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## How Does it Move?

*Hints for Teachers*

**MUSEUM INFORMATION:**

*This worksheet is designed to help students look closely at an animal and work on their observation skills. The activity also has four discussion questions for the chaperone that will allow students to verbally hypothesize about what these animals might eat and where they live.*

- The museum does NOT provide copies of *How Does it Move*?. 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 students and chaperones at a time. Please consider splitting into smaller sub-groups when completing the *How Does it Move?* activity.
- Students are asked to look for fossils of animal that used to fly, swim, walk on two legs, or walk on four legs. All these kinds of animals can be found on the main floor and throughout the Museum.

**PREPARING AN ACTIVITY:**

- *How Does it Move?* asks students to draw pictures of animals they find. Provide your students with crayons or pencils for their drawings. **Markers are not allowed in the Museum.**
- We ask that students refrain from leaning on any of the glass cases while drawing. We recommend providing students with clipboards or notebooks.

**IN THE CLASSROOM:**

*Extend the fun! Talk about movement and animals back in the classroom.*

- Talk to your students about different types of animals.
- Have them start to make connections between how animals move and where they live.
- Begin this discussion with animals they already know.

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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 in light of 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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## How Does it Move?

*Name:* _____

**Instructions**

- ✓ Look for animals that **FLY**, **SWIM**, walk on **2 LEGS** and **4 LEGS**, and draw them.
- ✓ Look for animals in different exhibits.
- ✓ Your group can choose to all draw the same animal for each category of movement, or each student can pick their own to draw.
- ✓ Use these questions for discussion:
    - Where does the animal live?
    - Which animal do you think is fastest? What **observations** did you make to help you **infer** this?
    - Which animal is the biggest? Which is the smallest?
    - Which animal would you like to be? Why?

* Chaperone Note: Please read the names of the specimen to your students.

1. Draw something that **FLIES**.

2. Draw something that **SWIMS.**

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3. Draw something that walks on **2 LEGS**.

4. Draw something that walks on **4 LEGS.**

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