What Does It Eat?

Nature of Science: Ask testable questions and make a falsifiable hypothesis about using properties in perform separations, and design a method to find an answer. (DOK 2-4)

**Be sure to refer to the "Students will know" section of your unit plan for crucial concepts that should be a part of teaching and learning in this unit.

Background Knowledge:
This activity is designed to connect students to the natural history of the Grand Valley. Students will be able to make connections between modern and prehistoric ecosystems in regards to predators and prey, as well as understand that different types of teeth have evolved to eat different foods.

Grade Level: 4	Learning Event: Using casts of teeth to determine what animals of the past ate.
Learning Objective/Target: Just like today, animals of the past consumed different foods. The different dental adaptations between animals living in the same time and place enabled them to eat different food sources, allowing them to thrive, reproduce, and pass their genes down to the next generation. S2 C1 EO a. Use evidence to develop a scientific explanation of what plants and animals need to survive (DOK 1-3) S2 C1 EO b. Use evidence to develop a scientific explanation for similarities and/or differences among different organisms (species) (DOK 1-3) S2 C1 EO c. Analyze and interpret data representing variation in a trait (DOK 1-2) S2 C1 EO d. Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate questions about characteristics of living things (DOK 1-2) S2 C2 EO a. Use evidence to develop a scientific explanation for: 2. What conclusions can be drawn from similarities between fossil evidence and living organisms (DOK 1-3) S2 C2 EO c. Evaluate whether reasoning and conclusions about given fossils are supported by evidence (DOK 1-3)	Essential Questions: • What similarities do the dinosaurs share with modern animals? • How can understanding the present help us interpret the past? • How can small variations in physical characteristics lead to large changes in survival?

Materials/Resources: - *Allosaurus* tooth casts (CPW 1, CPW 2) - *Camarasaurus* tooth casts (CPW 8, CPW 9, CPW 10, CPW 11) - *Ceratosaurus* tooth casts (CPW 3, CPW 4, CPW 5)	Assessment Options: • Presentation of diet hypothesis to class • Peer review of diet hypotheses by classmates

- *Apatosaurus* tooth cast (CPW 6, CPW 7) - Types of teeth presentation (on PPT – slides 65-67 on "The Grand Valley – Paleontology.pptx") - Plants of the past (on flash drive – "Plants of the Past.pptx") - *Camarasaurus* Skull PDF	

PREPARE AHEAD OF TIME:

Review the appropriate fossil casts and the PPT going over dietary choices before going out to Mygatt-Moore Quarry. There is also a brief video on the flash drive associated with the activity that reviews the animals and plants from the Jurassic of the area. Students will use casts of fossils from the Morrison formation in groups. Students should use rulers or paper scale bars (the template for the second is provided on the flash drive).

Suggested Procedure:

1. Background: Describe how teeth can be used to determine what animals used to eat.
    a. Ask students to explain what herbivore and carnivore teeth look like
    b. Give examples of modern organisms and their teeth
    c. Explain how animals that eat similar things can have different-shaped teeth to take advantage of different prey or different plants/parts of the same plant
    d. Model how to describe the teeth in basic terms, such as comparisons to everyday objects (pencils, spoons, knives)
2. Take students to Mygatt-Moore and review the fossils in the kit on-site
    a. Explain to students that they will have to examine and describe the teeth provided with the kit while on the trio
    b. Walk Trail Through Time to the *Camarasaurus* skeleton
    c. Have students identify which teeth in the kit are from *Camarasaurus*, based on the teeth impressions (see *Camarasaurus* Skull PDF)
    d. Have students explain to each other and to instructor why non-*Camarasaurus* teeth belong to different animals
        i. Have students justify their conclusions about the teeth of *Allosaurus, Apatosaurus,* and *Ceratosaurus* (i.e. serrations, size, shape, pointed tip, etc.).
3. Back in classroom:
    a. Review the "Plants of the Past" PowerPoint with the class
    b. Students need to sort the teeth into broad categories (carnivore, herbivore) based on fieldtrip activities
    c. Students should justify their categorization
    d. Students then need to hypothesize what specific plants *Camarasaurus* was eating
4. Ask students/groups to justify their hypotheses to each other
    a. This can be out loud, in a chart, or in a written format
5. Explain to students that science isn't about 100% agreement all the time (as students will likely have disagreements about things). Students should take away that tooth shape can be used by paleontologists to interpret diet, and that small differences in tooth shape can indicate a big difference between two closely related species diets.

Resource Links:	Speaking & Listening Connections:
• Video on Flash Drive.	• Students should be presenting their diet hypotheses to the class

	• Students should be critically listening to their classmates in order to assess the strength of their arguments
Extension: • Students write a letter to biologist or paleontologist, explaining why they think a certain prehistoric animal they studied ate what it did.	**Teacher Notes:** •