Environmental Education & Urban Teacher Initiative
A partnership of Michigan Technological University, Michigan Alliance for Environmental & Outdoor Education & Belle Isle Nature Zoo
with funding from the U.S. Forest Service

Field Investigations: Designing and Conducting Scientific Research Outside
9:00-3:30 pm, Saturday, March 12, 2011

Presenters:
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Workshop Description:  Teachers will learn to design and implement effective inquiry-based field investigations that are linked to the Michigan Grade Level Expectations. Students will construct knowledge of science content concepts related to life, physical, and earth science.

AGENDA
8:55 am  Welcome, Introductions, workshop overview, and credit options
  - Should we continue Saturday PD workshops or switch to multi-day workshops with overnight at nature center?

9:00  Essential Elements of Field-Based Scientific Inquiry
  • What can I monitor/measure with students on my school grounds? (30 minute walk outdoors)
  • Teacher teams brainstorm “questions” that their students could answer by collecting data, i.e. conducting scientific research in their schoolyard:
    ➢ Biotic measurements: Insects, Birds, Plants, Animals
    ➢ Abiotic measurements: air temperature, soil temperature, precipitation (rain gauges), soil moisture
  • Group questions by research focus: insect, bird, soil, weather, wildlife, and by research approach: descriptive, comparative (times of year, different years, different locations, etc.), correlational
  • Correlation with K-7 Michigan GLCEs – Constructing New Scientific Knowledge

10:00  Demonstrate Schoolyard and Natural Area Investigations of birds, plants, animals, soils, weather
  • Data collection methods & equipment/supplies needed
  • Record-keeping (data forms, etc.)
  • Data analysis

(1) Insects (Lisa)
  • Sweep netting - field or lawn
  • Hula-Hoop sampling
  • Beat sampling - insects in saplings, shrubs
  • Pit traps

(2) Plants & Soil (Joan)
  • Transects (biodiversity)
  • Quadrats (m²) or hula-hoops (productivity)
  • Soil texture, moisture, permeability

11:00  Switch groups; repeat 1 & 2
Noon      LUNCH

12:30 pm    (3) **Birds** (Joan, Lori Golani, Candace Kawatsu)
            (4) **Animals & Weather** (air temp, wind speed & direction, precip, etc.) (Lisa)

1:15        Switch groups; repeat 3 & 4

2:00        **Planning Your Field Investigations**
            • Student preparation, organizing student work groups, safety
            • Making interdisciplinary connections – reading, writing, math, science
            • Student assessment & sample rubrics
            • State and national environmental monitoring programs
            • US Forest Service: Investigating Your Environment (CD) and Discover Your Forest

2:45 pm     Team planning – teachers meet by school or grade level to plan a scientific investigation

3:15-3:30pm Evaluations & Closing

**Monitoring Equipment**
Insect pit trap
GPS units
Plasticine (for bird eggs)
Clipboards
Pencils
Yarn loops (meter length)
Hoola hoops
PVC quadrats
Thermometers – air, soil
Tweezers
Plastic gallon jugs & large soup cans
Meter tape
Scissors
Trowels or metal spoons
Supplies to make bird feeders – suet, onion bags, pine cones, peanut butter, black oil sunflower seeds, cornmeal, string,
wire, foot-long ¾” diameter sticks
Hand lenses (10 classroom set)
Bug boxes (30 classroom set)