

TEACHERS AS FIELD GEOLOGISTS

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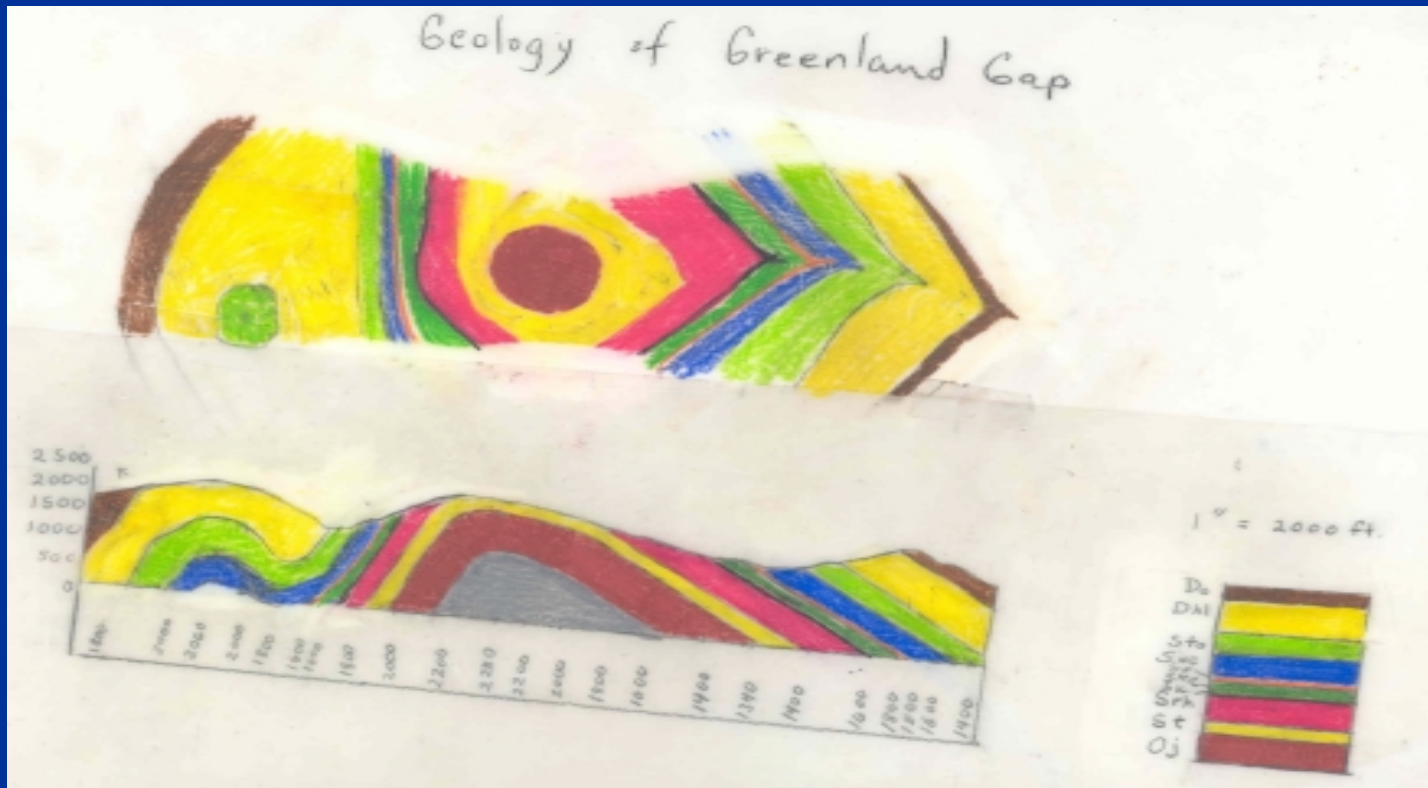
2002 Denver Annual Meeting
Session No. 55, Geoscience Education
Colorado Convention Center: Room C109
8:00 AM- 12:00 PM
Monday, October 28, 2002

Eight graduates of the West Virginia Geological and Economic Survey's decade- old RockCamp K- 12 Professional Development Program were selected to engage in a 14- day residency field experience. Under the supervision of geologists from the West Virginia Geological and Economic Survey, a situated learning experience was developed to model the typical summer field camps attended by undergraduate geology majors. The goal was to have the participants develop a deep appreciation for how geologic field work is accomplished, understand how the accumulated data is assessed and used, and engage in the scientific processes required to construct a meaningful geologic map. Working on selected exposures within the Valley and Ridge Province of West Virginia, teachers were asked to describe sections, measure strike and dips, make interpretations, plot data, and construct individual geologic maps and cross sections.

The rationale for the program was based on the observation that typical undergraduate college preparation for the teaching of earth science does not typically entail more than a survey of geologic principles. More significantly, it is short on the "methodology" of geologic research. As a result, both pre- and in- service K- 12 teachers are "told" how to read a geologic map. With no attempt to make a map, their appreciation of the geologic scientific processes represents a potentially serious classroom deficiency. This deficiency manifests itself when, as the National Science Education Standards (National Research Council, 1996) mandates, they extend themselves to present science in a more inquiry- based constructivist mode.

Pre- and post- testing instruments, group interviews, and individual journaling were developed and administered by Fairmont State College's science education professor. Preliminary analysis of evaluation data suggests participants enhanced their awareness of techniques needed to construct geologic maps. Additionally, relative to the transference of their experience to their students, the data suggests: 1. heightened interest in teaching geologic processes, 2. revised interest in the nature of scientific research, 3. realistic attitudes toward science in general, and 4. greater appreciation of the role inquiry plays in "doing real science."

GEOTEACH: Teachers as Field Geologists



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Deb Hemler, Fairmont State College

Paula Waggy, Pendleton County Schools

Tom Repine, West Virginia Geological Survey

GEOTEACH:

**A pilot project
in field geology for
West Virginia
K-12 science teachers.**



Part 1: The Program

Co-operative Partners

West Virginia Geological & Economic Survey



Fairmont State College

Funding

West Virginia Higher Education

Policy Commission

through the

Eisenhower Professional

Development Program

(No Child Left Behind Act)

(Grant EPDP-02-WVGEO-1)

GEOTEACH Rationale

- Typically, undergraduate geology classes West Virginia teachers are most exposed to are short on the methodology of geologic research.**
- Higher education instruction, for the most part, remains mired in the idea of “telling” not “doing.”**
- The movement toward inquiry-style instruction requires new ideas for teacher professional development.**

GEOTEACH Pedagogy

- **Situated learning experiences/Immersion**
- **Inquiry in “doing geology” rather than being told about geology**
- **Coaching more than instructing**
- **Constructing knowledge and skills**

GEOTEACH Participants

- 8 teachers (all women)
- Previous RockCamp training
- Expenses paid
- Stipend offered
- Equipment/transportation provided
- Conduct local/statewide peer sharing



GEOTEACH Schedule

- Two day weekend: Introduction
- Five day week: Measuring sections
- Five day week: Making a map
- One day: Review, assessment

Total = 13 days (and nights!)

= at least 156 instructional hours

Preliminary Results

- ✓ Use of inquiry technique allowed participants to “do real science.”
- ✓ Immersion enhanced understanding of the nature of geologic research and attitudes about the way geologic data is acquired and interpreted.
- ✓ The effort helped develop a better appreciation of what a geologic map is and how it is made.
- ✓ How does this translate into the classroom? Needs study, but was never primary objective.

Part 2: A Teacher's Perspective



Skills



Location,
location,
location



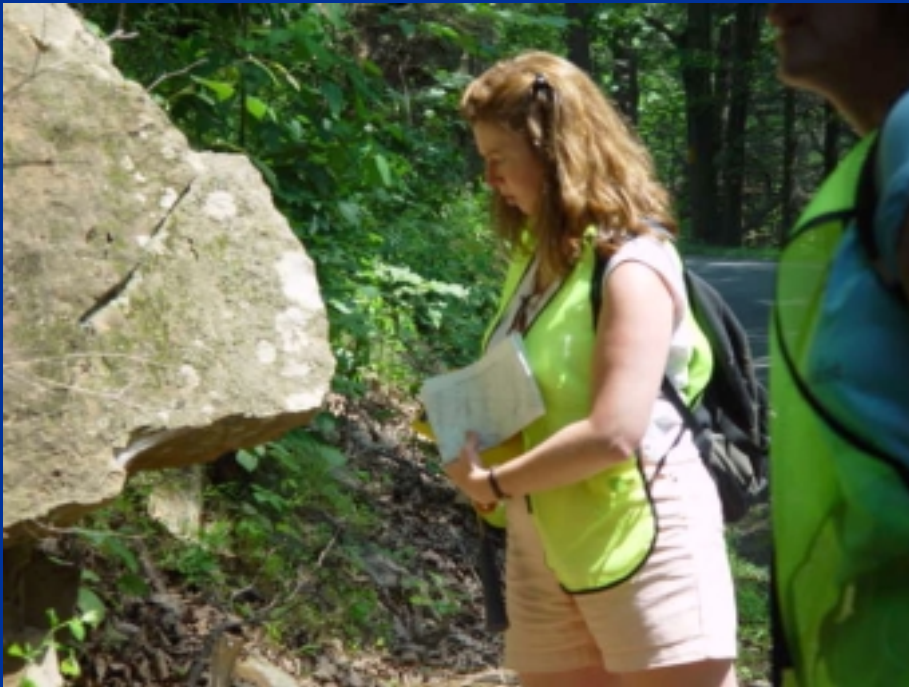
The Brunton



“Now, I understand strike and dip!”

Describing rocks for real!

(“The field book really is important!”)



Stratigraphy



Field Book to Geologic Column

120

Contact

↑ Same

Big, blocky beds of dark gray fine-grained calcareous sandstone, Thin fossil zones of brachiopods. Brimstone smell.

Blockier rock, very fine-grained, ^{sulfur stain} brimstone smell. calcareous

Thinly bedded limestone with brachiopods and cherty nodules, lots of calcite crystals

N 35° E
87° NW

100

Very thin layers of micritic limestone. Surface covered with dark gray and white evaporite from algae growing on wet rock. Some cherty areas, brachiopods in 80'-90'.

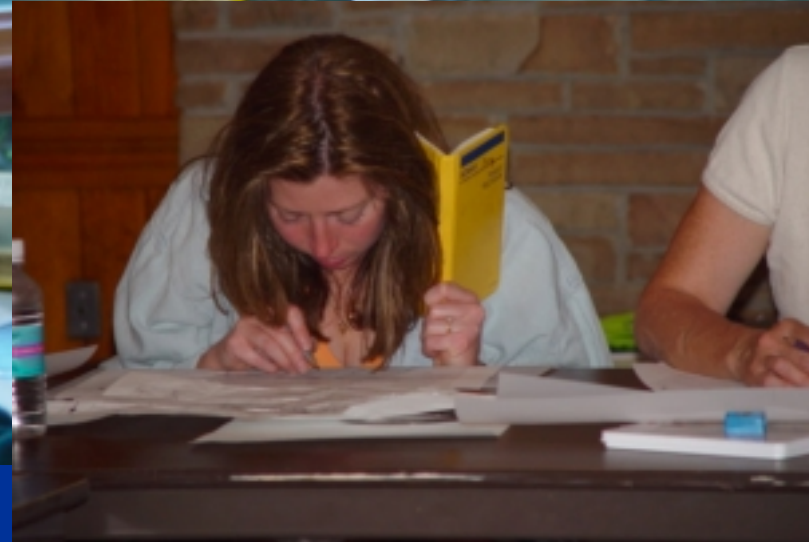
80

dk gray micritic limestone with calcite veins. Knobbly beds 6-8" thick, some thinner - gray crusty from algal growth - so for at seep
dk gray micritic limestone
some deformation

for at seep

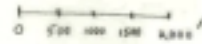
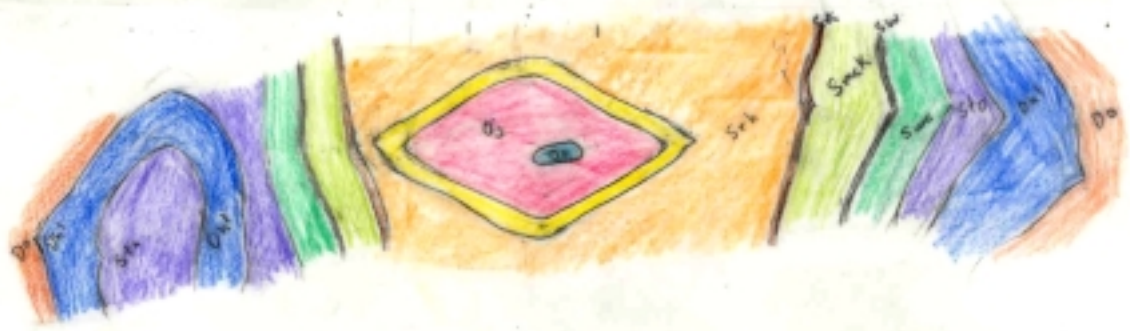
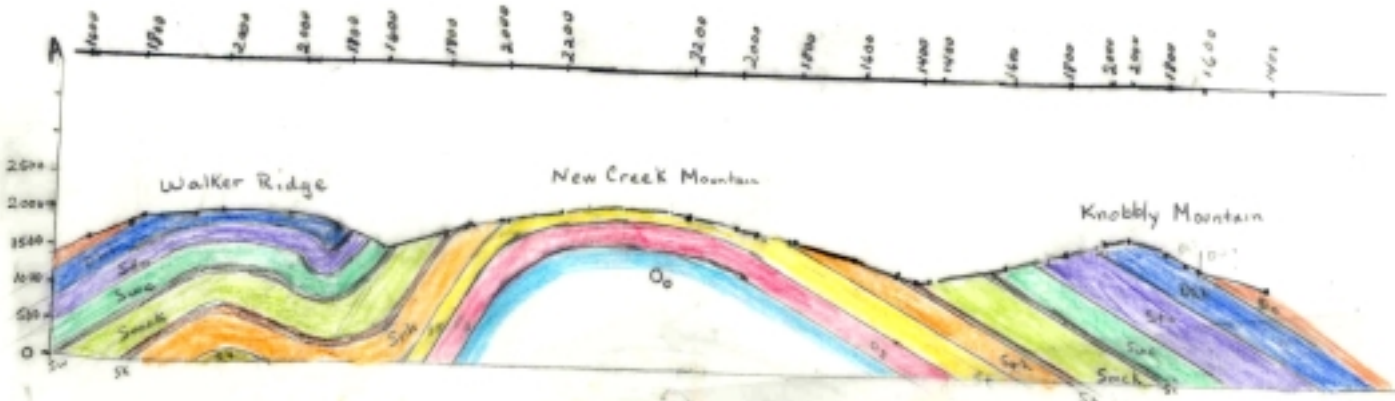
60

Field Data to a Geologic Map



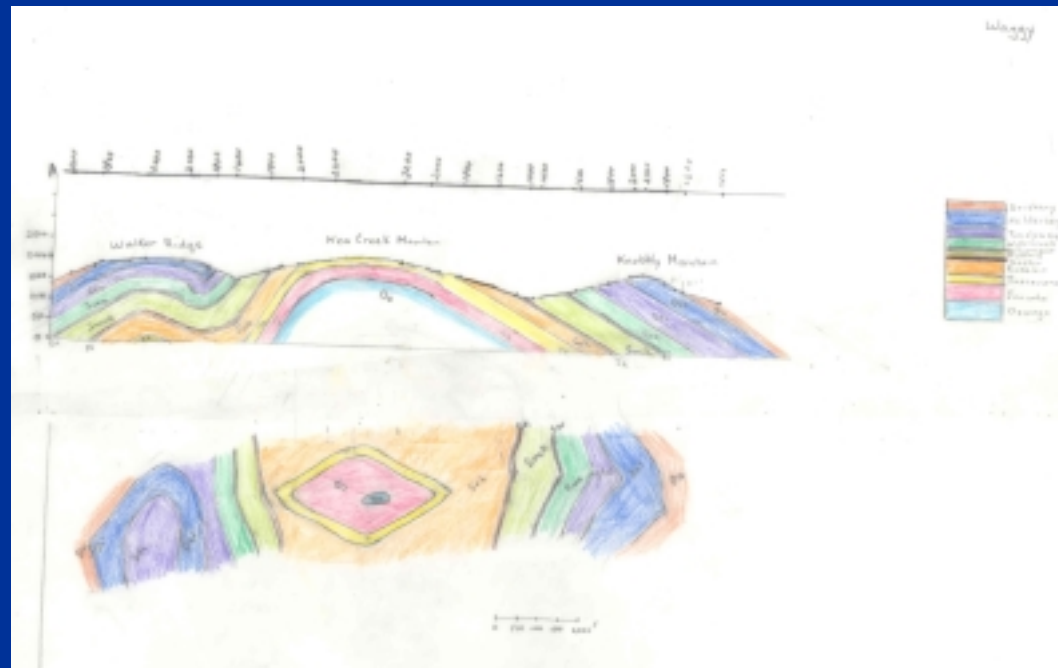
Geology of Greenland Gap

Waggy





(“Your map and cross section are different than mine?!”)





Better understanding of geologic maps

A different mindset!

- What it's like to be a field geologist
- Looking for clues
- Rock units are “schizophrenic”
- Organization important
- Open to interpretation



Empowerment: Being a better teacher of geology.

- Confidence
- Peer sharing
- Student research
- Content
- Nature of science
- Habits of mind
- Better classroom use of geologic maps





Fun!!

