Clues in the Jaw

Use fossil evidence to describe the earliest mammals.

ZOO.10.2 "Describe the characteristics of the first true mammal."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Circle the jaw and tooth features that fossils can show, and underline the fur and milk traits scientists infer for the earliest mammals. Use your marks to separate fossil evidence from inference.

A Small Animal After Dark

1. At dusk in the Late Triassic, roughly 220 million years ago, a tiny mammal might have slipped beneath fallen branches while larger reptiles moved nearby. Fossils do not identify one species as the first true mammal. Instead, they show a gradual shift from earlier mammal relatives to animals with a recognizable mammalian body plan. Many early mammals were small, probably active at night, and likely ate insects and other small prey. Those habits may have helped them avoid predators and find food. To describe these animals accurately, scientists separate features preserved in fossils from features they infer.

2. One key clue is the jaw. Earlier mammal relatives had a lower jaw made of several bones, with a jaw hinge between different bones. Early mammals developed a lower jaw dominated by one large bone, the dentary, which met a skull bone at a new hinge. Their teeth also became specialized: pointed teeth could grip prey, while broader back teeth could cut or crush it. Many early mammal relatives already had some of these changes, so no single tooth proves that a fossil was a true mammal. The pattern of jaw and tooth features provides stronger evidence.

3. Fur and milk are central to what makes a mammal a mammal, but hair and milk rarely fossilize. Scientists infer that the earliest true mammals had fur for insulation and fed their young milk, as living mammals do. Insulation helped them retain body heat, supporting activity when the air was cool. Their small size, complex teeth, and new jaw hinge are easier to investigate in fossils than these soft body features. Describing an early mammal therefore requires both physical clues and careful inferences, without pretending that every detail of its daily life is known.

2 ANSWER WITH EVIDENCE

Use the passage

1. Describe how an early mammal's lower jaw and jaw hinge differed from those of earlier mammal relatives.

2. Describe two kinds of teeth an early mammal had and how each could help it eat.

3. Describe one inferred body feature of the earliest mammals and explain how it may have helped them when the air was cool.

4. Why would a scientist use both fossil clues and inferences to describe an early mammal? Name one example of each.

3 YOUR TURN

Your own words

Write a 70 to 95 word museum audio-guide script about an imagined early mammal hunting on a cool night. Describe at least three mammalian characteristics, explain how two help it in this scene, and distinguish one fossil clue from one inferred trait.

ANSWER KEY

Clues in the Jaw

PART 1 · READ AND MARK

Circle the jaw and tooth features that fossils can show, and underline the fur and milk traits scientists infer for the earliest mammals. Use your marks to separate fossil evidence from inference. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Describe how an early mammal's lower jaw and jaw hinge differed from those of earlier mammal relatives.	**Its lower jaw was dominated by the dentary, which met a skull bone at a new hinge. Earlier relatives had lower jaws made of several bones and a hinge between different bones.**
2	Describe two kinds of teeth an early mammal had and how each could help it eat.	**Pointed teeth could grip prey. Broader back teeth could cut or crush food.**
3	Describe one inferred body feature of the earliest mammals and explain how it may have helped them when the air was cool.	**They likely had fur, which provided insulation and helped them retain body heat in cool air.**
4	Why would a scientist use both fossil clues and inferences to describe an early mammal? Name one example of each.	**Jaw or tooth features can be studied in fossils, but fur and milk rarely fossilize. Scientists infer fur or milk from living mammals.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Imagine a small early mammal searching under leaves for insects after dark. Its pointed teeth grip a beetle, while broader back teeth help break the food apart. A lower jaw built mainly from the dentary meets the skull at a mammalian hinge, a feature scientists can study in fossils. The animal's fur probably helps it retain body heat during the cool hunt. Fur and the milk it likely provides its young are inferred, since those soft features seldom survive as fossils.

Accept accurate descriptions that distinguish preserved jaw or tooth features from inferred fur or milk. Students should avoid naming a single species as the known first true mammal.