Lesson 10 - A

Interdisciplinary Mystery

Using a Large Coprolite to Understand an Ancient Environment
(See photo of large coprolite labeled Coprolite One)

1. The specimen in this photograph is fossilized feces, or poop, known scientifically as a coprolite. How big do you think the animal was that produced it? (circle all that apply)

a. Chicken-size
b. Human-size
c. *Triceratops*-size
d. *Tyrannosaurus*-size

2. Why do you think this?

Only a very large animal could produce such a large deposit. Without further evidence cannot tell if *Triceratops* or *Tyrannosaurus*.

3. When paleontologist Karen Chin studied this specimen, she found that it contained many bone fragments ranging in size from 2 mm to 34 mm long. What are two things that this tells us about the diet or dietary habits of the animal that made this?

Bone indicates it was meat eater. Range of size could indicate that it chewed or somehow broke up its meal into small bits. Or that it ate other animals of a wide variety in size.

4. What does the survival of this coprolite tell us about the environment in which it was deposited? (circle all that apply)

a. It was deposited in a high-energy river, where it was carried away by fast moving water.
b. It was deposited on a flood plain and quickly buried by fine-grained sand and in essence protected from further damage.
c. It was deposited on top of a hill overlooking a lush valley, where wind, rain, and sunlight could alter it. The hilltop was also an area visited by animals ranging from poop-eating beetles to poop-stepping-on *Triceratops*.

5. Explain why you think this.

All other environments higher chance of removal or erosion of feces.

6. Based on its size and the items found within it, who do you think could have produced this coprolite? (circle all that apply)

a. A very hungry and aggressive carnivorous mammal about the size of a rat.
b. A *Hadrosaurus*, an herbivorous dinosaur
c. A *Tyrannosaurus rex*, a meat eater that ate anything it wanted.
d. A gar, which is a type of fish.

7. What additional information would you need to figure out what animal it came from?

Bones would help by showing what animals lived in this environment but there really is no way of saying for sure with a coprolite.

Lesson 10 - A

Interdisciplinary Mystery

Using a Small Coprolite to Understand an Ancient Environment
(See photo of small coprolite labeled Coprolite Two)

The specimen in the photograph is about twice life size. Adjacent pieces originally attached to center piece (4 cm wide). A microscopic view reveals no signs of undigested bones, muscles, or teeth.

1. The specimen in this photograph is fossilized feces, or poop, known scientifically as a coprolite. How big do you think the animal was that produced it? (circle all that apply)
   a. Chicken-size
   b. Blue Whale-size
   c. Human-size
   d. *Triceratops*-size

2. Why do you think this?

Too big to be from a chicken and too small to be from a whale or adult *Triceratops*.

3. Paleontologists used a microscope to discover that this specimen contained small, scattered plant fragments making up 1-2% by volume. Do you think this indicates an herbivore or a carnivore? Why?

Carnivore as an herbivore would contain more plant matter.

4. What does the survival of this coprolite tell us about the environment in which it was deposited? (circle all that apply)
   a. It was deposited in a high-energy river, where it was carried away by fast moving water.
   b. It was deposited on the banks of a slow-flowing, meandering stream, possibly on a spot where fine-grained sediments accumulate.
   c. It was deposited deep in an ocean, where the water quickly broke down soft non-bone rich deposits.
   d. It was deposited on the side of an active volcano, where regular flows of lava covered the landscape.

5. Explain why you think this.

All other environments higher chance of removal or erosion of feces.

6. Here are descriptions of some animals and the feces they produce. Which one do you think could have produced the coprolite above? (circle all that apply)
   a. Small meat eating dinosaur, runs on two legs, scat often contains bits of bones and teeth.
   b. Carnivorous turtle, internal anatomy of digestive tract often leads to grooved coprolites.
   c. Small crocodile (about 5 feet long), long narrow snout, because of the nature of their digestive tract, the remains of bones and teeth are rare in fossilized scat.
   d. A very aggressive and very large chicken, which produces many large piles of scat.

7. Explain why you think this.