Sparking Discovery in the Classroom

TRAVELING
SCIENCE
WORKSHOPS

DISCOVERY MUSEUM

Dinosaurs

Teacher Resource Guide

Traveling Science Workshops are generously sponsored by:

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Learning Objectives

While investigating dinosaurs, children will…

- explore how fossils tell a story about plants and animals that lived a long time ago
- practice simple tool identification and safe use while excavating a mock paleontology dig site

Vocabulary

Body Fossil – A fossil preserving the body part of a living thing (examples: bone or tooth).

Coprolite – Fossilized animal feces.

Fossil – The remains or imprint of a living thing that lived a long time ago that has been preserved in rock form.

Paleontologist – A scientist who learns about living things that lived a long time ago by studying fossils.

Paleontology – The study of living things that lived a long time ago and have been preserved as fossils.

Trace Fossil – A fossil preserving trace remains of a living thing (examples: footprint, egg, coprolite, or skin imprint).

Connections to the MA Science and Technology/Engineering Curriculum Framework

Life Science, Grades Pre-K-2: Standard #5
"Recognize that fossils provide us with information about living things that inhabited the earth years ago."

Technology/Engineering, Grades PreK-2: Standard #2.1
"Identify tools and simple machines used for a specific purpose, e.g., ramp, wheel, pulley, and lever."

Materials

Circle Time

- Model Dinosaur (Preschool Only)
- Ribbon Timeline
- Coprolite
- *My Big Dinosaur Book* (Preschool Only)
- Paint Brush
- Sieve
- Pair of Safety Glasses

Dinosaur Egg Nest

- Images of Modern Types of Nests (1 set of images)
- Images of Dinosaur Nests & Eggs (8 Copies)
- 13 Oviraptor Eggs (Replicas)
- 6 Brown Bowls
- Natural Insulation Materials
- Images of Dinosaur Embryos (8 Copies)
- 6 Baby Louie Models
- Assortment of Dinosaur Books (Extension)

Mock Dinosaur Dig & Fossil Exploration

- Paleontologist's Notebook Recording Sheet
- Replica Dinosaur Fossil Identification Sheets (1 set)
- 6 Bins of Jurassic Sand
- 13 Paint Brushes
- 13 Pairs of Safety Glasses
- 13 Sieves
- Replica Duckbill Dinosaur Tooth Row
- Replica T-rex Tooth (Large)
- Replica T-rex Tooth (Small)
- Replica T-rex Brain Cast
- Replica Velpciraptor Claw with 2 Digits
- Replica Nanosaurus Rex Hind Foot
- Replica Grallator Track
- Replica dinosaur Track (Species Unknown)
- Replica Spinosaurus Tooth
- Replica Camarasaurus Claw
- Replica Nanosaur Skull
- Replica Iguanodon Thumb Spike
- Replica Dinosaur Skin Impression
- Replica Acrocanthosaurus Hand Claw
- Fossil Recording Sheets
- Model Dinosaur Skeletons (Preschool Only)
- Model Dinosaurs (Preschool Only)
- The Great Dinosaur Landscape (Extension)
- Fossil Rubbing Plates (Extension)
- White Paper (Extension)
- Rubbing Crayons (Extension)

Circle Time

- coprolite fossil Model Dinosaur
- Model Pterosaur
- Model Plesiosaur
- Model Wooly Mammoth
- Model Cave Man

Set Up:

Dinosaur Exploration Stations

- The students are divided into two groups and they spend fifteen minutes at each station.
- A classroom teacher assists Station Two while the TSW teacher facilitates Station One.
- Set up each station with designated materials prior to the start of the program.

Schedule (45 Minute Program)

Circle Time (7 minutes)

Today we are scientists. Scientists ask questions about the world and use their senses and tools to try to answer the questions.

Explore the children's prior knowledge on dinosaurs by asking:

- What is a dinosaur?
    - Have the children describe dinosaurs in their own words.
    - Did dinosaurs have fur?
        - Mammals have fur and dinosaurs are believed to have been reptiles, which have scales. There is now evidence that some dinosaurs had feathers.
    - Did dinosaurs swim in water/have flippers?
        - These were a different type of prehistoric reptile called plesiosaurs.
    - Did dinosaurs fly/have wings?
        - These were a different type of prehistoric reptile called pterosaurs.

- Has anyone ever seen a real, living, breathing dinosaur?

    - Dinosaurs became extinct (died out) before humans came into being.
        - Dispel the misconception, if present, that cavemen were alive during the time of dinosaurs.
    - Use the ribbon timeline as a visual representation of the earth's life and highlight the periods of time when the dinosaurs lived and when humans came into being, noting the period of time in between the two.*
- If no one has ever seen a real, living, breathing dinosaur, then how do we know about them?
    - Allow the children to share how they learned about dinosaurs.
    - Share that the information we have learned about dinosaurs in school, in books, on TV, and on the Internet was discovered by scientists.
        - Introduce "paleontologist," "paleontology," and "fossil" vocabulary words.

Explore how paleontologists identify fossils by:

- Introducing the mystery fossil (coprolite) to the children. Model how to unearth the fossil using safety glasses, paintbrushes, and sieves.
- Posing the question: "What is it?"
- Encouraging the children to use their senses to describe the fossil.
    - Children should have the opportunity to see, touch, and smell the fossil.
- Allowing the children to share their guesses to the identity of the fossil.
- Revealing the true identity of the fossil (dinosaur poop) and reviewing its characteristics.
    - Did it look, feel, or smell like poop? It has undergone a change. It was buried in the ground and over a long period of time it turned into rock, preserving the shape of the poop.
- Connecting the process the children just undertook to identify the mystery fossil with the process paleontologists use to identify fossils
    - Introduce "body fossil" and "trace fossil" vocabulary words with examples of each – be sure to mention eggs.
    - Paleontologists use their senses and tools to learn about the fossil.
        - Reminder about the safety glasses, paintbrushes, and sieves..
    - Paleontologists make comparisons to known fossils and living things still alive today.
    - Some information can never be determined, such as the type of dinosaur that created the coprolite.

We are going to study fossils to learn more about dinosaurs.

Preschool Adaptation: Before asking the first question, present a model dinosaur to the children and ask them to identify it (looking for animal type, not dinosaur species).

Story Suggestion for Preschoolers: *My Big Dinosaur Book*

Station One: Dinosaur Egg Nest (15 minutes)

Explore how paleontologists believe dinosaurs cared for their eggs by:

- Give each child a dinosaur egg and ask them to consider what it might be. Introduce that it is an egg once they have had some time to examine it and talk about their ideas. Examine scientific and artistic representations of dinosaur embryos and hatchlings.
- Discuss how present day eggs are cared for by their parents and brainstorming what a dinosaur would have needed to do to care for its eggs.

    - Nest

    - Warmth (Plant Insulation – every species may not have done this)
    - Protection from Predators
- Compare dinosaur egg nests to present day egg nests Examining and discussing replicas and photo representations of the fossil evidence.

- Encourage the children to care for their egg by working together to build insulated nests (children clean up their nests when they are finished).
    - Bowl = Mound of Earth – It can be used upside down or right side up.
    - Artificial plants can be used as insulation.

Extension Activity: Exploration of an Assortment of Dinosaur Books.

Station Two: Mock Dinosaur Dig & Fossil Exploration (15 minutes)

Explore how paleontologists excavate fossils, the diversity of dinosaur fossil types, and how paleontologists document fossils by:

- Excavating replica dinosaur fossils in a mock dig site practicing safe and proper tool use.
- Comparing and contrasting the variety of replica dinosaur fossils unearthed.
- Selecting a fossil to examine. Fill out a fossil recording sheet, which includes a drawing of the fossil, measurements of its length and width, a written description of its features, and a guess to its identify.*

*Children can fill out as many recording sheets as time allows.

Circle Time (5 minutes)

Continue exploring the diversity of fossil types by:

- Having the children share their guesses to the identities of the replica fossils.
- Revealing the true identities of the replica fossils (only focus on fossil type, not species, if need to save time).
- Classifying the fossils into “body fossil” and “trace fossil” groups.

Reinforce the general information learned about dinosaurs by:

- Having the children review an assortment of animal models and have the children identify the models that aren’t dinosaurs (pterosaur, plesiosaur, wooly mammoth, and cave man).
- Reviewing the process paleontologists go threw to discover and identify fossils (excavation using tools, comparison to similar fossils, and comparison to animals alive today).

Replica Dinosaur Fossils Identification Sheet

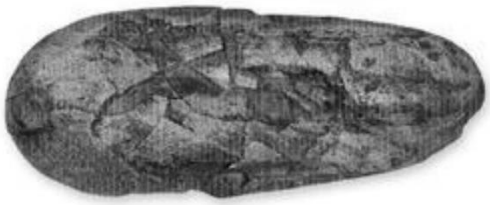
Tyrannosaurus rex Skull Plaque

Tyrannosaurus rex Brain Endocast

T-rex Tooth (Small)

T-rex Tooth (Large)

Nanosaurus Skull



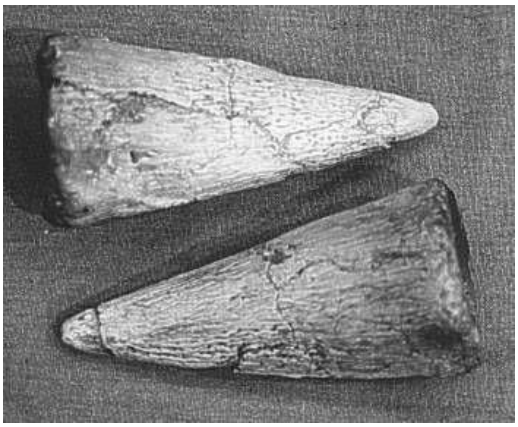
Oviraptor Egg

Velociraptor Claw with Two Digits

Spinosaurus Tooth

Duckbill Dinosaur Tooth Row

Nanosaurus rex Hind Foot



Iguanodon Thumb Spike

Grallator Dinosaur Track

Dinosaur Track from California

Edmontosaurus Skin Impression

Camarasaurus Toe Claw

Ornithomimus Hand Claw

Acrocanthosaurus Hand Claw