Data Sets: Eco-monitoring

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
What is a watershed? Why is the health of a watershed important? How can you measure the health of a watershed? Why is the health of Upper Dry Creek important to the entirety of Dry Creek?

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

ACTIVITY MATERIALS
Data set found at: butternutvalleynaturecenter.com/DataSets.htm
Eco-monitoring activity review:
butternutvalleynaturecenter.com/pdf/AdvEcoMonitoring.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 "Eco-monitoring" activity. These data will be used in a long-term study of the health of Upper Dry Creek. The students measured the physical (pH, dissolved oxygen, temperature, turbidity), biological (animal species), and chemical (creek flow, depth, width, precipitation, substrate, weather, GPS location) conditions of the creek. Point out that using the information gathered from scientific tests can help conservationists understand the cause and effects of healthy and polluted water. With this knowledge, they can make wise decisions that will help protect the watershed.

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 and include the chemical data collected: date, ph, dissolved O_2, temperature and turbidity. Have the students create new columns for the calculations of interest. Students can calculate the overall, yearly, or daily averages of each measurement. If they wish to

Teacher's Corner

Grade Level(s)
6^{th} – 12^{th}

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: Eco-monitoring

ACTIVITY (cont.)
measure trends by season, have them create a new column indicating the season by using the date. For example, they may want to calculate the average creek water temperature in the spring months and compare them to the fall months. They can do this comparison for all the measurements. 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,

ENRICHMENT - COMPUTER TECHNOLOGY AND SCIENCE
Computer technology – have the students research the topic of water pollution or watershed health and 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. The creek water temperature changes.)
- Ask a question (e.g. Does the time of year affect water temperature?)
- Form a hypothesis (e.g. The creek water is warmer in the spring.)
- Test the hypothesis (e.g. Measure water temperature and record the time of year.)
- Analyze the data (e.g. Calculate temperature averages according to season.)
- Form a conclusion (e.g. Average creek water temperature is higher in the spring.)
- Communicate the Results (e.g. Creek temperature changes according to season which may be an important factor in the life found.)
- Make a new observation and continue (e.g. The pH measurements show little variation.)

ADVANCED ENRICHMENT
Estimating Stream Diversity Simulation - This simple model simulates seining a stream for animal life. Sixteen species of invertebrates are sampled as they travel downstream. Counts of individual species, total species and individuals are given to allow calculation of various diversity indices. Follow this link: http://faculty.etsu.edu/jonestc/Virtualecology.htm and navigate to “Biodiversity” and “Estimating Stream Diversity to launch the simulation authored by Dr. Thomas Jones of East Tennessee State University.

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