

Data Sets: Barf Bag**GENERAL INFORMATION****OBJECTIVES**

1. Students use data that they have collected to make technological exercises more meaningful and fun.
2. Students use science to understand computer software.
3. Students are part of the scientific process, which will give value to the results of the study.

QUESTIONS

How can we help protect plants and animals from becoming endangered? What habitat features can scientists measure to help understand the plants and animals they are protecting?

VOCABULARY

Data, line/bar graph, pie chart, table, spreadsheet, analysis, deduce

ACTIVITY MATERIALS

Data set found at: butternutvalleynaturecenter.com/DataSets.htm

Barf Bag review: butternutvalleynaturecenter.com/pdf/BarfBag.pdf

METHODS**INTRODUCTION**

Preview the main points of the activity and give students an idea of what they will be doing. Tell them they will be using data collected at BVNC during the “Barf Bag” activity. Each team of students dissected a Barn Owl pellet, which is regurgitated indigestible food matter. Students gathered data on external and internal characteristics of the owl pellet, such as weight, width, number of bones, etc. Any skulls were identified to species using a dichotomous key. Review these steps of the exercise to refresh their memory. Point out that using the information gathered from scientific tests can help conservationists understand the needs of Barn Owls. With this knowledge, they can make wise decisions that will help protect the owl.

ACTIVITY

It is the students’ task to analyze the data collected and communicate the results. First, access the data found at the BVNC website. The data are presented in a simple Excel spreadsheet. There are three worksheets within the file:

- Food Species Data – number and name of each species of animal found in owl pellets.
- Average Weight of Food Species – chart for the average

Teacher’s Corner**Grade Level(s)**

9th – 12th

Time

20 – 40 minutes

Learning Expectation(s)**Computer Literacy**

3.1: Students will use technology tools to enhance learning, increase productivity, and promote creativity.

3.2: Students will use productivity tools to collaborate in constructing technology enhanced models, prepare publications, and produce other creative works.

5.2: Students will use technology tools to process data and report results.

6.1: Students will use technology resources for solving problems and making informed decisions.

Learning Expectations(s)**Biology I**

SPI 3210 Inq.1-7

SPI 3210.Math.1

Integration:

Computer technology, biology, math

Datasets: Barf Bag

ACTIVITY (cont.)

- weight of each food species (note: figures are not based on scientifically collected data).
- Total Barf Bag Data – all data collected from pellets (use for your own ideas).

After accessing the spreadsheet have the students create new columns for the following calculations:

- **Biomass:** For each species, use the average weight provided in the worksheet entitled “Average Weight of Food Species”. To find the biomass, multiply the number of individuals by the weight. (e.g. If there are 2 shrews, then $2 \times 10.1 \text{ grams} = 20.2 \text{ grams}$).
- **% Biomass:** Add up the total biomass of all species. Divide the biomass for each species by the total biomass and multiply by 100 (e.g. If the total biomass is 2,207 grams, then the % biomass for shrews is $20.2 \text{ grams} / 2,207 \text{ grams} \times 100 = 0.9\%$. The shrews made up 0.9% of the all the owls’ food intake).
- **Frequency:** Divide the total number of each species by the total number of all animals found in the pellets (e.g. If there are 20 animals found in all the pellets and there are 2 shrews, then the frequency of shrews would be $2/20 = 10\%$. Shrews made up 10% of all food intake.)

Have the students prepare charts, tables, or graphs to depict the results if time allows.

DISCUSSION

Lead the students in a discussion about the result and explain the trends. For example, if the students find more medium-sized rodents in the pellets, then the students may deduce that small ones do not provide enough calories and large ones may harm the owls. Discuss how the frequency calculations may be misleading in determining the bulk of the owls’ diets (one large rodent will make up more of a diet than many small rodents). Discuss other reasons why one rodent type would occur more often in the diet (abundance, ease of capture, daily cycles, etc.). Finally discuss how these results would be important in making decisions about owl conservation.

ENRICHMENT - COMPUTER TECHNOLOGY AND SCIENCE

Computer technology – have the students research the topic of owl conservation and present their findings, results, and conclusions in a power point presentation.

Science - Explore the steps of the scientific methodology and discuss how they were met in this exercise. For example (some steps were performed at BVNC):

- Make an observation (e.g. Examining owl pellets indicates the diet of a Barn Owl.)
- Ask a question (e.g. Are voles important to a Barn Owl?)
- Form a hypothesis (e.g. Voles make up the bulk of a Barn Owl’s diet.)
- Test the hypothesis (e.g. Key owl pellet food species skulls.)
- Analyze the data (e.g. Calculate % biomass and frequency of species found in pellets.)
- Form a conclusion (e.g. Voles do not make up the bulk of a Barn Owl’s diet.)
- Communicate the Results (e.g. Voles are not as important to Barn Owls as other rodent species and therefore vole conservation may not be as important in owl conservation.)
- Make a new observation and continue (e.g. There were many large rodents in the pellets.)

ACKNOWLEDGEMENTS

- Copyright © 2008 Healing Stones Foundation. All rights reserved.
- Activity developed by Allison Mains and Melissa Squirlock; March 2009.
- Adapted lab exercise: Dr. Kamal Islam, Ball State University. Wildlife Biology. November 2005.