Amherst College

Vertebrate Hunting

Hints for Teachers

MUSEUM INFORMATION:

This worksheet is designed to help students practice scientific observation skills in the Beneski Museum of Natural History in conjunction with the classroom curriculum; however, it can also be used independently.

- The Museum does NOT provide copies of *Evolution, Speciation & Extinction*. Please prepare copies for your students.
- While exploring the exhibitions, encourage your students to look above their heads to see specimens displayed at different levels of the Museum.
- The Beneski Museum of Natural History can accommodate up to 45 children and chaperones at a time. Please consider splitting into smaller groups when completing the *Vertebrate Hunting* activity.
- When your students arrive at the Museum, they will be given a brief greeting by a museum staff member. After this greeting is a good time for you to introduce the activity.

PREPARING AN ACTIVITY:

- *Vertebrate Hunting* asks students to look closely at specimens and make thoughtful observations. Please pay close attention to the written interpretive materials associated with each specimen.
- The Museum asks that students refrain from leaning on any of the glass cases while working. We recommend providing students with clipboards or notebooks.
- *Vertebrate Hunting* has a brief set of directions printed at the top for chaperones to use.

IN THE CLASSROOM:

Extend the fun!

- Have the students go over some basic metric measurements. This worksheet can be done using Standard English units, but most science uses metric units today.
- Consider preparing 1-meter strips of paper with 10-decimeter marks or a paper yard stick with 1-foot marks.

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Vertebrate Hunting

Information for Chaperones

COMPLETING THIS ACTIVITY IN THE BENESKI MUSEUM OF NATURAL HISTORY:

- Please allow your students a few minutes to explore the main and bottom floors before beginning the *Vertebrate Hunting* activity.
- Consult with other chaperones and assign each group of students a question to begin with, so they start at different sections. This way, not all the students are looking for the same specimen at the same time.
- The worksheet asks for common names but see if your students can pronounce the scientific names as well.
- Remind your students to look all around them, even above their heads.
- Remind your students that the exhibits in the Museum are fragile. Please do not allow them to touch any of the exhibits.

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Tenets of the Nature of Science

Creativity
The sciences and humanities interact more than most people think. Science is not possible without imagination. In every stage of the process, from idea to experiment, creativity drives inspiration and innovation. Science is also often abstract and thinking outside the box helps us wrap our heads around complex concepts. When science and arts intersect, we achieve the most progress.

Curiosity
Derived from the concept "tentativeness," curiosity describes both the drive for and inherent skepticism of scientific discovery. Scientists are constantly building upon each other's work, using solutions derived by peers to ask new questions. Some generally accepted ideas have lasted for hundreds of years, so it is reasonable to have confidence in their validity, but new innovations are always approached with some apprehension. We are always learning, and there is always more out there. Curiosity keeps us going.

Observation and Inference
Observations involve the five senses. Using physical information, we draw conclusions we can all agree on. Inferences often rely on information not directly available to the senses; we find explanations for what we observe. Science is much more than just a collection of observations; it also requires inferred interpretations.

Scientific Laws and Theories
In science, laws are descriptions of observable phenomena. They are often expressed in empirical terms. Theories, conversely, refer to inferred explanations that have been widely accepted by the scientific community. Laws and theories are importantly distinct from one another and are not interchangeable. They both require substantial supporting evidence but can be adapted considering new information or discoveries.

Objectivity and Subjectivity
There are infinite factors that can affect a scientist's biases. From institutional affiliation to religious belief, from race to gender, from societal values to personal ones, scientists must always be aware of external influences affecting their practices and conclusions. Though scientists are tentative of new developments and employ measures to hold themselves accountable and improve objectivity (like peer-review), subjectivity can never be fully disregarded.

Empirical Evidence
Empirical Evidence is evidence that can be directly observed and obtained using our senses or through experimental procedure. Some scientific concepts lean toward the theoretical, but they must be rooted in observational or experimental data to be accepted. Challenging existing conceptions is only possible when supported by qualitative or quantitative empirical evidence.

Scientific Methods
Though there are many ways scientists practice their work and develop bodies of information, observations and experiments must be replicable. Scientists must outline their methods so that another scientist could try the same thing and draw the same conclusions. This way, we check each other's work and have more faith in new developments. The scientific method is often viewed as an independent practice, but it is intrinsically collaborative.

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Hunting Vertebrates

Name: _____

The Beneski Museum of Natural History has one of the most outstanding collections of vertebrate fossils in New England. ***Your goal: Find and "capture" vertebrates. You "capture" vertebrates by naming them, estimating their size and making quality observations. Don't forget, never touch the display!***

Before you start, review the Tenets of the Nature of Science, and keep them in mind as you complete the activity.

1. Mammoth

Ice Age Mammal Exhibit
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What is one fact you find interesting?

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2. Mastodon

Ice Age Mammal Exhibit
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What is one fact you find interesting?

3. Cave bear

Ice Age Mammal Exhibit
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

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4. Irish elk

Ice Age Mammal Exhibit
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

5. Dire wolf

Ice Age Mammal Exhibit

Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

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6. Saber-toothed cat

Ice Age Mammal Exhibit
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

7. Moa

Extinction: The Human Factor
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

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8. The Evolution of the Horse (pick one)

The Evolution of the Horse Exhibit
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

9. Brontothere

Wall of Mammoth Exhibit
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

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10. Archaeopteryx

Vertebrate Evolution, last drawer
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

11. Eryops

Milestone: Vertebrate Evolution
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

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12.Hominid Skills (pick one)

Human Evolution
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

13.Dunkleosteous

Milestone: Vertebrate Evolution
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

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14. Dryosaurus altus
Milestone: Vertebrate Evolution
Scientific name of organism: _____
Size estimate (length and height)

L: _____

H: _____

Observations (sketch, notes/thoughts)

Read informational plaque. What was one fact from the plaque you found interesting?

15. Review the definition of **curiosity** provided at the beginning of the worksheet. **Write at least two questions you have after your visit to the Museum and one way you might go about finding the answer.**

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https://www.amherst.edu/museums/naturalhistory