



The Tasks of a Trunk: An Adaptations Inquiry (K-8)

At a glance

Students investigate the question of how elephants use their trunks most often through observation at the Zoo.

Time requirement

- 2 classroom sessions of 45 minutes each (one prior to the Zoo visit, and one after)
- 30 minute observation period at Zoo

Group size and grades

Any number of small groups of 2 to 5 students
Grades K-8

Materials

Stopwatches
Pencils
Data sheets
Results worksheets
Clipboards

Goal

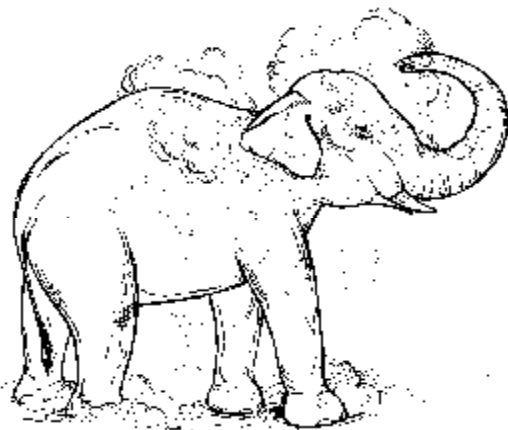
To learn about elephant adaptations through inquiry

Objectives

1. Students will be able to describe how they investigated the question
2. Students will be able to calculate averages and create a bar graph
3. Students will be able to interpret and discuss their findings
4. Students will understand how their findings could be useful in real world applications
5. Students will be able to define adaptation
6. Students will be able to describe how an elephant uses its trunk as an adaptation

Theme

The elephant uses its trunk as an adaptation in a variety of different ways to help it survive.



Elephants use their trunks to toss dirt and grass on their backs to keep biting insects away. Who knew that dirt could be used as a bug repellent!

Academic standards - Science

<p>Ohio Science Academic Content Standards (Grade: Indicators)</p>	<p>Life Science</p> <ul style="list-style-type: none"> • Characteristics and Structure of Life (1: 1,3) (2: 1,3,6) • Diversity and Interdependence of Life (K: 5) (1: 4) (3: 2) (4: 2) (5: 4) <p>Scientific Inquiry</p> <ul style="list-style-type: none"> • Doing Scientific Inquiry (K: 6,7) (1: 4-6,8,9) (2: 1,5,7-10) (3: 2,6) (4: 2-4,6) (5:2,3,6) (6:1,2) (7: 3,4,7) (8: 1,3,4) <p>Scientific Ways of Knowing</p> <ul style="list-style-type: none"> • Nature of Science (K: 1) (1: 1,2) (2: 1) (4: 2) (5: 1) (6: 1) • Science and Society (2: 4)
<p>Kentucky Core Content—Science</p>	<p>Biological Science</p> <ul style="list-style-type: none"> • Unity and Diversity (SC-EP-3.4.1) (SC-EP-3.4.3) (SC-04-3.4.1) (SC-05-3.4.1) • Biological Change (SC-06-3.5.1) <p>Unifying Concepts</p> <ul style="list-style-type: none"> • Interdependence (SC-EP-4.7.1) (SC-04-4.7.1)
<p>Indiana Science Standards</p>	<p>1- The Nature of Science and Technology</p> <ul style="list-style-type: none"> • Scientific Inquiry (K.1.1) (1.1.2) (2.1.2) (2.1.3) (3.1.2) (3.1.3) (3.1.4) (4.1.2) (6.1.2) (6.1.3) • The Scientific Enterprise (K.1.2) (1.1.3) <p>2- Scientific Thinking</p> <ul style="list-style-type: none"> • Computation and Estimation (K.2.1) (1.2.1) (1.2.2) (3.2.1) (6.2.1) (6.2.2) • Communication Skills (4.2.4) (4.2.5) (6.2.5) (6.2.6) (6.2.8) (7.2.7) (8.2.8) <p>4- The Living Environment</p> <ul style="list-style-type: none"> • Diversity of Life (K.4.2) (2.4.1) • Interdependence of Life (1.4.4) <p>5- The Mathematical World</p> <ul style="list-style-type: none"> • Shapes and Symbolic Relationships (6.5.4) • Reasoning and Uncertainty (2.5.4) (2.5.5) (2.5.6) <p>Biology I: Principles of Biology</p> <ul style="list-style-type: none"> • Developmental and Organismal Biology (B.1.15)

Academic standards - Math

<p>Ohio Mathematics Academic Content Standards (Grade: Indicators)</p>	<p>Number, Number Sense and Operations (K: 2,3,5)</p> <p>Data Analysis and Probability (K: 1) (1: 1-5) (2: 1,2,4) (3: 1,4) (4: 2,8) (5: 1,4) (6: 6)</p>
<p>Kentucky Core Content—Mathematics</p>	<p>Number Properties and Operations</p> <ul style="list-style-type: none"> • Number Operations MA-(EP-1.3.1) (04-1.3.1) (05 -1.3.1) <p>Algebraic Thinking</p> <ul style="list-style-type: none"> • Patterns, Relations and Functions MA-(06-5.1.4) <p>Data Analysis and Probability</p> <ul style="list-style-type: none"> • Data Representations MA-(EP-4.1.1) (EP-4.1.2) (EP-4.1.3) (04-4.1.1) (04-4.1.2) (04-4.1.3) (05-4.1.1) (05-4.1.2) (05-4.1.3) (06-4.1.1) (07-4.1.1) (08-4.1.1) • Experiments and Samples MA-(EP-4.3.1) (04-4.3.1) (05 -4.3.1)
<p>Indiana Mathematics Standards</p>	<p>Number Sense (1.1.1)</p> <p>Computation (1.2.1)</p> <p>Problem Solving (1.6.3) (3.6.1) (3.6.4) (4.7.4) (5.7.4)</p> <p>Data Analysis and Probability (4.6.1) (4.6.2) (5.6.1)</p>

Background

Each species is adapted to live in a specific habitat, where it lives and finds what it needs to survive—food, water, shelter, and space. The physical and behavioral characteristics that enable an animal or plant to survive in its particular habitat are called adaptations. While physical and behavioral adaptations usually develop through gradual processes over many generations, behavioral adaptations can also be learned and occur within a single generation.

The elephant's most famous adaptation is certainly its trunk. A formidable body part, the trunk is comprised of more than 100,000 muscles and has one or two (depending on the species) fingerlike tips. It's how the elephant uses the trunk, its behavior, which truly makes it an indispensable adaptation. For example, this fifth limb has the ability to pick up a huge tree by its trunk or a twig the size of a pencil. The trunk acts as a snorkel to breathe through when under water and as a hose while bathing. The elephant also uses its trunk to bring food and water to its mouth, to trumpet to communicate, to dust its back for protection from the sun, and to hold mother's tail for safety. Without its trunk and the ability to use it, the elephant would have a difficult time obtaining food, water, shelter and space.



The elephants on display at the Zoo are Asian elephants, which are found in the tropical region of Southeast Asia. They live in grasslands, swamps, and forests. Asian elephants are very big animals, weighing up to 11,000 pounds! Since they are so large, elephants eat a lot. They eat grasses, leaves, and fruit.

Elephants gulp down almost 250 pounds of food a day. That would be like eating 1,000 quarter-pound cheeseburgers in one day!

Vocabulary

Adaptation—A body part or behavior that helps an animal survive in its habitat

Hypothesis—A proposed explanation that predicts an outcome of an investigation

Elephants are very social animals and will greet each other by touching trunks - just like we shake hands!

Activity

Getting ready

Copy the Data Sheets so that each small group of students has one. Copy Results worksheets so that each individual student has one.

Optional: If you want the students to practice collecting data prior to the Zoo visit, either find a video of wild elephants or shoot a video of the elephants at the Zoo to use in the classroom.

Doing the activity

Classroom Session Prior to Zoo Visit

Ask students to think about when they eat cereal for breakfast. How do they pour the milk? Or pick up the spoon? We can eat and drink because we have special hands that have thumbs. Thanks to our thumbs, we can hold a spoon or pick up a cup, which makes eating and drinking a bit easier.

Having thumbs for grasping is an example of an adaptation. An adaptation is a body part or behavior that helps an animal survive. A thumb is a body part, and how we use it to grasp the milk carton or a spoon is a behavior.

Animals don't have to pick up a milk carton or a spoon, but they do have to eat. How do they do it without hands and thumbs? Each animal has special physical features and behaviors (adaptations) that help them to get food, drink water, and do other things.

Ask them how an elephant gets food and water. What adaptations does it have to help? A trunk! A trunk is very similar to our hands.

Make a list of all the different ways the students think an elephant might use its trunk. If you choose, you can have the students do some research on this topic. You might also want to show a video of elephant behavior.

Elephants use their trunks in many ways, but what do elephants use their trunks for most often: eating, drinking, bathing, dusting, or communicating?

Explain to the students that scientists often conduct observational investigations to answer questions about animal behavior. Learning about animal behavior can help people care for captive animals and better protect those in the wild.

Break the class into pairs or small groups. Tell the students that they will be conducting an investigation and each group needs to create a hypothesis, in which they will predict the activity that the elephants will do with their trunks most often and give a little explanation as to why they think so. For example: The elephant will use its trunk for eating more than any other activity, *because* elephants must eat a lot and more often for their size.

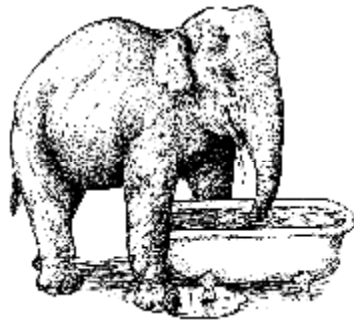
Discuss as a class how they could answer the question by watching the elephants at the Zoo. They'll need to count how many times an elephant uses its trunk for each activity.

Tell them that soon you will be taking a field trip to the Zoo to do their investigation!

At-the-Zoo

Pass out the Data Sheets, clipboards, pencils, and stopwatches. Go over the instructions for how each group will collect data during the Zoo visit. Hand out Zoo maps and point out the Elephant Reserve exhibit. Note that the elephants should be on exhibit outside if it's above 50°F. Otherwise, you can view them inside the building.

Elephants drink up to 40 gallons of water a day. They can suck up two to three gallons of water into their trunk at a time and spray it into their mouths.



Classroom Session After Zoo Visit

Enter all the data collected by students into the Results chart on the board so all can see.

Pass out the Results worksheets. Have students copy down the information on the board into the results chart on their worksheet. Then each student should calculate the average number of times an elephant used its trunk for each activity over all the observation periods and create a bar graph to illustrate the results.

The students should consider their results and answer the questions on the worksheet. Discuss their results and conclusions.

Wrap-up

Discuss what other questions about the elephants the students could study. Researchers have to keep accurate records. Discuss some difficulties that they encountered while collecting the data. Did the students experience any discrepancies between different groups' data? How would they design an experiment to answer their questions?

Assessment

Collect the completed Results worksheets.

Unsatisfactory—Did not complete the worksheet and/or put forth little effort.

Satisfactory—Completed the worksheet.

Excellent—Completed the worksheet and provided thoughtful answers.

Extension

Have students develop their own testable questions and design and conduct investigations about adaptations of wildlife in their backyards, animals in the classroom, or their own pets at home.

Resources

Books

Asian Elephant. Louise Spilsbury. 2006.
Elephants (True Books). Melissa Stewart. 2002.
Eyewitness: Elephant. Ian Redmond. 2000.
Little Elephant's Trunk. Hazel Lincoln. 2006.

Video/DVDs

Corwin's Quest - Episode 7: The Elephant's Trunk. Discovery Channel. 2007.

How Does an Elephant Use its Trunk Most Often? - Data Sheet

Names _____

1. Assign one group member to be the Timer, one to be the Writer, and the rest will be Watchers.
2. Pick **one** elephant to observe for 15 minutes.
3. When the Timer says start, the Watchers should observe the elephant and tell the Writer each time it uses its trunk for one of these activities:

Eating – The elephant uses its trunk to pick up grass/hay/food and puts it in its mouth.

Drinking – The elephant uses its trunk to suck up water, and sprays it in its mouth.

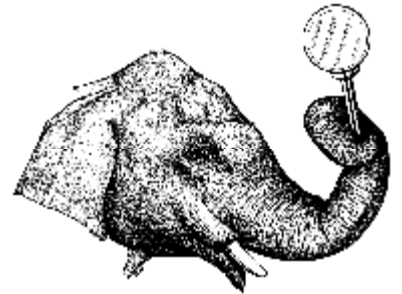
Bathing – The elephant uses its trunk to spray water on itself.

Dusting – The elephant uses its trunk to throw dirt or hay on its back.

Communicating – The elephant uses its trunk to touch another elephant, or to make noise.

Other – The elephant uses its trunk in some other way.

4. Each time the elephant uses its trunk, the Writer makes a tally mark in the box describing that trunk activity to keep track of how many times it does each activity.
5. The Timer should let everyone know when 15 minutes is up and they can stop collecting data.
6. Bring this data sheet back to school with you.



Start time: _____ Stop time: _____

	Eating	Drinking	Bathing	Dusting	Communicating	Other
Number of times						

How Does an Elephant Use its Trunk Most Often? - Results

Name _____

1. Fill in the chart with the number of times each group's elephant did each activity.
2. Calculate the average number of times an elephant did each activity.

To calculate an average, add up the total number of times all elephants did an activity, and divide that total by the number of elephants observed. Show your work here.

Number of times	Eating	Drinking	Bathing	Dusting	Communicating	Other
Group #1						
Group #2						
Group #3						
Group #4						
Group #5						
Average						

3. Create a bar graph. Draw a bar above each measurement category that goes as high as the amount recorded.



4. Looking at your results, how does an elephant use its trunk most often?
5. Was this what you predicted or hypothesized?
6. Why do you think it turned out that way?
7. How could knowing how an elephant at the Zoo uses its trunk most often be useful?
8. What other questions do you have about elephants that you could investigate?