FOSSIL EXPLORATION STATIONS

Teacher Directions:
Put students in groups and assign them to a station. Note: not all students will start at station 1, so be sure they start at the correct spot in their notebooks. Give groups roughly 10 minutes at each station before having them rotate (you can adjust the time based on the length of the class period). Some stations take longer than others, so I always remind students that if they finish early, they need to stay at their station until it is time to rotate. Discussing ideas and observations as they work through the stations should be encouraged.

Station 1: Similarities and Differences
At this station, students will examine the casts of two trilobite specimens—***Calymene*** (Silurian Period, Oklahoma)and ***Probolichus*** (Ordovician Period, Oklahoma) with hand lenses and make sketches of each trilobite on their notebook sheets. They will then describe the similarities and differences between the two specimens in writing. Trilobites lived in the ocean on the seafloor. Some trilobites ate small worms and soft-bodied animals living in the mud. Others swallowed the mud filtering out very tiny organisms and algae.

Station 2: Observation and Inference
Students will look at casts of two theropod dinosaur specimens from the Cretaceous Period at this station: a ***Tyrannosaurus rex*** (Late Cretaceous, Montana) tooth and a ***Deinonychus*** (Early Cretaceous, Oklahoma) "killer toe". First, students will list things they notice about each of the specimens. Then they will make inferences about each specimen based on their observations. Both of these dinosaurs lived on land and ate meat (carnivores).

Station 3: Making Inferences Based on Evidence
Students will make observations from images of an ***Acrocanthosaurus*** (a land-dwelling, theropod dinosaur from Oklahoma) foot and a ***Stenopterygerius*** (ocean-dwelling ichthyosaur from Germany) arm at this station. After observing the two limbs, students will make an inference about which animal lived on land and which lived in water. Finally, students will be asked to write or draw what their evidence or reasoning is for their inference (e.g., dinosaur foot has claws/looks like a bird-like while ichthyosaur has flattened bones/looks paddle-like).

Station 4: Inferences from Evidence
At this station, students will record the names of and examine casts of two mammal specimens from the Miocene Epoch of the Neogene Period in Oklahoma: the rhinoceros ***Teleoceras*** lower jaw and the bone- crushing dog ***Borophagus*** upper jaw. They will then take the clay/Play-doh and press each tooth specimen separately into the playdough. Students will observe the teeth indentations and infer whether each animal is a carnivore (*Borophagus*) or an herbivore (*Teleoceras*). Last, they will record their reasoning for their inferences.

Station 5: Predictions

Students will look at a cast of the skull of ***Trimerorhachis*** (an amphibian from the Permian Period of Oklahoma) with eyes and nostrils on the top of the skull and make a detailed sketch in their notebook. Students should take special note of where the specimens' eyes are located. Just as today, amphibians lived on land or in freshwater, but had to return to water to lay eggs. This animal probably ate fish, insects, or whatever it could catch.

Station 6: Structure and Function

At this station, students will look at a cast of a specimen of ***Captorhinus*** (a reptile-relative from the Permian Period of Oklahoma) with eyes and nostrils on the side of the skull and make a detailed sketch in their notebook. Students should take special note of where these specimen's eyes are located. This animal lived on dry land and probably ate smaller animals, insects, or whatever it could catch.

Station 7: Reading Station

Students use the reading and their drawings from Stations 5 and 6 to make a claim about the reason for the placement of the animals' eyes. *Trimerorhachis* eyes were on the top of its skull because it probably lived on the bottom of creeks/lakes and was an ambush predator. Another clue: nostril placement on top of head because it needed to breathe while remaining underwater (like a modern alligator). *Captorhinus* lived on land and probably hunted smaller animals, insects on the ground, in front rather than above it.

Depending on which station students started at, some may not have not visited Stations 5 and/or 6 yet, they will need to return to those pages in their Discovery Notebook to complete Question 3 for this Station.

Station 8: Structure and Function

Students will look at casts of two modern mammal specimens at this station and make a detailed sketches in their notebooks. Students should take special note of where this specimen's eyes are located. The **bobcat** (*Linx rufus*), a predator, has forward-facing eyes in this skull while the **grey squirrel** (*Sciurus carolinensis*), usually prey, has eyes more along the side of the skull.

If students note that the eyes face forward a little, ask them why? One possible reason: because stereoscopic (forward overlapping) vision is important for judging distances when jumping from branch to branch just as for attacking prey.

Station 9: Collecting Data Like a Paleontologist

At this station, students will use the measurement tools provided to collect data that a paleontologist would collect, such as the specimen's name, location and geological information (where it was found, what rocks it was found in, and what age of those rocks is), and a sketch or photo.

These are casts of two trilobites belonging to the same species, ***Homotelus bromidensis*** from an exposure of the Bromide Formation in Carter County, Oklahoma. These rocks date to late Ordovician Period (about 455 million years ago). By measuring in cm or mm, students can answer: how long is each specimen? How wide is each specimen? How far apart of the eyes are placed? How many segments make up each specimen? What is shape of the head?

They will then discuss with their group or whole class if these measurements are identical. Their measurements are not likely to be same. They can discuss how observations from many different specimens are necessary to create a description of a single species of animal because no two individuals are perfectly identical. [Note: Trilobites are also like many living insects; they grow in instars, molting (shedding their exoskeletons), and forming a new, bigger exoskeleton that often looks slightly different.] Also, students might consider their drawings of specimens of *Calymene* and *Probolichus* specimens from Station 1. Those differ from *Homotelus* and each other in many features, not just size, but the shapes of each segment.