Decoding Data (3-7)

Zoo Wild Pack Follow-Up Activity

At a glance

After using the Wild Pack at the Zoo, students practice their summarizing, analyzing, and presenting skills.

Time requirement

One session of 60 minutes

Grades 3-7

Group size: 10-30

Materials

Completed Wild Pack Investigation Worksheets (brought back from zoo field trip)
Paper and pencils
Calculators
Results Worksheets (Attached. One of each per student)

Goal

To practice summarizing, analyzing, and presenting skills in conclusion of Wild Pack investigations at the Zoo.

Objectives

1. Students will be able to summarize and analyze data.
2. Students will be able to graph the results.
3. Students will be able to draw conclusions from the findings.

Theme

Following data collection, the final steps in scientific investigation include summarizing, analyzing, and presenting the findings.

Academic standards - Science

Ohio Science Academic Content Standards	Scientific Inquiry • Doing Scientific Inquiry (3:3,5)(3:6) (4:6) (5:1) (5:2,3) (5:4-6) (6:2) (7:4) (7:7)(8:1,2) (8:3,4) Scientific Ways of Knowing • The Nature of Science (3:1) (4:1) (5:1) • Ethical Practices (3:2) (3:4) (4:2,4) (4:3)(5:2) (5:5) (7:1,2) (8:2)
Kentucky Core Content—Science	Standard 1 – The Nature of Science and Technology • Scientific Inquiry (3.1.3,4) (3.1.5) (4.1.2) (5.1.2) (6.1.2,3) (7.1.3,4) (8.1.3) • Scientific Enterprise (4.1.3) (8.1.4)
Indiana Science Standards	Unifying Concepts • Interdependence (SC-04-4.7.1) (SC-05-4.7.1) Biological Sciences • Unity and Diversity (SC-06-3.4.2) (SC-07-3.2.1) (SC-08-3.4.4)

Background

Engaging your students in scientific inquiry lets them become the scientists and make scientific discoveries, instead of just reading about them. Studies show that knowledge gained through self-discovery is more meaningful and lasting than if obtained secondhand.

The Q.U.E.S.T. experience outlines the steps of inquiry, which aligns with the scientific method.

1. **Q**uestion & Observe
   The first step is to observe closely and see what questions come to mind.
2. **U**ncover a Comparative Question
   The next step is to develop a meaningful, comparative question to investigate based on the observations.
3. **E**xplore Predictions
   Make a prediction—one that can be tested. A prediction is simply a statement rather than a question. You should have a sensible reason for your prediction.
4. **S**tart Action Plan & Collect Data
   Next step is to make a plan of how to answer the question and collect data. What do we need to measure? How long will it take? What tools do we need?
5. **T**hink Hard About Findings & Share Discoveries
   The last step is to summarize the results to find out whether the prediction was correct. What if the prediction was not true? That's important information, too. Scientists don't always get the answers they think they will.
   How can we share our findings? What further questions could we study based on our findings?

Vocabulary

Comparative question—a question that compares two or more things and goes beyond a simple yes or no answer

Data—measurements or information gathered through scientific investigation

Observe—to watch something closely, or more generally to pay attention with all of your senses

Investigation (inquiry)—the process of asking questions and making discoveries through data collection, critical reasoning, reflection, and sharing ideas

Prediction—statement of what one thinks will happen

Activity

Getting ready
Gather materials.

Doing the activity
Today, students will be concentrating on step five: Think Hard About Findings & Share Discoveries.

Discuss how the data collection for the Wild Pack investigations went at the Zoo. What did they enjoy most? What surprised them? What did they learn from it?

Explain that the next step is to summarize and analyze the results. Pooling together all of their results, they will create graphs to illustrate the class' findings and make it easier to draw conclusions.

Distribute the Results Worksheets and ask the students to compile the entire class' results for each investigation. (Each group should have brought back the investigation booklet(s) from the Zoo, in which the results of each investigation were recorded.)

On the back side of each Worksheet, have the students create a bar graph depicting the results. Do the bar graphs more clearly show the results than just the numbers?

Wrap-up
Did the results turn out the way they predicted? Why do they think the investigations turned out the way they did? How could the information they discovered be useful? What further questions about primates and handedness, plants and seed dispersal, and ants and speed could they investigate? Ask each student to write out his thoughts on the worksheet. As a group, brainstorm ways to share discoveries such as a poster presentation to other classes.

Assessment

Collect the students' worksheets and graphs.

Unsatisfactory—Did not complete the graph and/or discussion questions.

Satisfactory—Completed the graph and discussion questions.

Excellent—Created an excellent graph and provided thoughtful answers to the discussion questions

Resources

Dragonfly QUEST Leader's Guide*:* Leading Teams of Young Investigators on Astounding Expeditions. 1998. Contains detailed descriptions of each inquiry step and sample investigations. Available from Project *Dragonfly*, Miami University. Contact Connie Malone at 513-529-5103 or email malonecm@muohio.edu

Inquiry and the National Science Education Standards: A Guide for Teaching and Learning. 2000.

Yager, Robert E. Inquiry: The Key to Exemplary Science. 2009.

Further investigations and readings related to Wild Pack topics are supported at www.WildResearch.org

Note: Please consider printing the following worksheets double-sided.

Which Ants are Faster: With or Without Leaves?
Data Worksheet

Using the Wild Pack worksheet, write down the data collected from your investigation and those of your classmates.

Ants with Leaves

Time (seconds)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Total: _____

Average: _____
(total time/# of ants with leaves)

Ants without Leaves

Time (seconds)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

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_____

_____

_____

_____

Total: _____

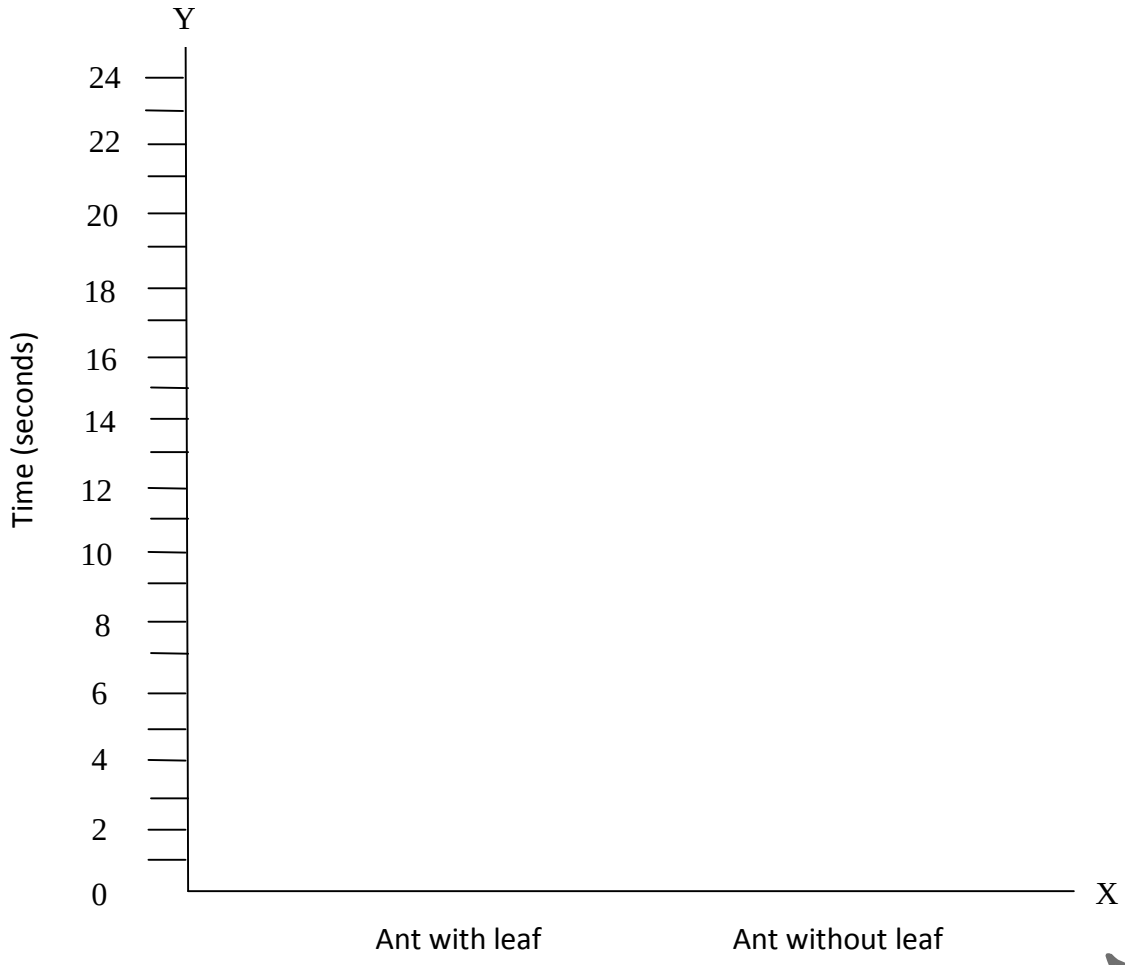
Average: _____
(total time/# of ants without leaves)

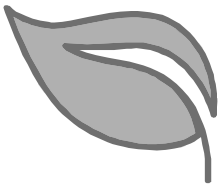
Which Ants are Faster: With or Without Leaves?
Graph

Create a bar graph that displays the average amount of time it takes for an ant with and without a leaf to run the race.

The vertical line (called the y-axis) represents amount of **time in seconds**.
The horizontal line (called the x-axis) represents the two categories: **ants with and without leaves**.

Above the "ant with leaf" category, draw a bar that rises from 0 seconds to the average number of seconds it took an ant with leaf to run the race. Do the same for the ant without a leaf category.





1. Which ants are faster?

2. Why do you think it happened that way?

3. How could this information be useful?

4. What further questions about ants could you investigate?

Cincinnati Zoo & Botanical Garden

Which Seed Falls More Slowly?
Data Worksheet

Using the Wild Pack Worksheet, write down the data collected from your investigation and those of your classmates.

Small Seed Long Wing (SL) Time (seconds)	Small Seed Short Wing (SS) Time (seconds)	Big Seed Long Wing (BL) Time (seconds)	Big Seed Short Wing (BS) Time (seconds)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
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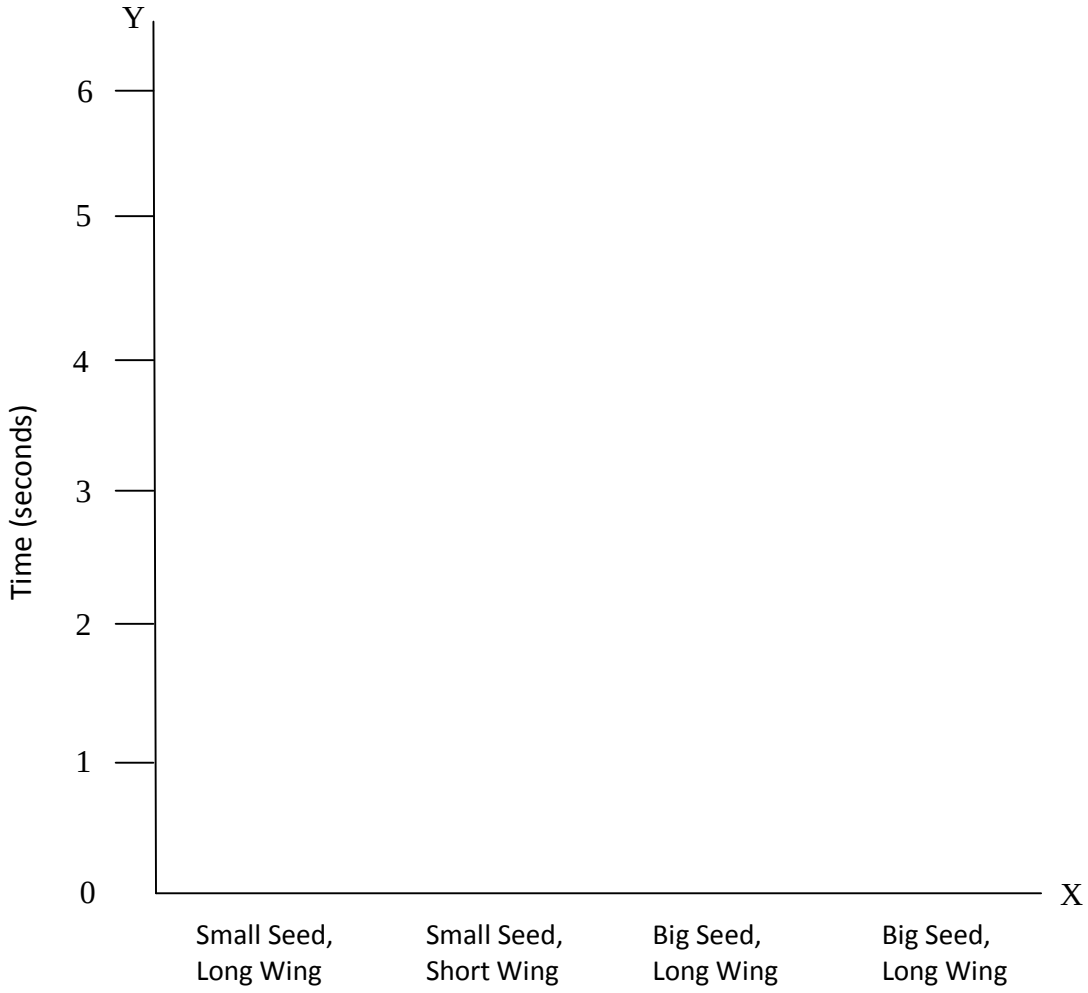
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Total:	**Total:**	**Total:**	**Total:**
_____	_____	_____	_____
Average:	**Average:**	**Average:**	**Average:**
_____ (total time/# of SL seeds)	_____ (total time/# of SS seeds)	_____ (total time/# of BL seeds)	_____ (total time/# of BS seeds)

Which Seed Falls More Slowly? Graph

Create a bar graph that displays the average amount of time it takes for each type of seed to fall.

The vertical line (called the y-axis) represents amount of **time in seconds**.
The horizontal line (called the x-axis) represents the **four categories of seeds**.

Above each seed type category, draw a bar that rises from 0 seconds to the average number of seconds it took that kind of seed to fall.



1. Which seed falls more slowly?

2. Why do you think it happened that way?

3. How could this information be useful?

4. What further questions about seeds and dispersal could you investigate?

Are Primates Left or Right Handed? Data Worksheet

Using the Wild Pack worksheet, write down the data collected from your investigation and those of your classmates.

Left Hand Scores (Total from Wild Pack worksheet)	Right Hand Scores (Total from Wild Pack worksheet)

Total: _____

Average: _____
(total left hand scores/# of teams)

Total: _____

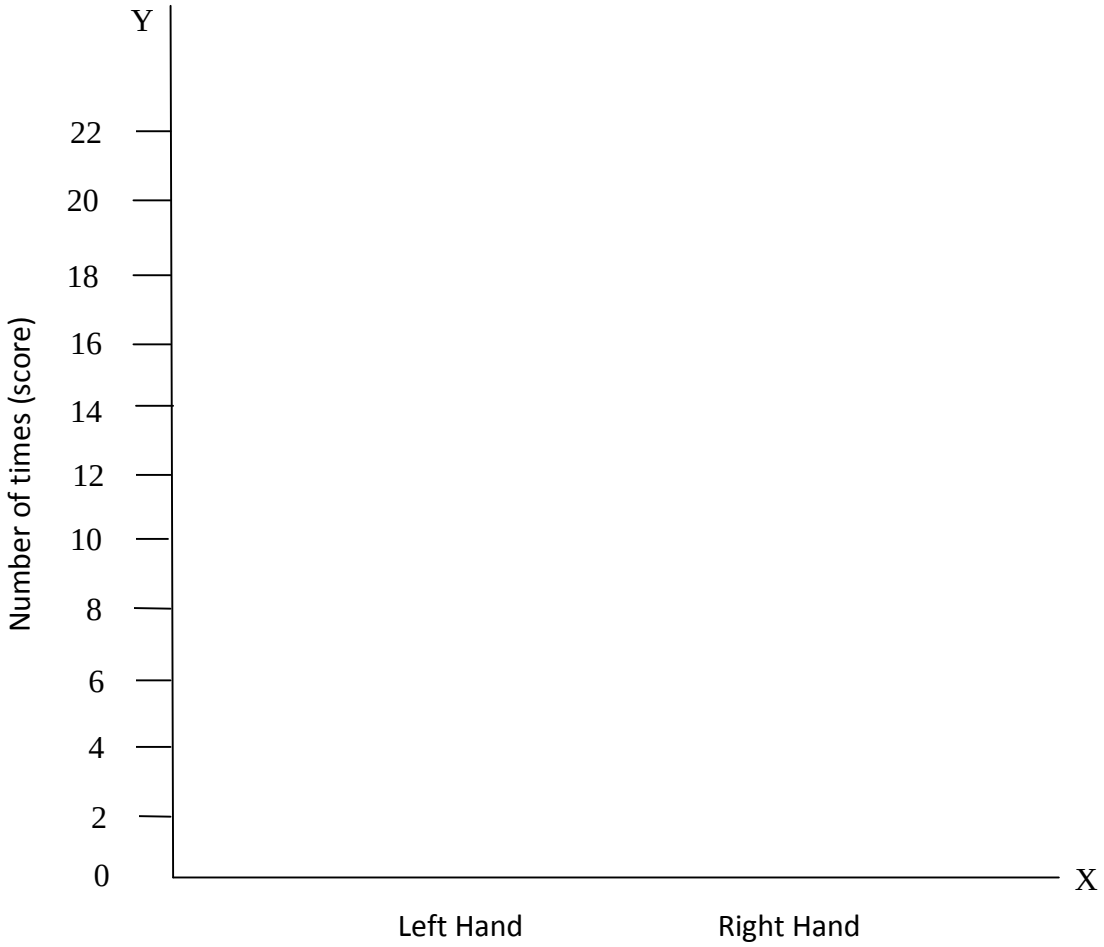
Average: _____
(total right hand scores/# of teams)

Are Primates Left or Right Handed? Graph

Create a bar graph that displays the average number of times a primate used its left and right hands.

The vertical line (called the y-axis) represents the **number of times a primate used its hand.**
The horizontal line (called the x-axis) represents the two categories: **left and right hands.**

Above the left hand category, draw a bar that rises from 0 seconds to the average score, or number of times a primate used its left hand. Do the same for the right hand category.



1. Are primates left or right handed?

2. Why do you think it happened that way?

3. How could this information be useful?

4. What further questions about primates or handedness could you investigate?