

## Fossil Forensics Facilitated Program

**Overview :** Can you help us solve a mystery? Deep in an underground cave lie the remains of an extinct marsupial predator. Analyse the clues using forensic techniques to deduce how this animal died, and what it might have been like when it was alive.

In this lesson, students will investigate fossils, animal skulls and other clues to piece together the past.

**Duration :** One hour facilitated experience with a Museum Education Officer.

Please allow approximately 45 minutes additional time for self-guided gallery exploration using Student Activity sheets.

### What your class will experience:

- Learn about the discovery of skeletal remains of an extinct Australian marsupial predator.
- Investigate elements of the unique and significant Museum project to recover and study the remains.
- Participate in hands-on activities that reflect the examination and reconstruction of the animal's skeleton.

### Excursion Booking and Enquiries:

For enquiries and bookings please contact:

Western Australian Museum – Perth  
Education

Phone: 9427 2792

Fax: 9427 2883

Email: [education@museum.wa.gov.au](mailto:education@museum.wa.gov.au)



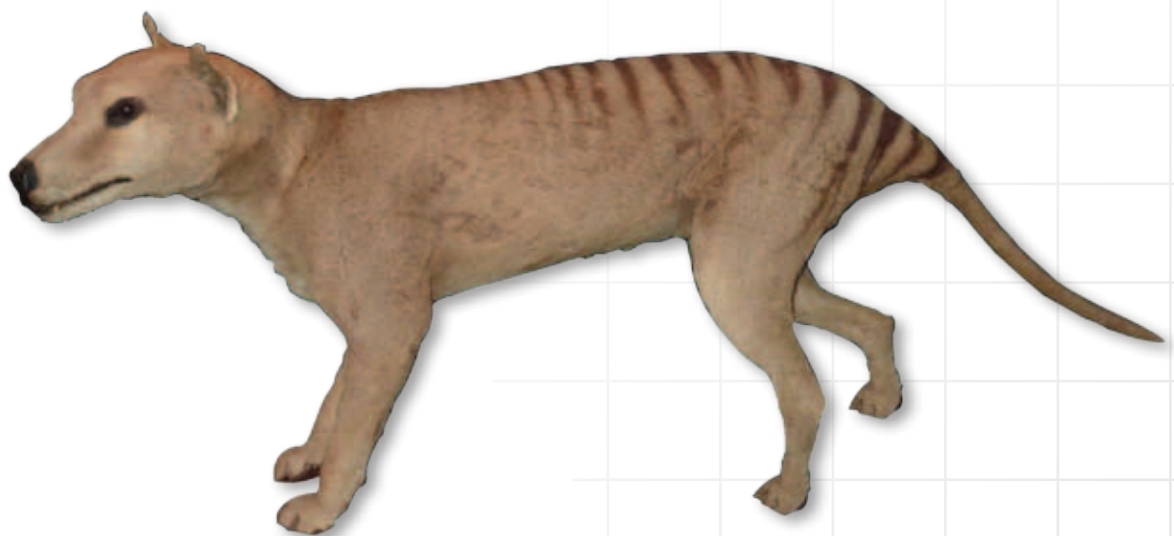
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## Student Activity Sheets

- Photocopy**  
*Fossil Forensics* Student Activity sheets (for every student)



# Links

## Curriculum

### Science

#### Life and Living

*Students understand their own biology and that of other living things and recognise the interdependence of life.*

#### Investigating

*Students investigate to answer questions about the natural and technological world, using reflection and analysis to prepare a plan; to collect, process and interpret data; to communicate conclusions and to evaluate their plan, procedures and findings.*

### Key Messages

1. Fossils and skeletal remains can teach us about the appearance, habitat and behaviour of extinct animal species.
2. Fossil evidence can reveal how an animal died, or what happened in the time frame just before it died.
3. Evidence from the past can help us to understand how Australia's landscapes, flora and fauna have changed over time.

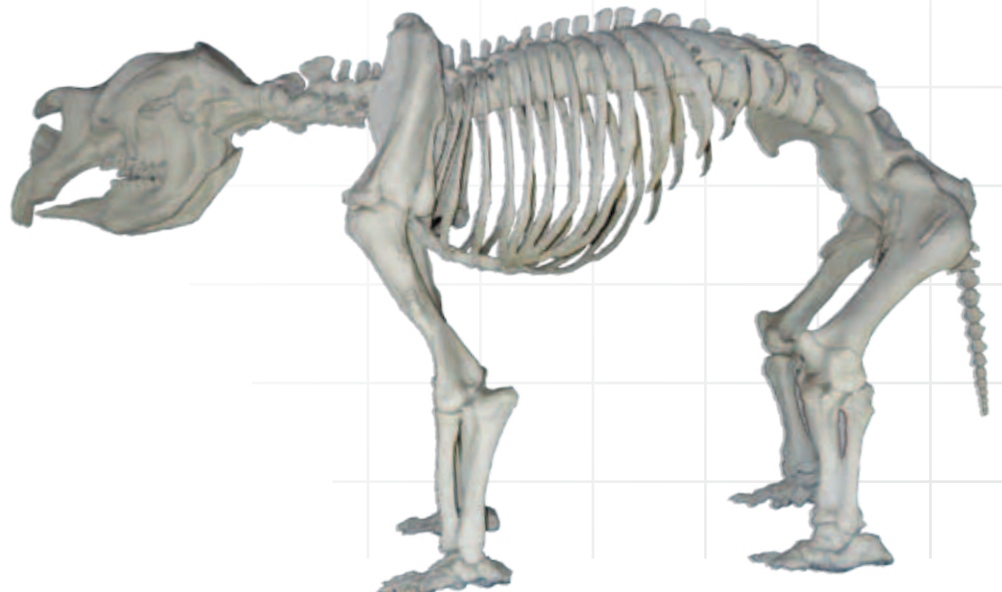
## Galleries



**Western Australia: Land and People**  
Hackett Hall, Level 1



**Diamonds to Dinosaurs**  
Jubilee Wing, Level 2



## At the Museum

### Facilitated Program

One hour

The facilitated component of *Fossil Forensics* takes place in one of the Museum's learning spaces. This hands-on investigation, facilitated by a Museum Education Officer, guides students through forensic techniques that support the discovery, recovery, examination and reconstruction of the skeletal remains of the 'marsupial lion' - *Thylacoleo carnifex*.

Discovered in an underground cave on the Nullarbor Plain in 2002, a near-complete *Thylacoleo* skeleton was the subject of a significant project undertaken by a team led by the *Western Australian Museum*.

**Please have your students split into four or five groups for this experience (depending on the number of students and adults). Each group will require one adult supervisor to assist them with the activities.**

### Self-guided Experience

Approximately 45 minutes

The self-guided component of *Fossil Forensics* takes place in the Museum's galleries. Using the questions contained within the Student Activity group leaders will be able to assist as they explore our collection of fossil-related exhibits.

Please allow for time to explore the galleries before or after your facilitated program. Maps are available at the Front Desk to assist you in locating these galleries, or please ask a staff member for directions.



#### Photocopy

**Please bring with you on the day of your excursion:**

- *Fossil Forensics* Student Activity sheets (for every student)

### Related Museum Resources

#### Planning Your Excursion

- Excursion Management Plan
- Excursion Essentials



Available online at [museum.wa.gov.au/education](http://museum.wa.gov.au/education)

### Classroom Activities

From this list, please select some activities that are suitable for the age and ability of your students.

- **Fossil fun:** Gathering evidence from examining fossilised remains can help us to understand the past.
    - Create a class brainstorm of information that can be obtained from a skeleton (such as age, broken bones, tooth shape, size of bones, hip width, etc).
    - Research some examples of well-known human and animal remains that provide specific information (eg. mummified body of Tutankhamun, body casts from Pompeii, bog bodies from Northern Europe and frozen specimens of Woolly Mammoth).
    - Make a chart that matches facts that we know about dinosaurs to the clues that inform us of these facts. For example, tooth and jaw shape indicate an animal's diet, plant fossils may suggest habitat, leg bones and footprints give clues to an animal's locomotion, and complete skeletons allow us to compare size and shape to living animals.
  - **Do a diorama:** Use modelling clay and other materials to make a 'Museum' display about an extinct animal, including information panels with a brief description.
- Conservation:** Imagine that a chosen extinct Australian species was discovered alive today (for example, a pair of Thylacines were discovered in local bushland).
- Students work in teams to develop a plan to help this species survive (and thrive), including strategies to identify and minimise threats, analyse the animals' natural habitat and requirements, develop a safe breeding ground and to raise awareness of the animal's existence once its safety is assured.
  - Students could find out about existing conservation projects for threatened Australian species.
- **PMI analysis:** What would it be like if extinct Australian animals were alive today? Draw up a 'PMI' (Plus, Minus, Interesting) chart and host a class discussion, recording the potential positive, negative and interesting outcomes of this animal species living in their local environment today.
  - **Timelines:** The class can develop a pictorial timeline of the various periods in geological history, highlighting the evolution and extinction of groups such as the dinosaurs, mammals, megafauna and humans.

## DVD Activities:

Available for purchase, please enquire at time of booking.

- *Bone Diggers – Mystery of a Lost Predator* DVD: \$20 per school group.

This *Western Australian Museum* production is a documentary that follows the discovery, recovery and research of the Thylacoleo skeleton. This DVD will consolidate what is learned during the excursion and should be viewed in the days following the Museum visit. Please find related activities in the Suggested Activities section.

Following the Museum visit, view the DVD *Bone Diggers – Mystery of a Lost Predator* and select any of the activities below:

- Make a list of the jobs for the people involved in the *Western Australian Museum's* Thylacoleo expedition, based on observations from viewing the DVD. Discuss how projects such as this involve a range of experts.
- Students write a diary, newspaper article or re-enact an interview with one of the team members involved in the discovery, recovery or research of the Thylacoleo skeleton. Students can use available resources, as well as their existing knowledge to build up a bank of questions and answers about the discovery before adapting the information to an article or an interview format.
- Students imagine that they are embarking on an important field trip to the Nullarbor Plain to find more cave specimens. Make a list of the equipment required for the expedition.
- Develop a flow-chart outlining each stage of the Thylacoleo project, including the discovery of the cave, the recovery of the remains, the research of each part of the body and the unveiling of the skeleton display at the museum.
- In groups, students can make a model of the cave where Thylacoleo was discovered. This can include using scale measurements and investigating ways to present the cave, such as in a cross-section.
- Explore the reasons why animal remains were so well preserved in the cave, including environmental conditions, lack of predators, etc.

## Related Classroom Resources

### Publications

Clode D. (2009). *Prehistoric Giants: the Megafauna of Australia*, Museum Victoria, Melbourne, Victoria.

Long J. (2009). *The Short, Tragic Life of Leo the Marsupial Lion*, Western Australian Museum, Perth, Western Australia. (Best to read after the Museum visit.)

Long J. (2004). *Gogo Fish!: The Story of the Western Australian State Fossil Emblem*, Western Australian Museum, Perth, Western Australia.

McNamara K and Murray P. (2010). *Prehistoric Mammals*, Western Australian Museum, Perth, Western Australia.

# Fossil Forensics Student Activity Sheets

## Photocopy

*Fossil Forensics* Student Activity sheets (for every student).

## How to use Student Activity Sheets

Use the questions contained within these sheets to encourage discussion as students explore the Museum's galleries.

## Galleries

You will visit two galleries. The following icons are used within this document and the Student Activity sheets to identify which gallery you should be in.



**Western Australia: Land and People**  
Hackett Hall, Level 1



**Diamonds to Dinosaurs**  
Jubilee Wing, Level 2

# Fossil Forensics



Investigate  
our Museum's  
amazing fossils.



## Meet the Megafauna


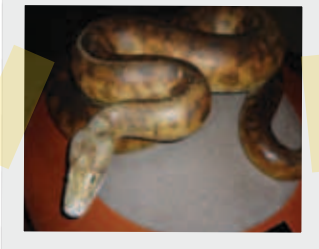

Fossils come from all sorts of plants and animals, not just dinosaurs.

Megafauna (big animals) like the Woolly Mammoth and the Sabre-toothed Tiger might be well-known, but they did not make it to our shores. Australia's Megafauna, giant relatives of our native species, went extinct between 10,000 and 50,000 years ago.

Read the labels to find out what we have discovered from these animal's fossils.

Use your own detective skills to circle your answer and fill in the blanks:



			
	<i>Zaglossus</i>	<i>Wonambi</i>	<i>Zygomaturus</i>
<b>Classification</b>	Mammal   Reptile   Bird	Mammal   Reptile   Bird	Mammal   Reptile   Bird
<b>Body covering</b>	Fur   Scales   Feathers	Fur   Scales   Feathers	Fur   Scales   Feathers
<b>Diet</b>	Herbivore   Carnivore	Herbivore   Carnivore	Herbivore   Carnivore
<b>I can be compared to</b>	Kangaroos   Pythons Echidnas   Koalas Wombats   Emus	Kangaroos   Pythons Echidnas   Koalas Wombats   Emus	Kangaroos   Pythons Echidnas   Koalas Wombats   Emus
<b>Interesting fact</b>			

Why do scientists think the Australian Megafauna went extinct?

The answer is in this gallery:




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# Diamonds to Dinosaurs

Jubilee Wing, Level 2

## Trapped in Time

Explore the amazing fossils in *Diamonds to Dinosaurs* and discover the information that they reveal.



This prehistoric event took just a few minutes, but was preserved in rock for 540 million years. Find this amazing fossil. Explain what was happening as this trilobite became trapped.



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Which ocean predator did this come from?

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How big was it? 

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If this tooth was the only clue, how could you figure out how big the animal was?

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WESTERN AUSTRALIAN  
museum



# Diamonds to Dinosaurs

Jubilee Wing, Level 2

## Buried Treasures

Sometimes scientists can examine a group of fossils that were found in the same area, and use these clues to figure out what might have happened just before they became fossilised.



Find the collection of insects and marine life preserved in limestone. Read the information panel to learn how this prawn ended up buried so close to this dragonfly.

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Explain how scientists think this fish may have become so twisted.

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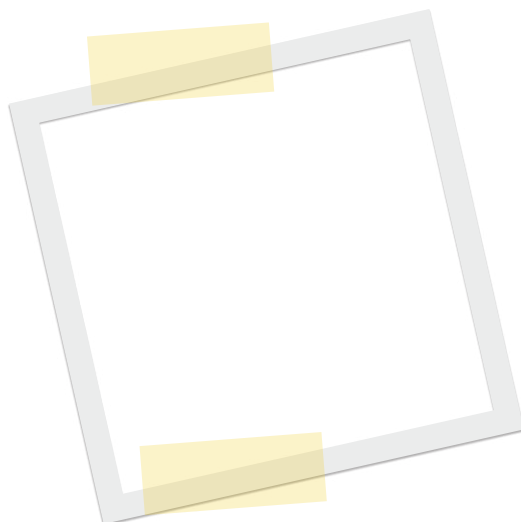
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How old are these fossils?

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Choose one animal in this display that closely resembles its modern equivalent and draw it here:



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**MUSEUM**





# Diamonds to Dinosaurs

Jubilee Wing, Level 2

## Dino Detectives

Discover the connections that can be made by comparing fossils and from examining where they are found.



Look at the two skeletons on either side of the skull. Which one would the middle dinosaur look most like? Give a reason for your answer.

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Why is this fossil so special?



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The man who found this ammonite fossil first thought it was a

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This fossilised shell was found hundreds of kilometres from the coast, in a desert region. What does that tell you about this area of land and how it use to look?

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Scientists knew that this enormous egg came from an elephant bird from Madagascar. How did it end up on a Western Australian beach?



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museum



# Diamonds to Dinosaurs

Jubilee Wing, Level 2

## Ancient Animals

Not all fossils are dinosaurs. Not all fossils are bones. Not all fossils are millions of years old. Explore this area to discover the different types of fossilised evidence that can be found.



Approximately how old is this amazing specimen?

\_\_\_\_\_

What parts of the body have been preserved?

\_\_\_\_\_

How did it last so well? \_\_\_\_\_

\_\_\_\_\_

Where was this mummified body discovered?

\_\_\_\_\_

What does this animal's location tell you about the Thylacine (Tasmanian Tiger)?

\_\_\_\_\_



### Find the rest of this animal's skeleton.



Do you think this skeleton is older or more recent than the Thylacine?



This skeleton was discovered on the Nullarbor Plain. What are the advantages of discovering such a complete skeleton?

- We can find out more about how the animal moved.
- We can compare many body features to living animals and guess what it might have eaten.
- We can make a more accurate model .
- All of the above.



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# Mammal Gallery

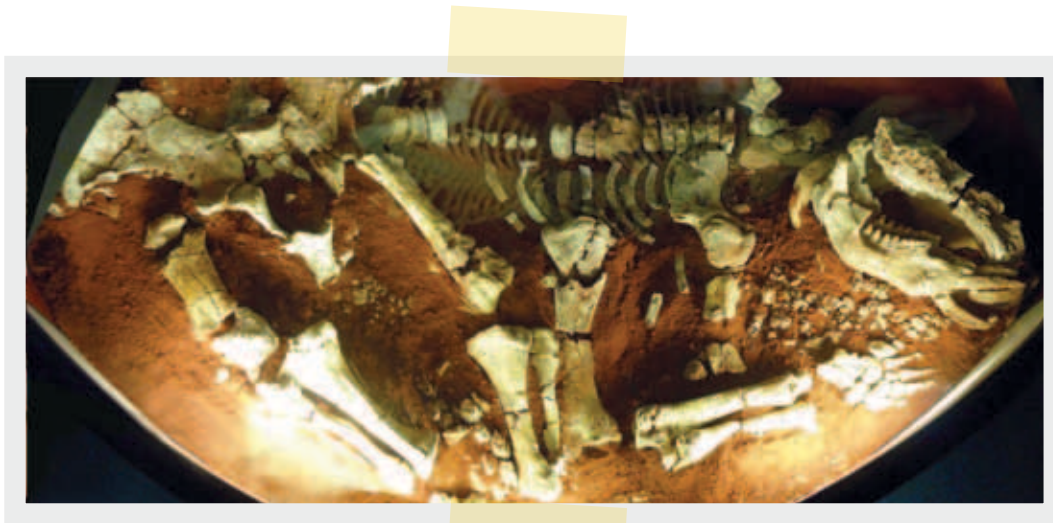
Jubilee Wing, Level 1

## Making Models

Scientists and other experts are able to study an animal's remains to figure out what it looked like so that they can create realistic models, like the ones you might have seen in other parts of the Museum.



Draw lines from the labels to the correct body parts on the Diprotodon fossil, the model skeleton and the drawing of what it may have looked like.



- Ribs
- Pelvis
- Jaw
- Vertebra
- Toes



Find out more about this fossil. Were all of the bones from the same animal?



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