

JUNIOR PALAEO INVESTIGATORS

PROGRAM OVERVIEW

TOPIC: Carnivores/herbivores and dinosaur/non-dinosaur

THEME: Discovering differences between carnivores and herbivores and understanding certain characteristics that differentiate dinosaurs from other animals.

PROGRAM DESCRIPTION: Everyone likes solving a mystery! In this program, students will discover how palaeontologists use clues from the past to learn about ancient life. Through a variety of challenges and activities, they'll use their detective skills to identify herbivores and carnivores, and to understand the differences between dinosaurs and other animals.

AUDIENCE: Grades 2 – 3

CURRICULUM CONNECTIONS

Grade 2 Science: Small Crawling and Flying Animals

Grade 3 Science: Animal Life Cycles

PROGRAM OBJECTIVES

Students will be able to:

1. Identify the differences between herbivores and carnivores.
2. Recognize a wide variety of fossils and identify whether they belonged to a herbivore or carnivore.
3. Identify the difference between dinosaurs and other animals.
4. Exercise their co-operative and observational skills.
5. Develop analytical and hands-on skills.

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SUGGESTED PRE-VISIT ACTIVITIES

1. PROGRAM TERMINOLOGY

Following are some terms to introduce to your class before attending your program at the Royal Tyrrell Museum. These terms will prepare the students so they will get the full benefit of the program.

Carnivore: an animal that feeds exclusively on meat.

Herbivore: an animal that feeds exclusively on plant material.

Omnivore: an animal that feeds on both meat and plants.

Time Scale: showing the events of the Earth's history (like a calendar of Earth's life).

Palaeontology: the study of ancient life, based on the fossil record.

Palaeontologist: one who studies ancient life through fossils.

Habitat: the part of the physical environment in which an animal or plant lives (its home).

Vertebrate: animals possessing a backbone and skull.

Invertebrate: animals without a backbone and bones in general.

Reptile: an animal covered in scales, breathes with lungs, cold-blooded.

Mammal: warm-blooded animal that feeds its offspring milk.

Ceratopsian: horned dinosaurs that lived during the Cretaceous Period.

Mosasauro: a type of marine reptile that lived during the Cretaceous Period, closely related to living lizards.

Mammoth: a relative of the modern elephant, covered in a thick coat of fur that lived during the Quaternary Period.

Raptor: a type of bird-like carnivorous dinosaur. Small to medium sized and lived from the Jurassic to the Cretaceous. Nickname for the group of dinosaurs called dromaeosaurs.

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SUGGESTED PRE-VISIT ACTIVITIES

2. FEATHERS ON DINOSAURS?

Have your students draw their favourite dinosaurs covered in feathers. Initiate some discussions like:

- Why might it be a good thing to have a coat of feathers? (warmth, scare away predators, attract a mate, etc)
- Which types of dinosaurs could have feathers? Would *T. rex*? Would *Triceratops*? Would a dromaeosaur (raptor)?
- Do feathers mean that the dinosaur could fly? Do all feathered creatures fly? What kind of feathers are needed for flight?

Evidence for feathered dinosaurs:

<http://blogs.discovermagazine.com/d-brief/2013/09/20/dinosaur-feathers-found-in-ancient-amber/>

http://www.sciencedaily.com/articles/f/feathered_dinosaurs.htm

http://www.amnh.org/science/papers/velociraptor_feathers.php

<http://esciencenews.com/articles/2012/10/25/canadian.researchers.discover.fossils.first.feathered.dinosaurs.north.america>

Needs a free registration: <http://news.nationalgeographic.com/news/2010/01/100127-dinosaurs-color-feathers-science/o/>

Royal Tyrrell Museum: http://tyrrellmuseum.com/media/Feathered_Dinosaurs.pdf

(Keywords: feathered dinosaurs, colour of dinosaur feathers, Velociraptor had feathers)

3. NOT JUST DINOSAURS

Let's see what the students know about the creatures that lived in the past with dinosaurs. Brainstorm as many creatures as you can. Lead the children to think about groups of animals like fish, amphibians, reptiles, mammals, birds, insects, etc. This will prepare them to identify the mystery creature(s) they will be investigating during Junior Palaeo Investigators!

<http://www.enchantedlearning.com/subjects/dinosaurs/mesozoic/>

<http://www.enchantedlearning.com/subjects/dinosaurs/dinoclassification/Notdinosaurs.html>

Natural History Museum: <http://www.nhm.ac.uk/nature-online/life/dinosaurs-other-extinct-creatures/>

4. NOT JUST THE AGE OF DINOSAURS

Not all extinct creatures were dinosaurs, and not all extinct creatures lived with dinosaurs. Pick a period of time, like the Ice Age, and brainstorm as many creatures as you can. Which are extinct? Which are not? What are some of the differences in the creatures that have survived? What adaptations did these creatures have to survive the cold?

Ice Age Mammals <http://www.enchantedlearning.com/subjects/mammals/Iceagemammals.shtml>

(Key words: ice age extinction, ice age animals, extinct creatures)

Links to Other Websites

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POST-PROGRAM ACTIVITIES

1. MORE MYSTERIES!

Now that your students are trained Palaeo Investigators, they need to keep up their skills! There are many other animals (dinosaurs and non-dinosaurs) that could become mystery creatures. Here is how you can create a mystery creature for your class to solve its identity.

- Print a picture of an ancient creature and cut it into puzzle pieces.
- Give clues about the animal's body to reveal if it is a herbivore or carnivore.
- Give clues about the animal to reveal if it is a dinosaur or non-dinosaur.
- Slowly add pieces to the puzzle until a student guesses the creature!

For an added challenge, have students work in groups with a mystery creature and let them create the clues for their classmates! Here are some good places to find pictures of ancient creatures:

<http://www.enchantedlearning.com/subjects/dinosaurs/mesozoic/>

<http://www.enchantedlearning.com/subjects/dinosaurs/dinoclassification/Notdinos.html>

(Keywords: ancient creatures, dinosaurs, non-dinosaurs)

Note to Teachers: If you wish, this activity can be done with modern creatures (maybe some from the local environment); only create clues for carnivore/herbivore.

2. ONE OF THESE THINGS IS NOT LIKE THE OTHER!

Not all creatures can be classified as herbivores or carnivores. What do you call something that eats dead things? Or bits and scraps? Plants and animals? Choose some animals and have the class investigate what they eat. Are there things they have in common? Can you tell by a creature's skeleton whether it is a scavenger? An omnivore? What if it doesn't have a skeleton?

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POST-PROGRAM ACTIVITIES

3. *T. REX*: SCAVENGER OR PREDATOR?

Why would a predator choose to eat something that was already dead? What could happen to a predator during an attack on living prey?

Do you think *Tyrannosaurus rex* was an active predator, scavenger, or both?

Search some information on the web about this topic.

<http://dinosaurs.about.com/od/dinosaurcontroversies/a/trexhunter.htm>

<http://www.sciencedaily.com/releases/2013/07/130716135841.htm>

(Keywords: *Tyrannosaurus rex*, scavenger or active predator?)

4. THIS AND THAT

Compare an extinct dinosaur with a modern mammal that has similar features (i.e. rhinoceros/*Triceratops*, giraffe/sauropod, ankylosaur/armadillo). Even though they are not related, they look alike and have similar ways of life.

Do they eat similar things? Do they live in similar habitats? Do they live in herds or on their own? Can we try to understand how dinosaurs live by learning about today's animals?

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ONLINE RESOURCES

University of California, Berkeley

<http://www.ucmp.berkeley.edu/diapsids/dinosaur.html>

Website on evolution and dinosaurs

<http://www.pbs.org/wgbh/evolution/extinction/dinosaurs/>

Includes links to dinosaurs and geology

<http://en.wikipedia.org/wiki/Paleontology>

Bristol University

<http://palaeo.gly.bris.ac.uk/>

Website for younger grades

<http://www.enchantedlearning.com/subjects/dinosaurs/>

Smithsonian Institute

<http://paleobiology.si.edu/>

National Geographic

<http://animals.nationalgeographic.com/animals/prehistoric/>

The Discovery Channel (current dinosaur discoveries)

<http://dsc.discovery.com/tv-shows/curiosity/topics/paleontology.htm>

Up-to-date scientific reports on dinosaur science

http://www.bbc.co.uk/sn/prehistoric_life/dinosaurs/

American Museum of Natural History, New York

<http://www.amnh.org/exhibitions/permanent-exhibitions/fossil-halls>

Natural History Museum, London

<http://www.nhm.ac.uk/nature-online/life/dinosaurs-other-extinct-creatures/dino-directory/index.html>

Walking with Dinosaurs

http://www.abc.net.au/dinosaurs/dig_deeper/faq.htm#five

Links include videos, sound buttons, virtual tours, interactive quizzes, databases and timelines

<http://www.dinosaur.dkonline.com/>

Up-to-date information on all aspects of science, including geology and palaeontology

<http://www.sciencedaily.com/>

(Keywords: Evolution, dinosaurs, geology, Discovery channel, Natural History Museum of London, American Museum of Natural History, Smithsonian Institute, Science daily, Palaeontology)

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