

## Dinosaurs

### *Lower Secondary*

#### Key Inquiry Questions

1. What is a fossil?
2. How do paleontologists find out information about dinosaurs?

#### Learning Outcomes

1. Students will be able to make a hypothesis based on observation by the end of the lesson.
2. Students will be able to explain how they know information based evidence by the end of the lesson.
3. Students will be able to give a report on a dinosaur using evidence and drawings by the end of the lesson.

#### Overview

In this lesson, students will be living the life of a paleontologist. Students will use their observation skills as well as find evidence to create and give information on dinosaurs. Students will begin the lesson by discovering what a fossil is as well as a paleontologist. Next students will work in partners on a worksheet called “Skeleton Dig”. Skeleton gives information and a picture of a real Tyrannosaurus Rex named Sue as well as questions for students to answer based on the information and picture they are given. After students complete the worksheet, students will create their own report on a dinosaur they have discovered. Students will include a picture of the dinosaur fossil they found, name of the species of dinosaur (does not have to be real), a one-page description of the dinosaur and a story about its life (based off of the evidence of the fossil), and predictions on the dinosaur. Students will turn this report in at the end for a grade.

#### Materials

##### **SolarSPELL Resource:**

1. “Skeleton Dig” worksheet (included below)
2. “Sue the Tyrannosaurus Rex Bone Info” (included below)

##### **Other:**

- Writing Utensil
- Paper

## Suggested Procedure

### *Before Lesson:*

- Where all students can see, draw a picture of a known animal (1) for students:
  - Dog, cat, cow, chicken, etc.
- Ask students what they already know about this animal.
  - Example, (if the animal were a cow), students might say:
    - Eats grass, large size, not a fast runner, not sharp teeth, has short fur, etc.
- After students have identified what they already know, ask students what a fossil is.
  - Fossil: the remains of a living or nonliving organism left in either a mold or form of a skeleton.
- Ask students, if they were to now find this animal as a fossil, what would they know about it?
  - From the answers students came up with, they should only answer with the things they know that have to do with just the bones.
- Explain to students that the rest of their answers, (eating grass, short fur, large in size), would now be considered educated guesses we would have to make based off of evidence.
- Tell students that paleontologists, a scientist who studies fossils, must do this with dinosaurs.
  - They mainly find out what they know about dinosaurs based off of what their bones say about them.
- Ask students if they know how fossils are formed.
  - Answer: an organism must be buried quickly. Once it is buried, the soft parts of the organism decay while the hardened rock forms around the organism.
    - It can be buried quickly by a volcano, water, or mud.
    - Must be buried fast otherwise other organisms may eat it instead.

### *During Lesson:*

- Explain to students that they will now become Paleontologists.
- Tell students to get with a partner to complete the worksheet.
- Print out the activity for each student: “Skeleton Dig”.
- **If printing is not available:**
  - Ask students to take out a piece of paper and write down the following questions:
    - Based on the teeth, what kind of food do you think Sue ate?
    - Write a hypothesis of why you think she has each bone damage.
  - After students have written down the questions, show students the image on the document labeled “Skeleton Dig”.
  - Tell students this is what you know about the skeleton:
    - **Sue the Tyrannosaurus Rex:**  
**Location:** Cheyenne River Reservation, South Dakota.  
**Size:** 12.3 meters long and 4.0 meters tall.

**Weight:** 8.4 to 14 metric tons.

**Bone Damage:** damaged shoulder blade, three broken ribs (all healed), and multiple holes in the skull.

- Ask students, with a partner and the following information, answer the questions.
- If students are curious if their hypothesis is correct, information about the bone damage on Sue has been included.

*After Lesson:*

- Tell students they are now going to become Paleontologists in a museum.
- Explain to students they have discovered a never found dinosaur and need to report back to the museum on their findings.
- Students reports must include:
  - A picture of the dinosaur fossil they found.
  - Name of the species of dinosaur (does not have to be real).
  - One-page description of the dinosaur and a story about its life (based off of the evidence of the fossil).
  - Tell students they can make predictions but must use the fossil to back up their prediction.
    - Example: this dinosaur is a meat eater because of its sharp teeth.

*Assessment:*

- Students will turn in their report for a grade.

# SKELETON DIG

**SUE THE TYRANNOSAURUS REX**

**LOCATION:** CHEYENNE RIVER RESERVATION,  
SOUTH DAKOTA.

**SIZE:** 12.3 METERS LONG AND 4.0 METERS  
TALL.

**WEIGHT:** 8.4 TO 14 METRIC TONS.

**BONE DAMAGE:** DAMAGED SHOULDER  
BLADE, THREE BROKEN RIBS (ALL HEALED),  
AND MULTIPLE HOLES IN THE SKULL.



Based on the teeth, what kind of food do you think Sue ate?

Write a hypothesis of why you think she has each bone damage.

## Sue the Tyrannosaurus Rex Bone Info

Close examination of the bones revealed that Sue was 28 years old at the time of death—the oldest *T. rex* known until Trix was found in 2013. A *Nova* episode said that the death occurred in a seasonal stream bed, which washed away some small bones. During life, this carnivore received several injuries and suffered from numerous pathologies. An injury to the right shoulder region of Sue resulted in a damaged shoulder blade, a torn tendon in the right arm due most likely from a struggle with prey, and three broken ribs. This damage subsequently healed (though one rib healed into two separate pieces), indicating Sue survived the incident. The left fibula is twice the diameter of the right one, likely the result of infection. Original reports of this broken bone were contradicted by the CT scans which showed no fracture.

Multiple holes in the front of the skull were originally thought to be either from a bacterial infection or bite marks by some other tyrannosaur. A subsequent study found these to be areas of parasitic infection instead, possibly from an infestation of an ancestral form of *Trichomonas gallinae*, a protozoan parasite that infests birds and ultimately leads to death by starvation due to internal swelling of the neck. Damage to the back end of the skull was interpreted early on as a fatal bite wound. Subsequent study by Field Museum paleontologists found no bite marks. The distortion and breakage seen in some of the bones in the back of the skull was likely caused by post-mortem trampling. Some of the tail vertebrae are fused in a pattern typical of arthritis due to injury. The animal is also believed to have suffered from gout. Scholars debate exactly how the animal died; the cause of death is ultimately unknown.

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Sue (dinosaur). (2019, July 14). Retrieved from https://en.wikipedia.org/wiki/Sue\_(dinosaur).