Educator Overview

Snake or Fake? - Using Natural History Collections to Understand Evolution

Museums for Digital Learning

Audience	**Grade levels** 6-8 9-12	**Subjects** Science Careers in museums	**Topics** Life Science Careers
Guiding Questions	1. How are museum collections used for current scientific research?	2. How can we use morphology to differentiate between different species and organisms?	3. How can we use claims, evidence, and reasoning to communicate our scientific findings?
Overview	Students will be introduced to the herpetology collection (reptiles and amphibians) at the Harvard Museum of Comparative Zoology (MCZ). They will discover that while snakes are known for being long, skinny, and legless, there are in fact many other long, skinny, legless reptiles and amphibians. Students will learn which elements of snake morphology can help differentiate between snakes and "fakes." Students will then use the MCZ database to view images of and see data on six real specimens. They will use this information to make arguments using claims, evidence and reasoning, about which specimens are snakes and which are not. Along the way, they will hear from people who work in the collections and consider how museum collections of preserved animals are used for current research.		
Activity 1: Supports Guiding Question #1	**Welcome to the Harvard Museum of Natural History** Background in museum collections: Students will watch a video about the MCZ herpetology collection and consider: • What kinds of groups of animals are found within this collection? • What do the people that work with the collection do? • How is this collection used?		

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Activity 2: Supports Guiding Question #2	**Getting to Know Some Herps** Activating prior knowledge: Students will view a slideshow of images of snakes and other legless reptiles and amphibians (without being told what they are) and consider what animals they might be and why they think that.
Activity 3: Supports Guiding Question #2	**What Makes a Snake a Snake?** Introduction to snake anatomy: Students will watch a video about snake characteristics compared to other legless reptiles and amphibians and consider: ● What features mentioned are specific to snakes? ● What characteristics do you think would help you distinguish snakes from other animals that might have similar body types?
Activity 4: Supports Guiding Question #2	**Snake Morphology** Review of snake morphology: Hotspot activity. Students will click on different parts of an image of a snake to learn how these parts are unique to snakes and helpful for identification.
Activity 5: Supports Guiding Question #1	**How to Use the MCZ Database** Introduction to the MCZ Database: Hotspot activity. Students will click on different parts of an image of a database entry to learn what information can be found on the database and how to use it. The **Herps Comparison Chart** in the “Additional Resources” section will be used for the following activity. We recommend **printing it for your students to use**, however they can also use it as a PDF.
Activity 6: Supports Guiding Question #2	**MCZ Specimens** Using the MCZ database to collect data: Using links in the “Additional Resources” section, students will visit six entries in the MCZ database - some will be snakes and some will be other legless reptiles and amphibians (these links will take them to web pages outside the

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	Resource Kit). Students will explore the images and data on these entries and use the information to fill in the **Herps Comparison Chart** to record notes on morphology. The **Herps Comparison Chart** can be found in the "Additional Resources" section of Activity 5 and in the "Educator Materials" section of the Resource Kit. We recommend **printing it for your students to use**, however they can also use it as a PDF.
Activity 7: Supports Guiding Question #3	**Snake or Fake? Claims, Evidence, and Reasoning** Using claims, evidence, and reasoning to make an argument: Students will select one specimen to focus on. Using the **Claims/Evidence/Reasoning Worksheet**, they will make an argument for if their specimen is a snake or a "fake." Students will share their arguments with the class. The **Claims/Evidence/Reasoning Worksheet** can be found in the "Additional Resources" section of this activity and in the "Educator Materials" section of the Resource Kit. We recommend **printing it for your students to use**, however they can also use it as a PDF.
Activity 8: Supports Guiding Question #2	**Snake or Fake Escape Room** Escape room: Students will use their new knowledge of what makes a snake to determine if five images show snakes or "fakes." For each correct answer, they will receive a letter. When all the letters are collected, they can be unscrambled to form a work that unlocks the escape room door. Students can also learn more about the specimens they have studied using the **Student Research Guide** in the "Additional Resources" section of this activity.
Activity 9: Conclusion	**Conclusion**
Other Notes	Throughout the lesson, students will focus on six species - three species of snakes, and three species of other reptiles and amphibians including amphisbaenians and caecilians. These species are each represented by an image of a living animal and a database entry showing images of a

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(Supplies needed, independent vs. whole class engagement)	preserved animal. More information on these species can be found in the Student Resource Guide, included in the Educator Materials section of the Resource Kit. **Helpful Vocabulary:** Amphibians: Vertebrate animals that have moist, bare skin and usually spend part of their lives in water and part on land. Examples include frogs and toads, salamanders, and caecilians. Amphisbaenian: A group of reptiles with long bodies, rudimentary eyes, rings of scales, and (usually) no limbs. Annuli: External circular rings such as those seen on the body surfaces of some worms, amphisbaenians (worm lizards) and caecilians. Caecilians: A group of worm-like or snake-like amphibians. Cloaca: A single opening for digestive, urinary and reproductive tracts. Commonly termed the “vent.” Herpetology: The study of reptiles and amphibians . Herps: Informal name for reptiles and amphibians derived from the word “herptile.” Holotype: A single specimen upon which the description and name of a new species is based. In the videos, jars containing holotypes are marked with a red ribbon. MCZ: Museum of Comparative Zoology. Morphology: The form and structure of an organism or any of its parts; the way an animal looks. Reptiles: Vertebrate animals that have scales and lay shelled eggs, typically on land. Examples include lizards, turtles, alligators, crocodiles, and snakes.

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	Zoology: The scientific study of animals. **Supplies Needed:** Throughout the lesson, students will use two worksheets to record their observations and ideas. ● Herps Comparison Chart ● Claims/Evidence/Reasoning Worksheet PDFs of these worksheets are linked to within the Resource Kit activities and in the Educator Materials section of the Resource Kit. We recommend **printing these worksheets for your students to use**, however they can also use it as a PDF.