MANAGING AND CREATING SUSTAINABLE HABITATS: A STEM COURSE

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ABSTRACT

This two-week experience has been developed as a multidisciplinary, experiential, service-learning course taught on-site at Environmental Studies on the Piedmont (ES), a research, education and conservation organization headquartered on a 914 acre field station in the Northern Piedmont, Virginia, It is co-taught by a biologist and geologist. Students are expected to participate fully as a team-member, simulating the professional expectations of a group employed to construct wildlife habitats. They develop an understanding of the needs and methods of creating and maintaining a diversity of habitats in keeping with the mission of ES by: an introduction to “nature awareness” and the animals and plants that inhabit various ecosystems at ES; developing the skills of basic map making and use of surveying equipment (pace and compass, transits, GPS); and creating and implementing a final project to maintain existing, or constructing new habitats. Students complete daily mapping projects and math sets, investigate the local ecosystems, and maintain a daily field-note book with both “front-line” and “reflective” journaling. In teams, working with the field station staff, they then design projects that enhance a wildlife habitat at ES, and complete the site work. Finally they present on their endeavors, mistakes and solutions, and strategies for future projects. We hypothesize that students will self identify increased interest, capacity and ability to apply their canonical knowledge and consequently improve understanding and retention of that knowledge.

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SCIENCE & TECHNOLOGY

SCIENCE
Skills in map making
Coyote Learning
- What animal or plant?
- What are they doing?
- Why?

What are their needs?

Following tracks

GPS

Collecting salamanders

Transits

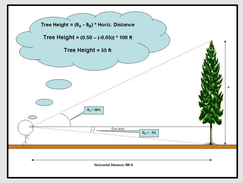
Bear scratches

TECHNOLOGY
Pace and Compass, cell phones, transits, GPS and GIS

ENGINEREERING & MATH

ENGINEERING
Surveying of ecosystems
Construction

MATH
Math problem sets
Algebra, angles, distances, conversions



OUTCOMES

HOW DO WE KNOW SOMETHING HAS BEEN LEARNED?
4 LEVELS OF LEARNING.

1. UNDERSTANDING:
Key words: Knowing, memorizing, insight, seeing the logic.
- Identify animals and plants, and their habitats.
- Gaining an understanding of ecosystem function

2. SKILLS:
Key terms: increase proficiency, mastery, craftmanship,
- Designing and implementing habitat improvements
- Neat accurate field notes. Front line journaling
- Opportunities and limits of equipment

3. AFFECTIVE:
Key terms: Inspired, motivated, gaining confidence, learning to appreciate
- Gain confidence in making observations in the field
- Gain confidence in interpreting the data
- Discover a passion (hatred) for fieldwork
- Teamwork is a necessity and can be fun!
- Investment in project

4. HABIT:
Key terms: automatic, improvise on, integrating, flow
- Problem solving
- Teamwork
- Navigational skills
- Visualize habitats as a complex system
- Reflective practice
- Patience and clear thinking in stressful conditions
- “I can do it”

PROBLEM-BASED LEARNING

STUDENT CHOOSE THEIR FINAL PROJECT BASED ON FIELD STATION NEEDS & THEIR INTERESTS.
Service Learning: Experiential Learning

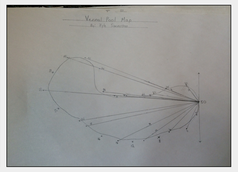
SALAMANDERS. Two examples
BUILDING VERNAL POOL
VERNAL POOL STABILIZATION

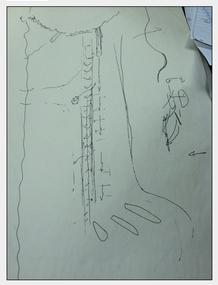
Spotted salamander

Building a vernal pool

First spring

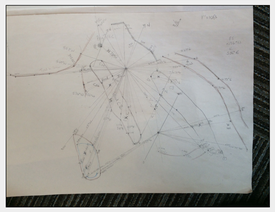
Tape and smart phone map of the pond:





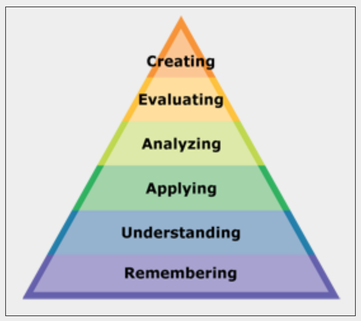
Planning the project

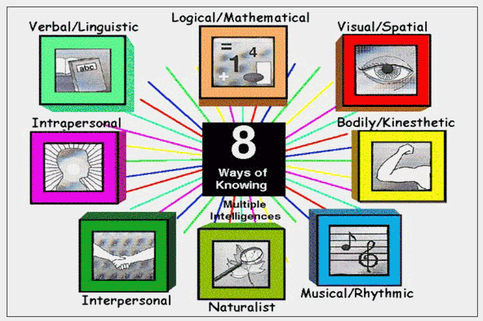
Transit map of the ponds that dry up

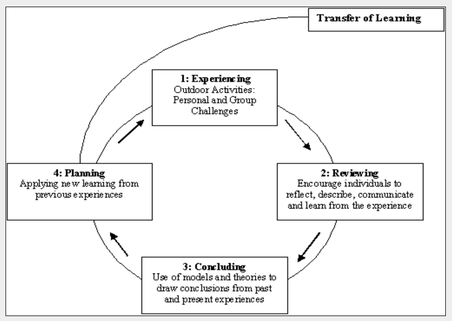


Tom Wood

Learning Models







Comments

Way beyond a “lets pull invasive species” service-learning project. Students were motivated to create great maps. Students were not content with incorrect data and analysis and created maps. Would take their “free time” to repeat projects.

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