



Teacher Guide



Denali's Dinosaurs

Comparing and Contrasting Animal Traits

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Lesson Overview

Animals leave clues behind that we can use to learn about them. In Denali, paleontologists have discovered clues from dinosaurs that lived here during the Cretaceous period. These clues include tracks, coprolites (fossilized poop), and skin impressions. In the distance learning program, students will interact with a ranger and go back in time 70 million years to observe Denali's dinosaurs. By examining the clues the dinosaurs left behind, students will gather information about these extinct creatures. At the end of the program, students will have the opportunity to create their own dinosaur, giving it traits that they learned about during the lesson.

Lesson Objectives

Students will be able to:

1. Describe, compare, and contrast the diet, physical features, and social habits of the three dinosaurs observed.
2. Describe the types of trace fossils found in Denali, including tracks, skin impressions, and coprolites.

Next Generation Science Standards addressed

- **K-LS1-1.** Use observations to describe patterns of what plants and animals need to survive.
- **1-L3-1.** Make observations to construct an evidence-based account that young plants and animal are like, but not exactly like, their parents.
- **2-LS4-1.** Make observations of plants and animals to compare the diversity of life in different habitats.
- **3-LS3-1.** Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.
- **3-LS3-2.** Use evidence to support the explanation that traits can be influenced by the environment.

Common Core Standards addressed

- **W.K.7** Participate in shared research and writing projects. **(post activity)**
- **SL.K.1** Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.
- **SL.K.2** Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification of something that is not understood.
- **L.K.6** Use words and phrases acquired through conversations, reading and being read to, and responding to texts.
- **1.RI.1** Ask and answer questions about key details in a text.
- **W.1.8** With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- **SL.1.1** Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.
- **W.2.8** Recall information from experiences or gather information from provided sources to answer a question.

- **SL.2.1** Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
- **SL.2.2** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
- **W.3.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. **(post activity)**
- **SL.3.1** Engage effectively in a range of collaborative discussions with diverse partners on *grade 3 topics and texts*, building on others' ideas and expressing their own clearly.
- **SL.3.3** Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.
- **MP.2** Reason abstractly and quantitatively.

Suggested Lesson Progression

Before Distance Learning Program

- 20-30 minutes: student reading, pre-activity, and questions

During Distance Learning Program

- 45-60 minutes: Zoom session

After Distance Learning Program

- 30-45 minutes: post activity

Background Information

In Denali National Park and Preserve, thousands of trace fossils have been found that give paleontologists clues as to which dinosaurs lived here in the late Cretaceous period. Tracks, skin impressions, and coprolites (fossilized dung) found in Denali help us understand which dinosaurs lived here and how they survived in this environment. During this lesson we will focus on three dinosaurs from Denali:

- **Edmontosaurus:** This hadrosaur ate low lying plants. It had a long, flattened snout with no front teeth but hundreds of teeth at the back of its mouth to grind, chomp, and crush rough plant material. It was about the size of a bus with a long, thick tail to help it balance when running. Edmontosaurs roamed in herds to better protect themselves from predators.
- **Pterosaur:** This flying reptile ate fish. It had up to a 25 foot wingspan but weighed about as much as a microwave. It had slim, hollow bones to help it fly easily. It had a manus on each wing that helped it walk, climb, and tear food.
- **Troodon:** This theropod ate lizards, insects, and other dinosaurs. It was 3-6 feet tall and weighed less than 200 pounds. It had a large brain for its size and hunted in packs like wolves. It had large eyes that allowed it to see in its low-lit habitat, and binocular vision that let it spot prey from a distance. The troodon had sharp claws for grabbing small animals. Its sharp, serrated teeth allowed it to easily kill and eat its prey.

All animals have distinct traits that allow them to survive. Paleontologists study dinosaur fossils in order to better understand these traits. Certain traits, like sharp teeth, allow carnivores to kill and eat their prey. The traits of dinosaurs can be compared to learn about their social behavior and diet. Please read the Denali's Dinosaurs – Student Reading for background information on the discovery of Denali's fossils and the role of paleontologists.

Before the Distance Learning Program

Time: 20 - 30 minutes

Materials

- Student Reading – Denali's Dinosaurs (one copy per student or read aloud)
- Animal and Food Scavenger Hunt Cards (1 animal per student; materials for 5 students per 1 copy- make additional copies as needed)

Getting Ready

1. **Check computer setup.** This is a good time to make sure your computer setup and Zoom connection is functioning properly. Check with a Denali Education Specialist if you have any questions and to perform a pre-conference connection.
2. **Student reading.** Students are asked to read a short background about Denali National Park and Preserve's dinosaurs. Decide whether you want them to read this as homework, in class individually, or together as a class.
3. **Prepare for Student pre-activity.** Copy and cut animal and food cards for the scavenger hunt.
4. **Submit class questions.** Have students collectively identify three questions they want to ask the education staff at the end of the videoconference session. Please submit these questions after completing the learning activities below, to the Education Team at Denali_education@nps.gov at least 24 hours in advance of the Zoom session.

Procedure

1. **Introduce Denali.** Tell students that they are going to have the opportunity to meet the education staff in an online videoconference session. Tell students that Denali National Park is located in Alaska. Ten years ago, dinosaur fossils were discovered in Denali. These fossils have given us clues as to what types of dinosaurs lived here. Tell students that these clues can teach us a lot about the dinosaurs. Explain that the rangers will help them learn more about Denali, but they need to prepare for the conference by finding out a bit more about Denali, the kind of scientists that study dinosaur clues, and what Denali's dinosaurs ate.
2. **Student reading.** Have students read (as homework, individually, or together as a class) a short background about Denali National Park and Preserve's dinosaurs. Discuss the information found in the reading.
3. **Animal and Food Scavenger Hunt.** This activity gives students a background on animals that currently live in Denali and what they eat. Students are introduced to the dinosaurs we will be learning about during the distance learning program and the vocabulary that will be used in the program (predator, prey, herbivore, and carnivore). Let students hunt for their food! Hide the food cards throughout the classroom. Food cards are labeled with a utensil symbol in the bottom corner. Give each student an animal card. Explain that the picture they are given represents the animal they are pretending to be. Students need to find the cards that are hidden

around the room that match the foods listed on their animal card. Students will search for their food, returning to their seats when they have found one of each food listed on their card.

- Define herbivore and carnivore. Ask students who have an herbivore animal card to stand up. Repeat with the carnivore animal card.
- For students who have carnivores, define predator and prey. Ask these students to hold up the picture of the **predator** and then the **prey**.
- Explain that these animals currently live in Denali National Park. Tell students that we have clues of what used to live in Denali long ago. Next, students will repeat the activity with animals that used to live in Denali.
- Pass out the Dinosaur Predator Cards, explaining that paleontologists have found clues that these animals lived in Denali.
- Repeat this activity using the dinosaurs and their food.

During the Distance Learning Program

Time: 45-60 minutes

Materials

For each student

- Pre-Activity - Student Reading (Optional)

For the class

- 2 paper airplanes (1 weighed down with 10 pennies taped along the spine)
- 2 5 foot sheets of aluminum foil

(Please have materials prepared and ready to go for the program. They will be used to show the students how dinosaur's light bones helped them fly and how their tracks can tell Paleontologist whether dinosaurs were walking or running.)

Getting Ready

1. **Student volunteers.** During the distance learning session, student volunteers will be needed for the following activities: paper airplane activity (1 student), track activity (2 students). Keep this in mind as the videoconference session proceeds and be ready to identify the selected students.
1. **Establish Zoom connection.** Expect an email with a connection link at least 15 minutes prior to the program.

Procedure

1. **Orient your students.** Before connecting via Zoom, show students the set-up and go over any standards of behavior students should follow during the session. Remind them that the education staff may not be able to see and hear everyone in the classroom, so they should look to you as an intermediary when they want to make a comment or ask a question.
2. **Connect with Denali.** At the designated time, click on the Zoom link to connect with the education staff. The program may last 30-45 minutes, depending on student input and questions.

3. **Let the communication begin!** Please be available to the education staff during the entire length of the program. At the end of the program, be ready to help facilitate questions.
4. **After the program.** Take some time after the program for students to discuss and provide feedback about their experience. If the class has further questions for the education staff, you can contact them at Denali_education@nps.gov.

After the Distance Learning Program

Post-activity

Time: 20-30 minutes

Materials

For Class

- Student Worksheet – Create a Dinosaur (one copy per student)
- Student Worksheet – Dinosaur Story (one copy per student; 2 options based on student ability)
- Trait Visual- project onto screen or make copies for students to share
- Coloring materials
- Pencils

Procedure

1. Give students a copy of the Student Worksheet – Create a Dinosaur.
2. Have students create and name a dinosaur using the traits covered in the lesson. Students should determine what their dinosaur eats and include those traits in their drawing. Students can refer to the visual included in the post activity document for guidance.
 - a. Carnivore traits: sharp teeth, big eyes, sharp claws
 - b. Herbivore traits: mouth for cutting leaves, strong legs for running, long necks
3. Have students write about their dinosaur. Fill-in-the-blank sheets and lined paper are included for students of different grades or abilities. Fill-in-the-blank answers could include: My dinosaur is the Stevesaurus. It eats plants. It has a long neck and grinding teeth. It travels in a herd. For those choosing the lined paper, writing prompts are provided below. You may choose which writing prompt to assign or give students the option.
 - a. Writing Prompt 1: Write a story about what would happen if the dinosaur you created came to your neighborhood. Does it live in a herd or alone? Is it a carnivore or herbivore? What would the dinosaur eat in your neighborhood? What would it do?
 - b. Writing Prompt 2: Write a story that details a day in the life of the dinosaur you created during the Cretaceous Period. Does it live in a herd or alone? Is it a carnivore or herbivore? What would the dinosaur eat? What would it do?

Extensions

- **Find animal clues in your neighborhood:** Discuss animals that live in your neighborhood. What clues do they leave behind? How can those clues teach us about them?
- **Create a Venn diagram:** Compare and contrast two of the dinosaurs students learned about today.