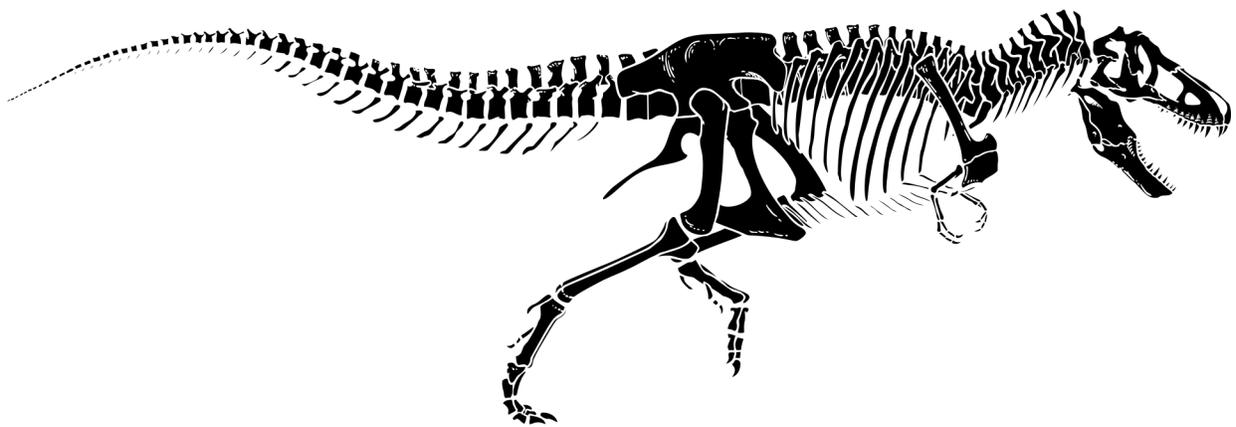


Functional Morphology

Allosaurus and *T. rex* hand claws

Grade Range: 6-8th grade

Created by: DeepTime Fossils





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Visit us online at:

<https://www.DeepTimeFossils.com>

Or in person at:

Rocky Mountain Dinosaur Research Center
201 S Fairview St, Woodland Park, CO 80863

Functional Morphology- *Allosaurus* and *T. rex* hand claws

As you work on this lesson, take notes and write your observations down. Don't forget to draw! You don't have to produce a work of art or show it to anyone. The act of drawing is a great way to develop your observation skills and have something cool to keep when you're done with the lesson!

Objectives

1. Observe and learn how different **structures** in an organism influence behavior or what those **structures** can tell us about their behavior.
2. To observe and interpret **structures** in cast fossil material.
3. To observe and be aware of **functional morphology** and how it operates in all living things.

Materials

Notebook and pencil

Access to animals, plants, or other **organisms** or photos online.

Deep Time *Allosaurus fragilis* and *Tyrannosaurus rex* hand claws or pictures of them online.

Allosaurus fragilis hand claw: <https://www.deeptimefossils.com/product-page/allosaurus-hand-claw>

Tyrannosaurus rex hand claw: <https://www.deeptimefossils.com/product-page/t-rex-hand-claw>

Terminology
Organism- an individual entity that embodies the properties of life. Plants, animals, fungi, bacteria, etc. are all organisms.

Manus- the furthest portion of the forelimb. Your hand is an example of a manus.

Structure- any biological entity that takes up space and is distinguishable from its surroundings.

Tissue- a group of cells that share the same origin that together carry out a specific function.

Functional Morphology- the study of the relationships between the structure of an organism and the function of the various parts of an organism.

Further Reading:

Functional Morphology in Vertebrate Paleontology by Jeffrey J. Thomason

[https://en.wikipedia.org/wiki/Morphology_\(biology\)](https://en.wikipedia.org/wiki/Morphology_(biology))

Background

Organisms have different structures in their bodies that serve different functions. By studying these structures, we can learn more about how that organism might behave.

For example, eagles have very large eyes and keen vision. From this we can infer that eagles use their eyesight a lot. When we observe them in the wild, we notice that they spot prey on the ground from high in the air. Their large eyes help them to hunt for food.

As another example, cacti have special **tissues** that hold and conserve water. From this we might infer that cacti need to store water because they don't have regular access to it. We observe in the wild that cacti live in dry climates.

Functional Morphology is the study of the function of different **structures** in an **organism** and how those structures relate to the behavior of that organism.

When we study dinosaurs and other fossils, we can directly observe the structures that those ancient organisms had when they were alive. By studying those structures, we can infer how the animals used them and learn something about their behavior.

We know that *Tyrannosaurus rex* was a huge predator that preyed on animals like *Triceratops* and the duckbill *Edmontosaurus*. *Tyrannosaurus rex*, often called *T. rex*, lived all over what is now western North America 68-66 million years ago. It was a carnivore and an apex predator in its environment. *T. rex* was one of the largest land carnivores of all time, reaching sizes up to 43ft and up to an estimated 8.8 metric tons in weight.

Allosaurus fragilis, although smaller than *T. rex*, was still a large predator. They lived in the same part of North America but about 80 million years earlier and preyed on animals like *Stegosaurus* and younger *Apatosaurus*. It was also an apex carnivore in its environment. *Allosaurus fragilis* averaged 28ft in length and an estimated 2.3 metric tons.

By comparing the teeth or claws of *Tyrannosaurus rex* and *Allosaurus fragilis*, we can learn a lot about how similar they were and about the different predatory strategies they used.

Activity One

Select any animal and take what you already know about living organisms and use that to infer something about their behavior.

1. What animal is it and what features does it have? Wings, legs, claws, large eyes, etc..
2. Either here or in your notebook, write down what these features might tell you about this animal. Feel free to make a drawing!
3. Is **functional morphology** restricted to animals? When plants have poisonous fruit, broad leaves, or tissues that conserve water, what does that tell us about how the plants operate?
4. Either here or in your notebook, write down what these features might tell you about a plant. Feel free to make a drawing!

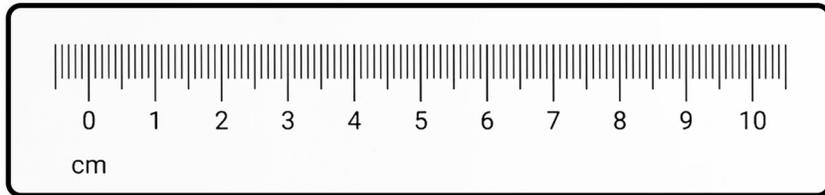
Activity Three

Take what you have learned so far and use it to keep learning about other organisms.

1. Can you think of examples of how we can apply these lessons to other kingdoms? Fungi or bacteria, for instance? Write, draw, or discuss your observations:

2. Can you find other examples of organisms with specialized structures that use those structures for a specific purpose? Go outside, look pictures up online, or find another way to examine this concept. Have fun!

***Allosaurus fragilis* Hand Claw**



***Tyrannosaurus rex* Hand Claw**

