

Implementing Course Design *or* “Now what?”

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Background

- Course *re*-design
 - Lab for year-long intro course
 - Most students are NOT geology majors
 - Lab required
 - Fulfils gen-ed requirement
 - Originally:
 - Met once per week, 2.5-hour session
 - 15 students per lab
 - Labs in Fall semester only
 - Taught by graduate students



Now What? ADE

- Ready?
 - ASSESS
 - Set?
 - DETERMINE GOALS
 - Administrative requirements
 - Departmental requirements
 - Available resources
 - Go!
 - IMPLEMENT
 - Evaluate
 - (and repeat)



Ready? Assess Current Labs

- Written student evaluations after each lab
 - Anonymous
 - Students were asked
 - To evaluate
 - Lab exercise
 - TA
 - What they think they learned
 - Oral debriefings with TAs after each lab

1998 1999 / / / /
Arrival at UB Evaluations

Ready? Assess the assessment

- End of semester evaluation as well
 - What labs worked? Why?
 - What labs didn't work? Why?
 - What labs could've worked with different teaching methods?

A horizontal timeline diagram with a wavy line representing time. The years 1998, 1999, and 2000 are marked along the line. Below the line, the text 'Arrival at UB' is written above the year 1998, and 'Evaluations' is written below the year 2000.

Ready? Identification of “Bad Labs”

- Each semester, identified worst 3 labs
 - Determined if they could be fixed or not
 - What skill is that lab trying to teach?
 - Can the same skill be taught in a different way?
 - Trashed hopeless labs

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1998 1999

Arrival at UB Evaluations

Set? Logistical Requirements

- Administrative
 - Increase enrollment
 - Decrease handouts (create lab manual)
- Space
 - One small classroom with no sink, no running water, no computer
 - Can't go outside after mid-October
- Time
 - Decrease lab to 2 hours
 - No lab the first week of class

Set? Scholarly Requirements

- What do the upper-level instructors want majors to know?
- Surveyed instructors via email
- Ranked requirements by frequency and importance

Set? Scholarly Requirements

- Minerals and rocks:
 - Quartz
 - Calcite
 - Other rocks, rock-forming minerals not as important
- Collect data and graph it
- Interpret graphed data
- Read a map

Set? My Requirements and Goals

- Fun
- Active
- Local
- Make it connect with what they're learning in lecture
- Make it worthwhile: this is the ONLY science course most of the students will get

Set? My Goals: The 3 A's

- Awareness
- Appreciation
- Action



Nuts and Bolts: What we did

- Went to full year of labs
 - Second semester optional; required for majors
 - Designed & implemented 6 new labs in one year
 - Found out which ones needed help
 - Improved them
 - Ran 'em again the following year

1998 / 1999 / 2000
Arrival at UB Evaluations Added 6 labs Evaluations

More Nuts and Bolts

- Ran same labs year 2
- Terminated some labs after year 2
- Returned to one-semester schedule in year 3
- In year 4, had to go back to same # of labs but now stretched over the whole year...

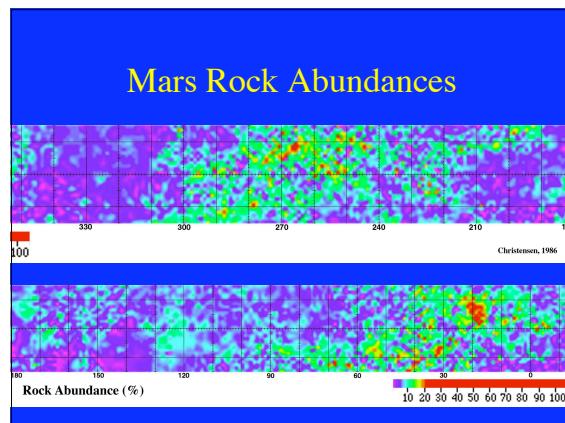
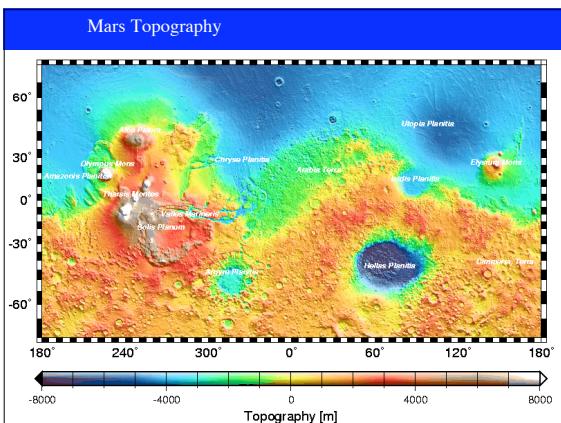
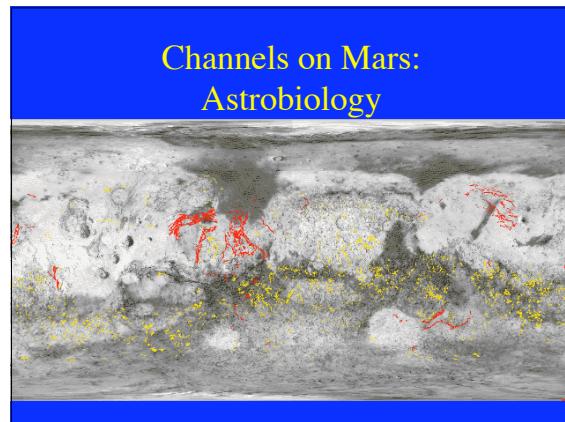
1998 1999 2000 2001 2002 2003 2004
Arrival at UB Evaluations Added 6 labs Improved 6 labs Trashed 6 labs New manual Evaluations Evaluations

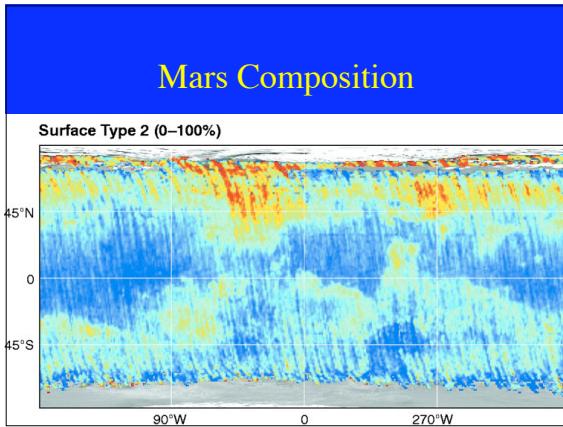
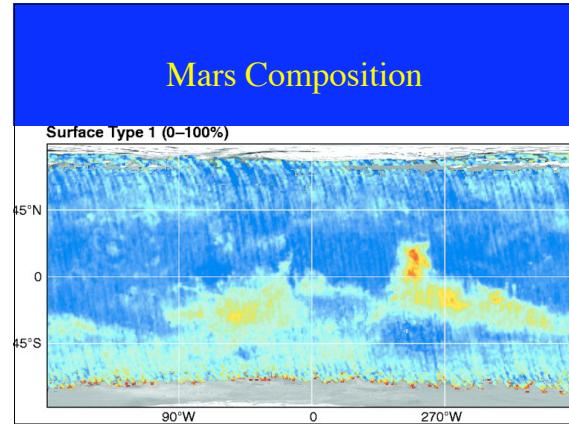
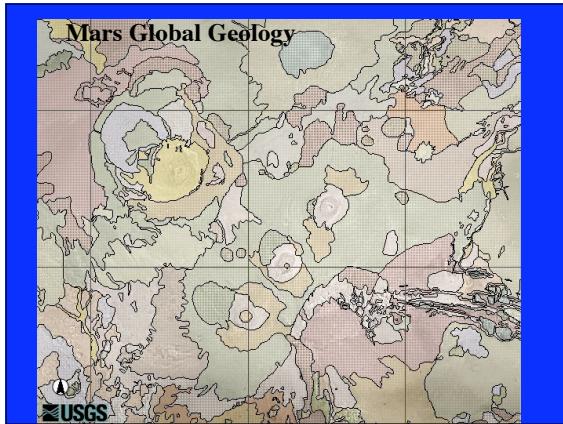
Examples of “New & Improved” Intro Labs

- Rock & mineral ID
 - Trip to campus cemetery
 - Student-based classification schemes
- Fossils
 - Dinosaur footprints & calculating dino speed
- Map reading
 - Selecting the next Mars landing site
 - Creating a lunar geologic map

Mars Landing Site Selection

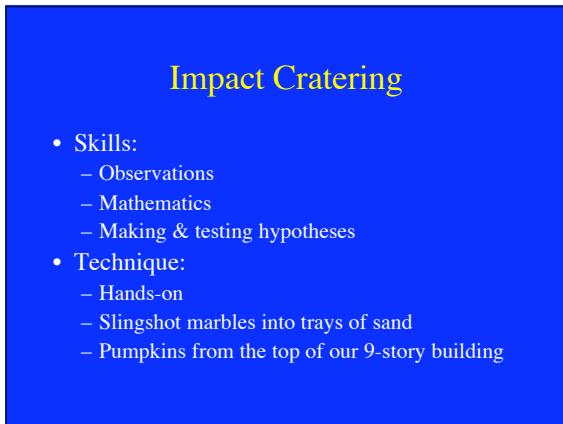
- Skills:
 - Map reading
 - Scientific consensus
- Technique: Jigsaw
 - Students are assigned to be one of:
 - Astrobiologist
 - Engineer
 - Geologist
 - Determine top 3 landing sites given constraints





Examples of “New & Improved” Intro Labs

- Rivers
 - Stream table
 - Geologic hazards
- Geologic dating
 - Made competitive
 - Used radiometric dating to explore geometric relations, graphing
- Impact cratering



Lessons Learned: Goofs

- Labs that take 2 weeks (Mars OK)
- Labs with “too many” rocks or minerals
- Labs with “too much” reading before or during
- A bad TA can ruin everything

Big Losers

- Acadian Orogeny
- Taconic Orogeny
 - Too much reading
 - Too many rocks that weren’t “real”
 - Students smelled fraud, fear and disorganization

Continuing Process

- Still have students evaluate every semester
- Ask faculty every year what they want their students to know
- Meet with TAs at least weekly
- Add supplies gradually as department can afford them

Course (re)Design Implementation: Conclusions

- Keep an open mind
- Be aware of your:
 - Requirements (at all levels)
 - Limitations (temporal, spatial, financial, intellectual...)
 - Goals
- LISTEN!
 - To the students
 - To the TAs
 - To the other faculty

Course (re)Design Implementation: Conclusions

- Ready?
 - Assess current status
- Set?
 - Determine requirements, limitations, goals
- Go!
 - Try new things
 - CONSTANT evaluation

ADE

- Assess
- Determine
- Evaluate

“Success is the ability to go from one failure to another with no loss of enthusiasm.” -- Churchill

(Rinse, lather, repeat)