Instructor Guide

Spring Day 5: Data Entry

Overview

Students practice accurate data management by entering their field results into their Stream Team dashboards. They submit data through a Google Form that automatically generates visualizations in a Google Sheet, with separate tabs for each parameter. With teacher guidance, students check for entry errors and begin organizing their data to share on the class Google Site. If needed, teams can also use this time to finish sorting and classifying macroinvertebrates collected on sampling days.

Standards Alignment

AFNR Natural Resource Systems Career Pathway Standards, Common Career Technical Core (CCTC)

NRS.01. Plan and conduct natural resource management activities that apply logical, reasoned, and scientifically based solutions to natural resource issues and goals.

> **NRS.01.02.** Classify different types of natural resources in order to enable protection, conservation, enhancement, and management in a particular geographic region. (NRS.01.02.04.a., NRS.01.02.04.b., NRS.01.02.04.c., NRS.01.02.05.a., NRS.01.02.05.b., NRS.01.02.05.c.)

Michigan Science Standards, High School Performance Expectations

HS-LS2-6 Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

Learning Objectives

- Students will practice accurate data entry for multiple types of stream-monitoring data, including water chemistry, *E. coli,* and macroinvertebrates.
- Students will evaluate how careful and consistent data entry supports the creation of clear, reliable visualizations that communicate stream health.
- Students will identify unexpected or inconsistent results that may indicate possible data entry errors, recording mistakes, or equipment issues.

Materials

- Stream Team Field Guide
- Computers or tablets
- Dashboard links
    - 01 Data Entry Form
        - **Share with students.** Use in preview mode to enter data.
    - 02 Raw Data
        - **Do not share with students.** Use to edit entry errors.
    - 03 Primary Datasheet
        - **Do not edit**, part of application architecture.
    - 04 Site-Specific Data Dashboards
        - **Share with students.** Use to view plots.
- *E. coli* data folders
    - **Share with students.** Use to view images of processed samples.

Advanced Preparation

1. Make sure each team has access to:
    a. Field Guide data sheets for each sampling date.
    b. *E. coli* images for counting glowing wells.
    c. Macroinvertebrate samples or data if identification is complete.
2. Confirm that your classroom has:
    a. Internet access and ensure that all Google Drive folders and linked files have the correct share settings so that students can view and edit as needed.
    b. Enough devices for students to open the Google Form, PocketMacros app, and dashboard files.
3. Remember to open all the files needed ahead of time on your own device.

Lesson Sequence

Explain: Demonstrate Data Entry (10-15 minutes)

1. Open the 01 Data Entry Form in "Preview" mode (use the icon).
2. Show students how to select the data type: water chemistry, *E. coli,* or macroinvertebrates.
3. Use the calendar icon to select the correct date for each dataset.
4. Show how to read the *E. coli* tray images by counting the fluorescing (brightly glowing) wells. Each tray contains 49 large wells (including overflow well at the top), and 48 small wells.

Tips for success:

a. Subtracting from the total number of cells can be helpful.
b. Count only fully fluorescing wells.
c. Do not enter lab blank data (included for quality control and comparison).

5. If macroinvertebrate sampling was not completed after each Spring sampling day, remind students how to navigate the PocketMacros app for macro identification and sort/count bugs in trays with a brief demonstration.

Elaborate: Student Data Entry (25-30 minutes)

1. Divide tasks between team members, with each team member tackling one dataset (chemistry, *E. coli,* macros). If possible, assign two students to macro ID and entry.
2. Have students check their entries by watching their plots populate in their 04 Data Dashboards. Each team will have a separate dashboard for their monitoring site.
3. Do a quick review of entries; if you see any obvious entry errors in the 02 Raw Data file, point them out and fix them by deleting or correcting the row.

Elaborate: Preparing for Sharing (10 minutes)

1. If you plan to embed your dashboards in a class Google Site, share a quick demo:
    a. From your Google Site, select Insert → Sheets → choose your dashboard.
    b. Position and add textboxes for site name, key findings, action shots, or captions.
2. Show students how to export individual charts.
    a. Click chart → select three dots upper right →Download chart → save as image.