The Yellowstone REU Site Project: Building Confidence, Competence and Capacity

D. W. Mogk, Dept. Earth Sciences, Montana State Univ., Bozeman, MT, (mogk@montana.edu)
D.J. Henry, Dept. of Geology & Geophysics, Louisiana State Univ., Baton Rouge, LA (glhenr@lsu.edu)

Yellowstone REU - True Research Experience

“Core” concepts/content from geoscience curriculum
Meaningful and relevant to students
Strong affective component
• Curiosity, motivation
• Collaborative and cooperative work
• “Ownership” of larger project
• Responsibility for personal contributions
• A trusting work environment

Excitement about making truly new discoveries

Choosing the Right Project

Emphasis that real contributions will be made
Calibrated to students’ expected knowledge and abilities
Addresses authentic research questions.

The field is where the truth resides; it is the essential core of geology. Models are essential figments of the imagination which must be tested by observation. Those who do no field work and do not gather data will never understand geology.

John Dewey, quoted in Butler (2008)

Preparing for the Research Experience

First Two Weeks
• Traverse entire study area,
• Introduction to major units, structures
• What is known, what is yet to be determined?
• Field notes
• Measurement—structural data, strat sections
• Sampling—objectives, strategies
• GeoPads and other instruments

Logistics
• Where do we need to go, how will we get there, what’s the best traverse?
• Daily Check—objectives, location, target samples, gear check, safety

Instructor “talk-throughs”

• Field notes
• Measurement—structural data, strat sections
• Sampling—objectives, strategies
• GeoPads and other instruments

Project Description

“Cradle to grave” research experience of a significant scientific problem

Field work—sampling and mapping
• Formulation of research questions - what can reasonably be done in field context
• Planning and execution of research plan
• Sampling, mapping as required
• Daily data compilations; sample control

Sample preparation (cutting billets, crushing rocks)

Analytical studies during following semester
• Microprobe, XRF, LA-ICPMS, Ar-Ar, ...

Communicating results

• Poster at Rocky Mountain GSA
• Writing retreat—each project will be a section of a larger research manuscript
• Senior Thesis

Lessons Learned or Relearned

Geologic mastery requires a long apprenticeship
Field work must be practiced early and often
Scaffolded to students’ level of development
REU is a great transition to profession, grad school
Faculty impacted in many ways
• Rejuvenation!
• Great students! Great geology!

Other: athletes, EMT…

Accepting applications for the 2011 summer season
http://serc.carleton.edu/36703

Research Project: Design and Implementation

List key targets, sampling/mapping goals, scientific objectives

Each student assumed leadership to pursue research goals, directed team on where to go, what to do

Each student contributed to overall research effort. E.g. collecting samples for a given task if the primary leader would not likely get to that location

TRUST, RESPECT

Assessments

Daily reflective journals
• Most important observations of the day
• New questions, new plans for future work

De-briefs after dinner
• What each group saw, inform other groups about key observations

Compilations
• Structural data, sample inventories, photos
• Make sure that sampling was adequate to answer ALL fundamental questions

• NPS permitting restrictions!
• ALL data are shared and available on the closed SERC website

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