Instructor Guide

Spring Day 1: Field Refresher

Overview

During this Field Training Refresher, students revisit their stream study site to observe seasonal changes, reconnect with monitoring equipment, and review sampling and safety procedures in preparation for spring data collection. Back in the classroom, they complete a reflection worksheet to identify new questions, assess their readiness with equipment and protocols, and note any skills they want to practice before the next sampling day.

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.01.02.05.a., NRS.01.02.05.b.)

NRS.04. Demonstrate responsible management procedures and techniques to protect, maintain, enhance, and improve natural resources.

> **NRS.04.01.** Demonstrate natural resource protection, maintenance, enhancement and improvement techniques. (NRS.04.01.01.b.)

Michigan Science Standards, High School Performance Expectations

HS-ESS2-5 Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

Learning Objectives

- Students will observe and describe seasonal changes at the study site, noting physical and ecological shifts.
- Students will generate new driving questions to guide their spring sampling and data collection priorities.
- Students will refamiliarize themselves with field equipment and sampling protocols to ensure continued accurate and consistent data collection.

Materials

- Stream Team Field Guide (1 per student)
- Spring Day 1 Spring Refresher worksheet (1 per student or group)
- Writing instrument
- Field monitoring kits for *E.coli*, stream flow, turbidity, and macroinvertebrates (per group)
    - Pole samplers
    - turbidity tubes
    - D-nets and kick nets
    - Waders/boots
    - Sorting trays
    - E.coli sample bottles
    - Gloves
- DI water

Advanced Preparation

1. Review any changes at the site (e.g., access issues, new erosion, construction).
2. Check that all field equipment is calibrated and ready to demonstrate.
3. Print and bring copies of the "Spring Refresher" worksheet or make it accessible online.

Lesson Sequence

Time period: 1 class period in the field, plus 10-15 minutes back in the classroom.

Travel to the study site (5 minutes)

Engage: Revisiting the Study Site Observations (10 minutes)

1. Reintroduce students to the study site.
2. Guide students in noting visible changes in streamflow, vegetation, erosion, and possible new sources of pollution, encouraging students to connect back to their observations of the study site from the fall.
3. Facilitate a brief discussion of their observations.

Explore: Equipment and Safety Refresher (30-40 minutes)

<u>Safety Review</u>

1. Review core field safety procedures, including depth checks, proper footwear, and team roles.

2. Demonstrate how to check stream depth before entering. Ask students, "*Why do we check depth before stepping in?*"
3. Reinforce wearing closed-toe water shoes, boots, or waders with good traction. Ask students, "*How does footwear affect safety?*"
4. Remind students to move slowly in the stream, avoid sudden shifts, and stay within their assigned study area.

Equipment Review

1. Pass out the Stream Team Field Guides to students.
2. Remind students of the field measurements they will measure in the spring (flow, water chemistry with probes, *E. coli* samples, macroinvertebrates), referencing the Stream Team Field Guide for full protocols. Have students turn to the sections in the field guide that contain the directions for these parameters to ensure they understand where to find the written directions.
3. Briefly review how to use multimeter probes to collect water chemistry data, including calibration checks, proper submersion techniques, waiting for stable readings, and rinsing the probes after use.
4. Demonstrate how to collect an *E.coli* sample without contaminating the sample.
5. Have students rotate through stations or team roles to practice collecting and recording measurements. No official sampling data will be collected on this date, as it is a day for students to review procedures.
6. As a review, model macroinvertebrate sampling and sorting techniques, following the habitat-specific protocols in the Stream Team Field Guide. Have students turn to the section in the field guide that contains the directions for macroinvertebrate sampling.
7. Review use of macroinvertebrate equipment (trays, forceps, containers). Emphasize correct net placement, proper rinsing, and careful transfer of organisms to trays.

Explain: Complete Spring Refresher Worksheet (15-20 minutes in classroom or on-site)

1. Pass out the Spring Refresher Worksheet.
2. Guide students through completing the three reflection questions on the worksheet, giving students time to complete the worksheet one question at a time. Encourage students to use the "Think About" prompts to add specific detail rather than general statements.
3. For question 1 on the worksheet, encourage students to think back to their first moments back at the study location earlier in the class period.

    Question 1 Sample Discussion Questions:

- *What changes did you notice right away when you arrived at the site? Why do you think those changes occurred?*
- *Are any parts of the streambank more eroded than in the fall? What might have caused that?*
- *Did you see anything that surprised you or contradicted what you expected to find this spring?*

4. For question 2, support students as they identify new sub-questions for the spring investigation. Remind students how sub-questions help guide their data collection and connect back to their driving question from the fall.

   Question 2 Sample Discussion Questions:

   - *What did you wonder about during fall sampling that you can now explore further?*
   - *How do your new observations help you refine or expand your original driving question?*
   - *Which of your questions could be answered with the data we'll collect this spring?*

5. For question 3, have students reflect on their comfort with equipment and sampling procedures. Prompt students to identify which tools they remember well and which they want to review (e.g., multimeter probes, flow measurement, macroinvertebrate nets).

   Question 3 Sample Discussion Questions:

   - Which piece of equipment do you feel most confident using right now? Why?
   - What part of the sampling process feels the least familiar after the winter break?
   - Is there anything you want demonstrated again before we begin collecting data?

6. Invite students to share one new question they're curious about this spring. Ask students, "*Did anyone's observations raise a question you think the whole class should investigate?"* Consider capturing shared questions on the board to reference during upcoming sampling days.