

Dinosaur Dig Pits

Prep Time: 30 minutes

Activity Time: 75 minutes

SUGGESTED GRADE LEVELS: 2nd – 6th (adult supervision recommended, especially for younger grades)

SAFETY INFORMATION : Be careful not to get sand, dirt, and plaster into eyes! Wear safety glasses if available

SUMMARY OF ACTIVITIES

- Activity 1: Paleontology Tool Kit
- Activity 2: Dinosaur Dig Pits!!

VOCABULARY:

Paleontology - the study of ancient life (at least 11,700 years ago) and includes the analysis of fossils in order to understand the lifestyles, adaptations & evolution of a species.

Fossil - the remains or traces of plants & animals that lived long ago preserved in (sedimentary) rock, soil or amber.

Prospect - to hunt for fossils that can potentially be excavated.

Excavation - the process of unearthing a fossil from the ground

Overburden - the overlying & surrounding debris/waste (e.g. rocks, dirt, sand) that needs to be removed in order to access a fossil.

IMPORTANT INFO TO KNOW

Dinosaur fossils are found in sedimentary rock (rocks made from sediments/particles deposited in layers) and when prospecting for fossils, paleontologists need to make sure they search in the right types of sedimentary rocks whose formation correspond with the time period they are interested in. Rocks are stacked in layers with the newest layers on top and the oldest on the bottom. These rock layers can be analyzed like a vertical timeline of the Earth which is how paleontologists are able to date the time frames for when a particular dinosaur species existed.

The 6 dinosaur species that students can discover in this FunShop are:

1. Tyrannosaurus Rex - (Upper Cretaceous Period, ~68-66 million years ago)
2. Stegosaurus - (late Jurassic Period, between 155-150 million years ago)
3. Ankylosaurus - (same as Tyrannosaurus Rex.)
4. Triceratops - (late Cretaceous Period, ~68 million years ago)
5. Parasaurolophus - (late Cretaceous Period, ~76.5-73 million years ago)
6. Diplodocus - (same as Stegosaurus.)

MAKING THE DIG PITS:

- Prepare dig sites by creating the following layers in each container:
- Bottom Layer = 1" layer of dirt + sand with ~70% of the bones hidden in this layer.
- Middle Layer = ¾" layer of pebbles with ~20% of the bones hidden in this layer.
- Top Layer = ¾" layer of plaster with ~10% of the bones hidden in this layer.

NOTE: Each dig pit should have 2 dinosaur puzzles' worth of bones hidden in them if possible to make the dig more challenging

Be careful not to make plaster too hard otherwise it will be too difficult to break through. Consider making plaster a little on the "wetter" side by using 1.5 parts plaster to 1 part water rather than the suggested 2:1 ratio. Plaster typically takes at least 30 minutes to harden.

ACTIVITY ONE (15 mins.)

MATERIALS

Per Person:

- 5 - toothpicks
- 5 - Q-tips
- 5 - popsicle sticks
- 1 - paint brush or toothbrush
- 2 - plastic spoons
- 2 - plastic forks
- 2 - bendy straws
- 2 - pipe cleaners

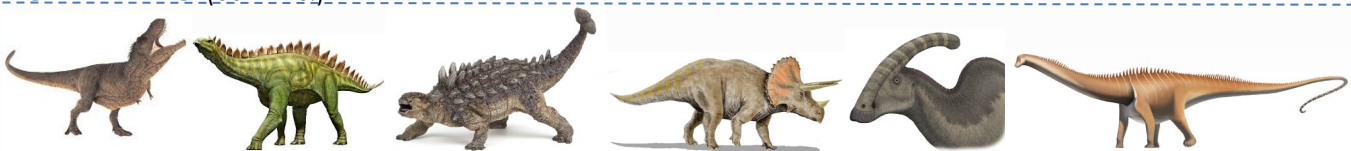
Per Table:

- 1 - masking tape roll
- 2 - scissors



1. What do paleontologists do?
 - a. *Paleontologists are scientists who study prehistoric life from (at least) 11,700 years ago. This includes the study of fossils in order to theorize on an organism's evolution & interactions with its environment and others. Basically, **paleontologists are like detectives who solve fossil mysteries by trying to figure out as much as they can about the plants & animals that left those fossil clues behind...***
2. If you were a paleontologist, what kind of fossils would you most want to discover?
 - a. *Answers will vary, but hopefully at least one person will mention wanting to find dinosaurs...*
3. What sorts of skills do you think paleontologists need to have?
 - a. *Answers will vary but hopefully someone will mention the need to have good fine motor skills for excavating, some puzzling/deductive skills and the need to be **patient**.*
4. What might be tricky about excavating fossils?
 - a. *Paleontologists need to be careful not to damage the fossils with their tools, fossils may be hard to spot, working outside in the hot desert sun can be taxing...*
5. What types of tools do you think paleontologists need to bring for a fossil dig?
 - a. *chisels, hammers, brushes, picks, shovels, jackhammers, probes, specimen collection bags & containers, glue, measuring tape, GPS, walkie talkies*
6. Give kids 10 minutes to design the tools they want to use for their excavations using only the materials listed above.

ACTIVITY TWO (60 mins.)



Potential dinosaur species students can find in their dig pits:

(Left to Right: Tyrannosaurus Rex, Stegosaurus, Ankylosaurus, Triceratops, Parasaurolophus, Diplodocus)

MATERIALS

- 1 – Pair of Safety Goggles (if available)
- 1 - paper plate (for collecting bones)
- 1 - Dig Pit
- 1 - tablecloth
- 2 - plastic containers, empty - (used as rinse bucket & "overburden" bucket)
- 1 - paper towel roll

WHAT TO DO

1. Before bringing out the prepared dig pits, make sure a tablecloth is put down over the surface you will be working at
2. It's time to see what our mysterious dig pits will reveal!
3. Besides the dig pits, everyone will have a rinse bucket as well as an overburden bucket for them to put all the extra **overburden** - (dirt, sand, pebbles, & plaster)
4. Before digging, put on goggles if available.
5. Once a dig plan is made (see Opportunity for Inquiry), it's time to dig! As kids begin finding hidden bone pieces, remind them to carefully clean off each piece before setting it to the side
6. Allow students to excavate the dig pits and assemble their dinosaur bones.



OPPORTUNITY FOR INQUIRY

Come up with a general dig plan/strategy before starting - (e.g. what tools are appropriate to use, divide & conquer vs. working on the same area together, remove layer by layer for entire dig site vs. all 3 layers in one smaller area simultaneously, etc...)

Remind kids to be careful when digging, so they do not accidentally break the dinosaur bones. Being careful and meticulous with the tools ensures that paleontologists do not damage what they find

Potential Questions to ask during activity:

1. In a real fossil dig site, would it make sense to find bones from the same dinosaur in 3 different layers of earth? *(No, because the layers of the Earth are formed chronologically with the oldest layers on the bottom, therefore bones from the same animal should not be appearing in 3 different layers because that would indicate that the animal lived simultaneously during 3 different time periods, which isn't very likely unless that animal figured out how to time travel...)*
2. Have a discussion of the 3 main types of rock (sedimentary, igneous, and metamorphic) and ask why fossils are hardly ever found in igneous or metamorphic rocks? *(Since igneous rocks are formed from lava and metamorphic rocks have usually undergone many extreme conditions such as high pressure and/or heat, fossils usually have a very hard time surviving those types of environments and therefore the vast majority of fossils are found in sedimentary rocks.)*

CHECK FOR UNDERSTANDING

1. Have kids describe their strategies for figuring out how to (re)construct their dinosaur skeletons. (e.g. *waited to collect all the bones first before attempting to piece them together, looked for distinguishable bones (e.g. skull, femur, ribs) to start piecing around*)
2. What were some of the challenges you faced while excavating your fossils? (Answers will vary but may include *difficulties over not being able to find the pieces they needed*), *needing to be very careful & precise during excavations, etc.*
3. Ask kids to compare & contrast their experience with that of an actual experience paleontologist. In what respects might it be same or different? *Similarities may include having to be very careful when excavating to make sure nothing gets damaged, using the same types of tools, having to make sense of the fossils they discover and piece them together...*
4. If you could ask a paleontologist a question about his/her job, what would you be curious to know?

REFERENCES

1. Anonymous. (2018, May 23). Fossil Hunting 101. Retrieved January 15, 2019, from <https://www.fieldmuseum.org/blog/fossil-hunting-101>.
2. Q & A with Dinosaur Expert Sue Hendrickson. (n.d.). Retrieved January 15, 2019, from <http://www.scholastic.com/browse/subarticle.jsp?id=21>
3. *The Process of Paleontology* [PDF]. (n.d.). Museum of the Rockies. https://museumoftherockies.org/uploads/Resources/Trunks_Kits/Background_Info-Process_of_Paleontology.pdf

MATERIALS

ITEM NAME	DESCRIPTION	AMOUNT NEEDED
TOOTHPICKS		5 total
COTTON SWABS (Q-TIPS)		5 total
CRAFT STICKS		5 total
PAINTBRUSH OR TOOTHBRUSH		At least 1
PLASTIC SPOON		2 total
PLASTIC FORK	r	2 total
BENDY STRAW		2 total
PIPE CLEANER		2 total
MASKING TAPE		1 roll

SCISSORS		2 pairs
SAFETY GOGGLES (OPTIONAL)		1 pair per person
PLASTIC TABLECLOTH		1 total
PAPER TOWEL ROLL		1 roll
PLASTIC CONTAINER	Any size you have available, one will be to clean off dinosaur pieces as they are uncovered and the other will be for the dig pit material as it is excavated	2 containers
PAPER PLATE	For collecting and separating dinosaur bones	2 plates
3D DINOSAUR PUZZLE	Possible Options: Calary 3D Wooden Puzzle Simulation Animal Dinosaur Assembly DIY Model Toy for Kids https://tinyurl.com/wwzgy4n Dinosaur 3D Puzzle 1 Pack - 10" Assorted Paleo Dino Skeleton https://tinyurl.com/wtvgf3x	2 puzzles
PEBBLES	Take from outside, or can be found at most hardware stores or on Amazon	3 pounds
SAND	Take from outside, or can be found at most hardware stores or on Amazon	3 pounds
DIRT	Take from outside, or can be found at most hardware stores or on Amazon	2 pounds
PLASTER OF PARIS	Falling in Art 1 Pound Plaster of Paris https://tinyurl.com/yx45e4x2	1 to 2 pounds