACK QUEENSLAND

Year 10 Teacher's Notes

Rationale:
The students will learn how the diversity of living things is a result of evolution by natural selection. Through discussing similarities between their classmates and families, they will investigate the link between variable features and genetic diversity. They will learn how genes are passed down through generations and that genetic mutations can result in new features. They will also learn that evolution can occur over time when populations are isolated. By studying anatomical features of fossils in Kronosaurus Korner, they will learn how different ancient animals evolved from a common ancestor. They will suggest how the evolution of novel features helped these creatures survive.
The students will be engaged by activities suited for various learning preferences, with new information processed with the use of visual sources (observing the features of students and fossils) and auditory sources (listening to class discussions). They will also enjoy working in groups and reporting on shared features.

Learning Outcomes:
Cognitive:
Students will:-
1. Recognise that evolution by natural selection is responsible for the origin of different living things.
2. Learn that physical and genetic variability exists within populations and that genes are passed down through generations.
3. Realise that organisms can evolve different adaptations when populations become isolated.
4. Comprehend that different fossil forms share anatomical similarities and common ancestors.

Affective:
Students will:-
5. Be excited to compare the different anatomical features.
6. Appreciate communicating with the teacher and other students.
7. Be excited to be on an excursion outside of the classroom.
8. Enjoy working in groups.

Procedural/Skill:
Students will:-
9. Develop their observational skills through studying different anatomical features.
10. Refine their communication skills through discussions with their teacher and fellow students.
11. Improve their teamwork skills in working in groups.
12. Advance their data entry skills by recording information in tables.

Resources:
Activity Sheets 1 and 2.

Note:
This lesson is intended to follow a guided tour of Kronosaurus Korner. Tours should highlight themes relating to the learning outcomes within these notes. Teachers wanting to run this lesson without a visit to Kronosaurus Korner can find information on creatures from the Eromanga Sea from:

www.kronosauruskorner.com
Clode, D. (2009). Prehistoric Life of Australia's Inland Sea. Melbourne: Museum Victoria Publishing.

For related teachers' notes and activity sheets, please go to www.kronosauruskorner.com.

Year 10 Teacher's Notes

Procedure:
Engagement:
Following a tour of Kronosaurus Korner, groups of four students will complete Task 1 of Activity Sheet 1. Each person will pick a set of features within their group, such as different hair styles and record how they vary. They will share their notes with others in their group and enter all of their findings in a table. Following the completion of Tasks 2, the teacher will ask for examples of rare and common features in the groups. The teacher will state that anatomical features vary within populations. They will outline the concept of natural selection - that in nature, specific anatomical features may help some individuals reproduce and survive compared to others of their own species. These anatomical features that are helpful for survival are called adaptations. Because adaptations are beneficial, they often occur more commonly in populations over multiple generations and may become more pronounced. This process drives the evolution of new species.

Lesson steps:

1. The teacher will state that students also share features within their families. The students will be asked how features are shared in families (answer: features are expressed by genes that are passed down from parents to offspring via reproduction). The teacher will explain that siblings share genes and features that are passed down from common ancestors - their parents, grandparents and so on. The students will be asked to complete Tasks 3-4 of Activity Sheet 1.

2. The class will gather around the *Kronosaurus* and elasmosaurid displays. The teacher will ask for the age of the plesiosaurs from the Eromanga Sea (answer: 115-100 million years old). The teacher will state that their common ancestor is known from fossils over 200 million years old. Anatomical features shared between these creatures can be seen in their fossils. In completing Task 5 of Activity Sheet 2, the students will study the plesiosaur fossils and list shared anatomical features.

3. The teacher will ask if students noticed different adaptations between the plesiosaurs. The students will suggest how these different features appeared. The teacher reinforces that genes are affected by rare mutations, resulting in new features. Over many generations, ongoing changes in features may result in the evolution of new species. This may happen over thousands or millions of years when populations are isolated by barriers. Isolation stops different populations from reproducing together, so variations and mutations are not shared between groups. Populations become more different the longer they are separated. If environmental conditions differ between barriers, populations may evolve different adaptations for survival.

4. The students will complete Tasks 6-7 of Activity Sheet 2.

Conclusion:

5. The students will be asked to hand in their work if they're finished. They will be asked to explain the concept of natural selection and how features are passed down from parents to offspring. The teacher will recap the major points from today's lesson, including key messages on natural selection, adaptations, common ancestors, fossils, genetic mutation, isolation and evolution.

Homework:
Students who haven't completed Activity Sheets 1 and 2 can finish any remaining tasks for homework based on information at www.kronosauruskorner.com.

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Year 10 Activity Sheet 1

Name: _____

Task 1. Students will work together in groups of four. Each person will pick a set of features within their group and record how it varies. They will then share their notes with other individuals in their group and record all of their findings in the table below:

Hair colour	Brown	Blonde	Black	Red	Other
Number					

Hair style	Short	Straight	Curly	Wavy	Other
Number					

Eye colour	Brown	Green	Blue	Hazel	Other
Number					

Height	Short	Medium	Tall
Number			

Task 2. What were the rarest and most common features amongst the group?

Task 3. What features do you share with your family?

Task 4. How are features passed on from parents to offspring?

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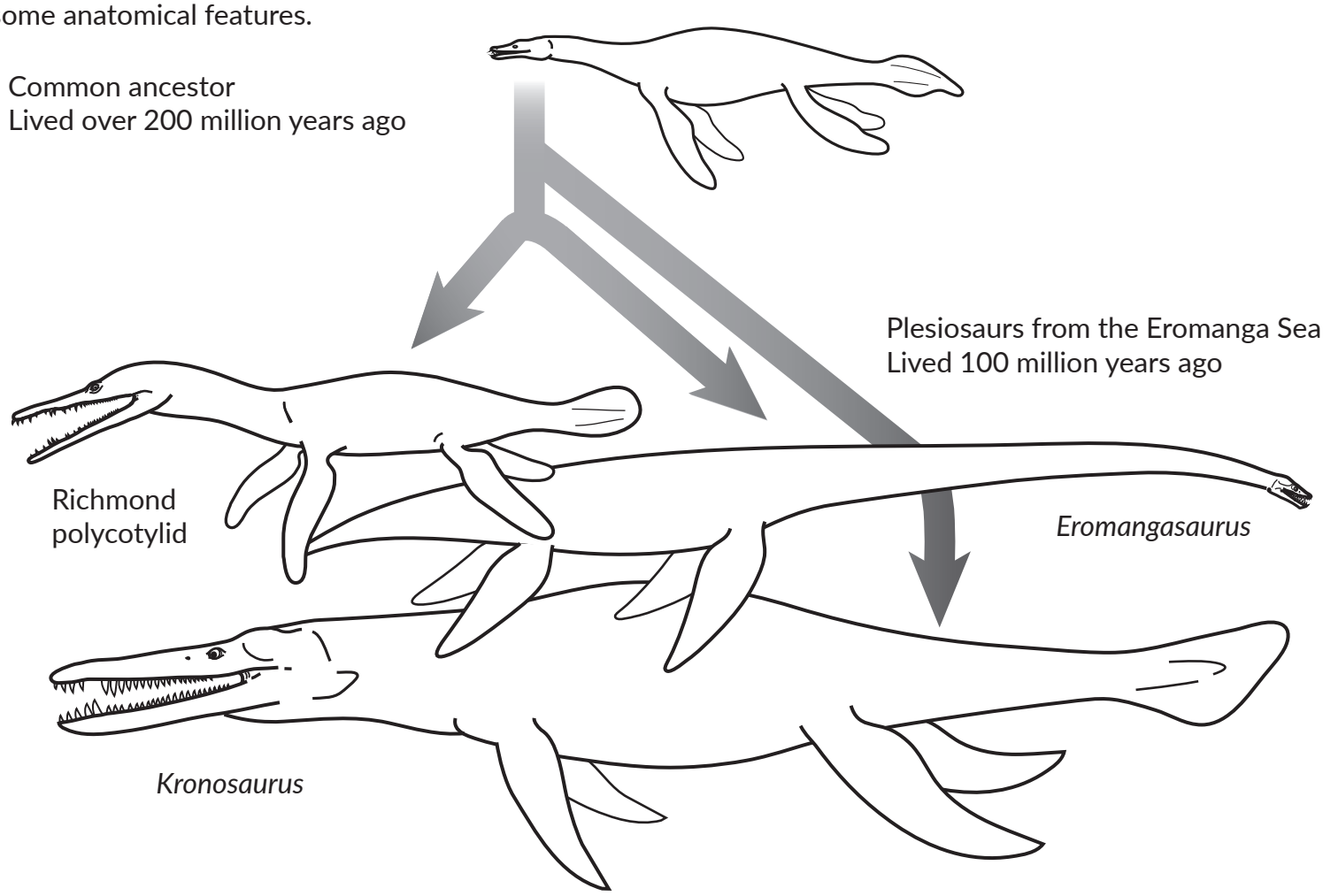
Year 10 Activity Sheet 2

Name: _____

Different plesiosaurs lived in the Eromanga Sea, including *Kronosaurus*, *Eromangasaurus* and the Richmond polycotylid. These creatures evolved from a common ancestor that lived millions of years earlier and share some anatomical features.



Task 5. By observing their fossils, list two anatomical features shared by these plesiosaurs.

Task 6. The plesiosaurs from the Eromanga Sea also differ in some adaptations. List one adaptation for each plesiosaur and suggest how it may have been used for survival.

Task 7. How did these new adaptations appear in plesiosaurs descended from a common ancestor?