

The background is a vibrant green color, densely populated with white line-art icons. These icons include various dinosaurs such as a Stegosaurus, a Triceratops, and a T-Rex. There are also depictions of fossils, including a trilobite and a dinosaur skull, and scientific tools like a magnifying glass, a test tube, and a brush. A small square icon of a dinosaur head is positioned above the main title box.

Dinosaur

educator guide

WELCOME TO THE DINOSAUR Educator Guide!

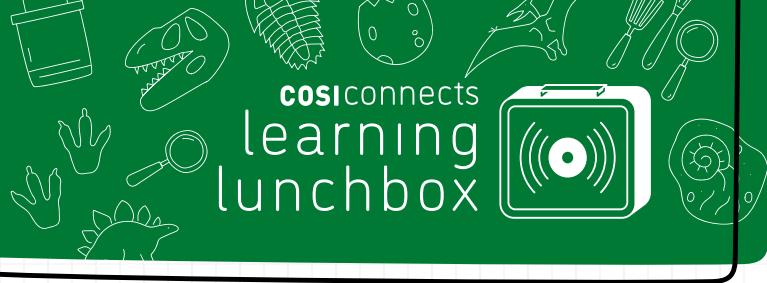
This guide contains information and additional resources that you can use to amplify the activities inside the Learning Lunchbox that each of your students have received.

Each box contains five activities equaling to about ten hours of STEM content centered around dinosaurs, fossils, and paleontology. The supplies to complete each of the activities is inside of the box.

On the following pages you will find Grade Banded Learning Standards aligning to each of the activities. You will also find a QR Code linking you to COSI Connects, an online universe of science through videos, activities and so much more! This site also includes a section called Community Connects, a digital hub for resources from museums, cultural institutions and other nonprofits that are available in-person and online.

For additional resources, including book recommendations, and video instructions for completing each of the activities inside your box be sure to check out COSI.org/Kits.





Dinosaurs

ACTIVITY 1: What Happened First?

GRADES
K-2

Extended Learning Activities and Guiding Questions:

1. Put your puzzle together and look at it. How many layers do you see?
2. What does a paleontologist do? Do you think you would like to be a paleontologist?
3. How do we know what kinds of animals lived long ago?

NGGS Learning Standards:

LS1.D: Information Processing

- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.

ESS1.C: The History of Planet Earth

- Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe.

GRADES
3-5

Extended Learning Activities and Guiding Questions:

1. If you made a timeline of your life, what would you put on it?
2. How can paleontologists tell how old a fossil is?
3. How long after the first dinosaurs appeared did the T-rex appear?

NGGS Learning Standards:

3-LS4-1 Biological Evolution: Unity and Diversity

- Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

4-ESS2-1 Earth's Systems

- Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

GRADES
6-8

Extended Learning Activities and Guiding Questions:

1. How can paleontologists tell how old a fossil is when no humans were around to observe?
2. What causes different layers in the rocks on the Earth?

NGGS Learning Standards:

MS-ESS1-4 Earth's Place in the Universe

- Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

MS-ESS2-3 Earth's Systems

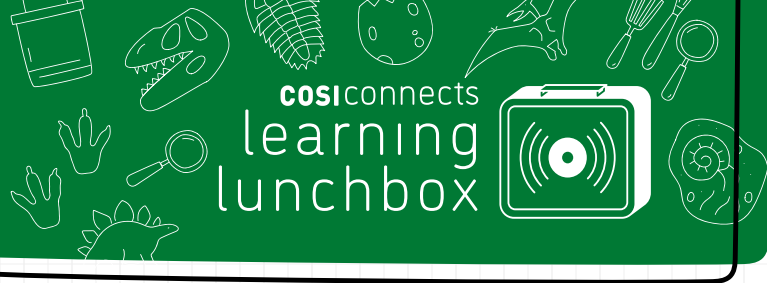
- Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.



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cosi.org/connects



Dinosaurs

ACTIVITY 2: Make A Fossil

GRADES
K-2

Extended Learning Activities and Guiding Questions:

1. Have you ever found a fossil? What did it look like?
2. Have you ever walked through mud? What did it feel like on your feet?

NGGS Learning Standards:

ESS1.C: The History of Planet Earth

- Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe.

LS1.D: Information Processing

- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.

GRADES
3-5

Extended Learning Activities and Guiding Questions:

1. What is the difference between a body fossil and a trace fossil? What is an example of each?
2. What makes fossils rare?
3. What are some things we can tell about an organism from looking at its fossil? What are some things we can't tell about it by looking at the fossil?

NGGS Learning Standards:

3-LS4-1 Biological Evolution: Unity and Diversity

- Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

3-LS4-2 Biological Evolution: Unity and Diversity

- Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

GRADES
6-8

Extended Learning Activities and Guiding Questions:

1. Oftentimes, museums do not display real fossils. Instead, they display casts, which are replicas of the fossils. Why do you think that is?
2. Why don't more things get fossilized? What makes fossils so rare?
3. What are some things we can tell about an organism from looking at its fossil? What are some things we can't tell about it by looking at the fossil?

NGGS Learning Standards:

MS-LS4-1 Biological Evolution: Unity and Diversity

- Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

MS-ESS2-3 Earth's Systems

- Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.



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ACTIVITY 3: Make an Impression

GRADES
K-2

Extended Learning Activities and Guiding Questions:

1. What happens if you make a footprint in the mud and someone else steps in the same spot? How might that apply to dinosaur footprints?
2. What are some things that might make a footprint or trackway disappear?

NGGS Learning Standards:

LS3.B: Variation of Traits

- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.

LS1.A: Structure and Function

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)

LS1.D: Information Processing

- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)

GRADES
3-5

Extended Learning Activities and Guiding Questions:

1. What is the difference between a footprint and a trackway?
2. What kind of ground material do you think would make the best track? Wet or dry? Hard or soft?
3. What are some things we can tell about an organism from looking at its trackway? What are some things we can't tell about it by looking at the trackway?

NGGS Learning Standards:

5-PS1-3 Matter and Its Interactions

- Make observations and measurements to identify materials based on their properties.

4-ESS2-1 Earth's Systems

- Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

GRADES
6-8

Extended Learning Activities and Guiding Questions:

1. How can paleontologists use trackways to determine how large and/or fast an animal was?
2. Why can't we tell what specific dinosaur or animal made a particular trackway or footprint?
3. What are some things we can tell about an organism from looking at its trackway? What are some things we can't tell about it by looking at the trackway?

NGGS Learning Standards:

MS-LS4-1 Biological Evolution: Unity and Diversity

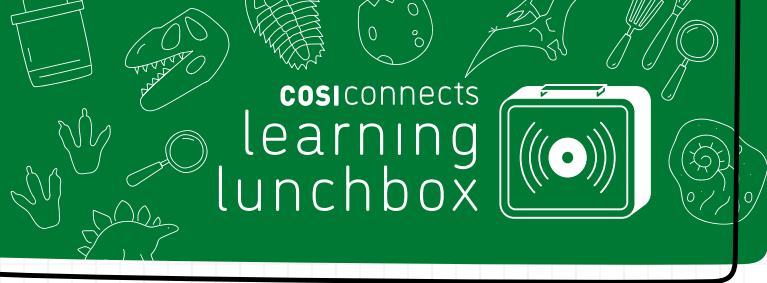
- Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.



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Dinosaurs

ACTIVITY 4: Sedimentary Rock

GRADES
K-2

Extended Learning Activities and Guiding Questions:

1. How do paleontologists know where to look for fossils?
2. What tools do you think a paleontologist might use to help uncover a fossil? Do you think they move quickly or slowly?

NGGS Learning Standards:

PS1.A: Structure and Properties of Matter

- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties.

ESS1.C: The History of Planet Earth

- Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe.

GRADES
3-5

Extended Learning Activities and Guiding Questions:

1. How can paleontologists tell how old a fossil is by looking at the layer of rock it was found in?
2. What can paleontologists learn from looking at the type of rock or material surrounding a fossil?
3. Did certain layers of your kit activity preserve better than others? Were some easier to pick through to excavate your dinosaur? Why do you think that is?

NGGS Learning Standards:

4-ESS1-1 Earth's Place in the Universe

- Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.

GRADES
6-8

Extended Learning Activities and Guiding Questions:

1. What are some things that might make it hard for fossils and trace fossils to be found?
2. What can paleontologists learn from looking at the type of rock or material surrounding a fossil?
3. Did certain layers of your kit activity preserve better than others? Were some easier to pick through to excavate your dinosaur? Why do you think that is?
4. What might happen if you added too much (or not enough) water to the materials when doing this activity? How might that change the outcome?

NGGS Learning Standards:

MS-LS4-1 Biological Evolution: Unity and Diversity

- Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

MS-LS4-2 Biological Evolution: Unity and Diversity

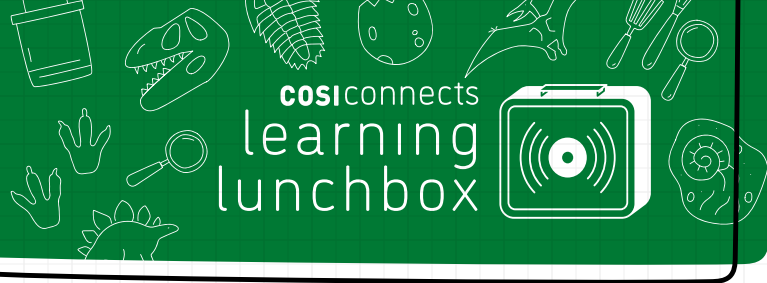
- Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.



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Dinosaurs

ACTIVITY 5: Document a Real Fossil

GRADES
K-2

Extended Learning Activities and Guiding Questions:

1. Look at your real fossil. What shape does it most look like?
2. Smell your fossil. What does it smell like? Can you smell an animal? Why or why not?

NGGS Learning Standards:

PS1.A: Structure and Properties of Matter

- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties.

ESS1.C: The History of Planet Earth

- Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe.

GRADES
3-5

Extended Learning Activities and Guiding Questions:

1. Smell your fossil. What does it smell like? Can you smell an animal? Why or why not?
2. Is it possible to find ocean animal fossils on land? Why might that be?

NGGS Learning Standards:

3-LS3-2 Heredity: Inheritance and Variation of Traits

- Use evidence to support the explanation that traits can be influenced by the environment.

3-LS4-1 Biological Evolution: Unity and Diversity

- Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

GRADES
6-8

Extended Learning Activities and Guiding Questions:

1. Do you think that larger or smaller fossils would be easier to find? Which do you think would be easier to excavate? Why?
2. How do you think that paleontologists protect the fossils that they find? What tools or procedures might they use to make sure the fossils are not damaged?

NGGS Learning Standards:

MS-ESS2-3 Earth's Systems

- Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.



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