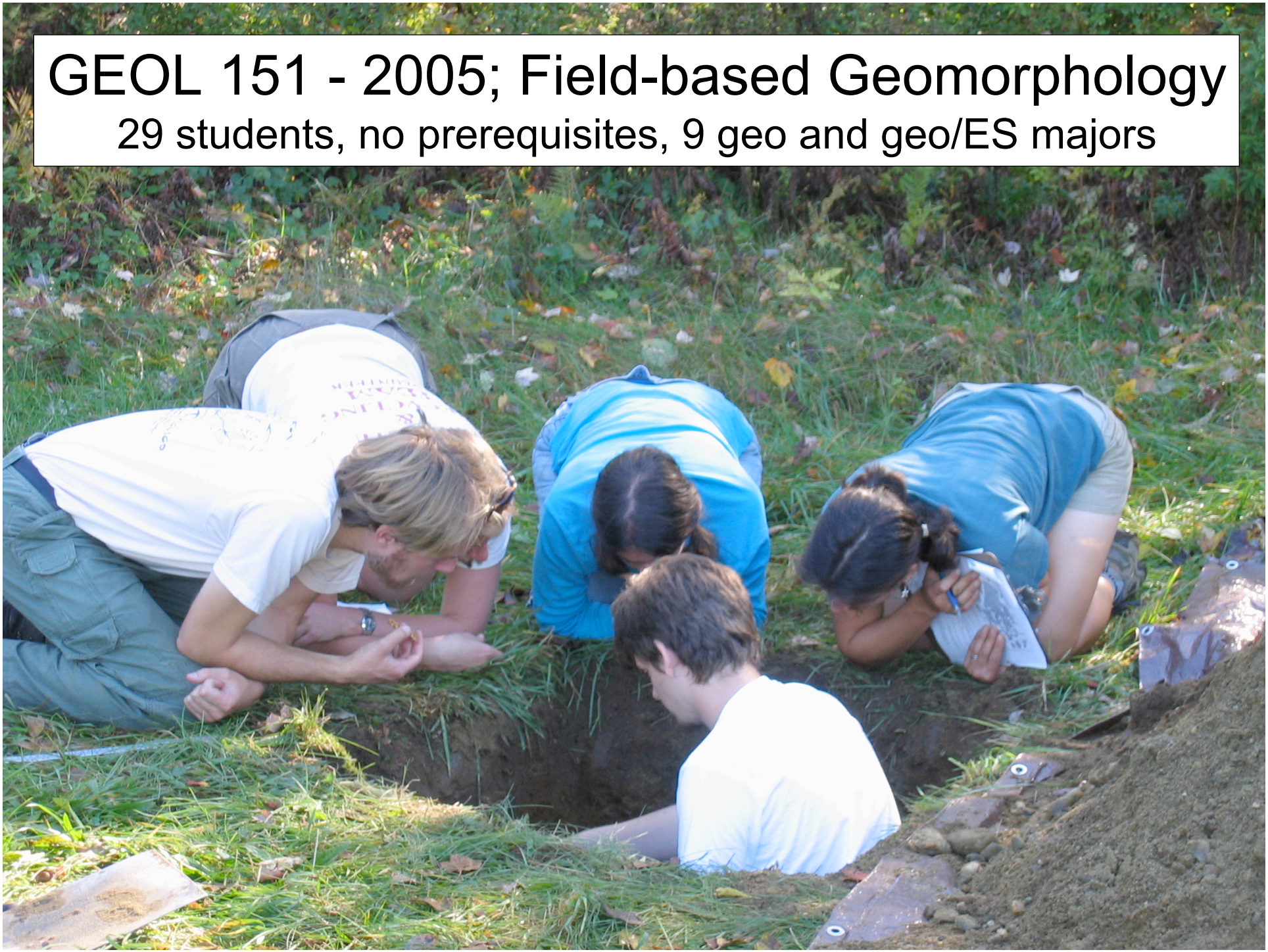
GEOL 151 - 2005; Field-based Geomorphology

29 students, no prerequisites, 9 geo and geo/ES majors



Very detailed Class Plan, extensive assessment. Some survey fatigue…..

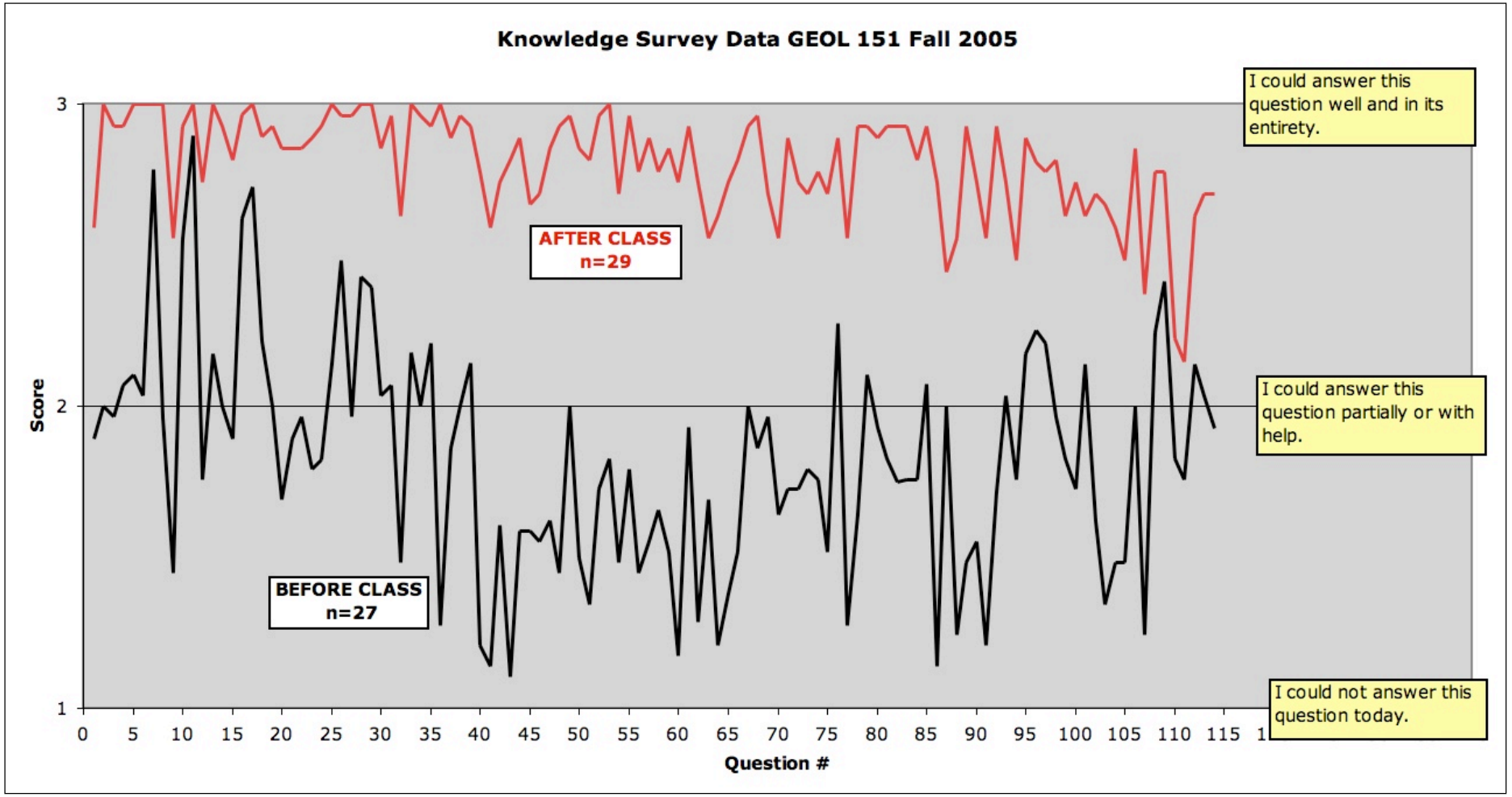
GEOMORPHOLOGY (GEOL 151) -- Class Plan with Learning Goals, Fall 2005

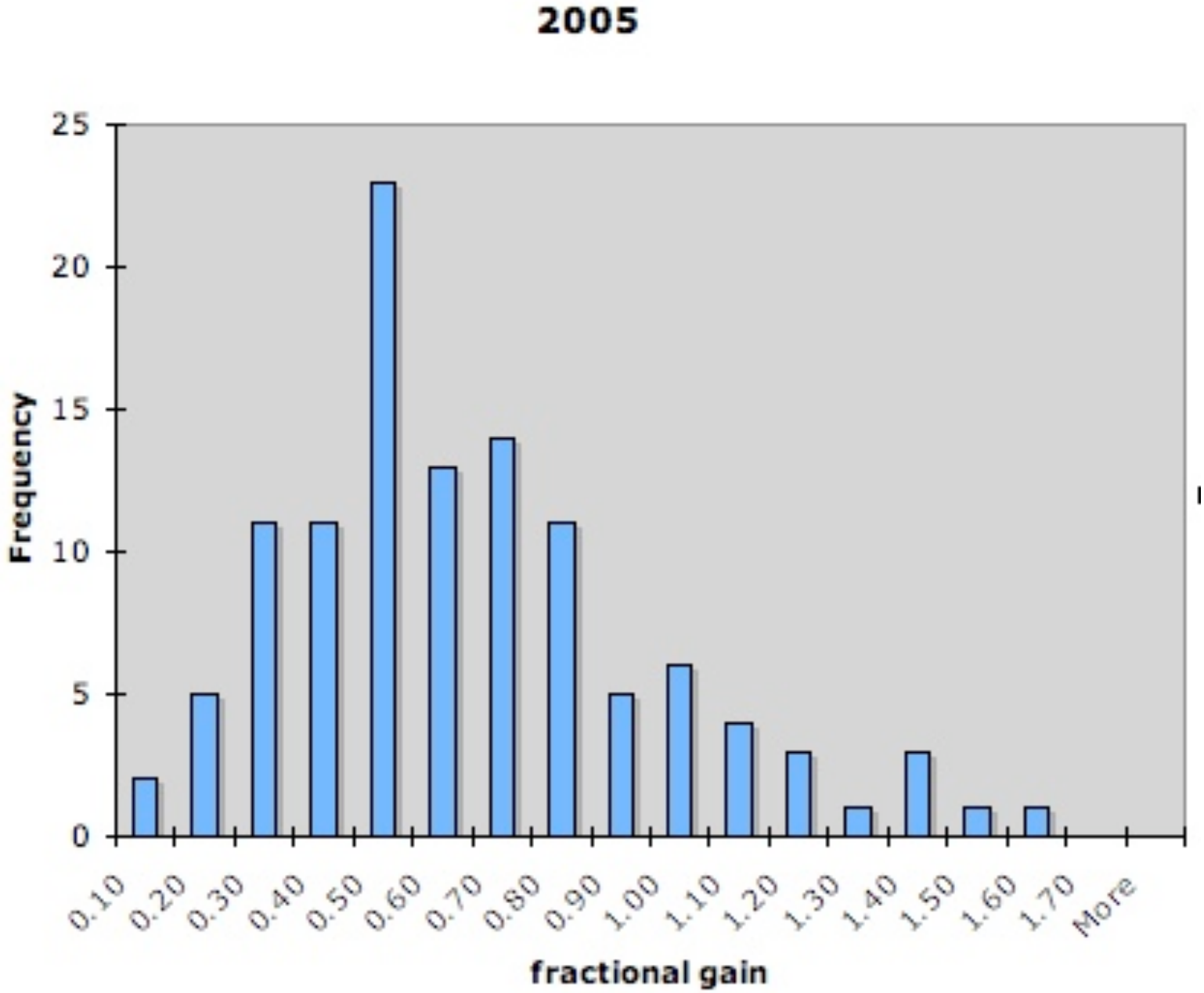
DUE Monday	Date	Monday Class	DUE Wednesday (+LAB FROM PREVIOUS WEEK)	Date	Wednesday Class	Specific skills and knowledge gains	Broader learning goals
		CL = use computer lab					
nothing	29-Aug (CL)	**Introductory class**; we will fill out consent forms as well as complete knowledge and attitude surveys after a brief introduction to the class structure and content.	**Review** http://geology.asu.edu/~sreynolds/topo_gallery/intro_title.htm **Review** http://www.maptools.com/UsingUTM/index.html **Review** http://www.maptools.com/FreeTools http://trimble.com/gps/ **Review** http://maps.google.com/	31-Aug (CL)	**Geolocating techniques lab** - We will use maps, GPS, and walking tour through the gully behind Delehanty Hall and on to the Winooski River as an introduction to the local river landscape and to GPS mapping skills. We will pass landslides, core trees, see a retention pond, use old megaslide images to see change over time and walk back up to campus via the river overlook. We will consider how this landscape has changed over time from 14,000 years ago until today.	By the end of this week, you should be able to use GPS to map locations in field, plot GPS-derived locations on a topographic map, read a topographic map, measure distance on map, measure distance with GPS, be familiar with operation of a Garmin 12, be able to plot, read, and use UTM coordinates to calculate a distance between two points.	By the end of this week, you should understand how GPS technology works, understand map plotting and coordinate systems, see a local example of the slope/stream/river continuum, become aware that landscapes change over time, be able to explain several ways that people influence landscapes and landscapes influence people, and recognize how images can be used as a data source for understanding landscape process, pattern and history.
nothing	5-Sep	**No Class - Labor Day**	**Do** Learning Landscapes, module 1, Why rivers? **Read** *Demands and Disposal*, p. 167-174, from *Water, Rivers, and Creeks*, Leopold **Read** *A River*, from *Encounters with the Archdruid*, McPhee	7-Sep	**Putting rivers in a human context** - We will see both a hydroelectric plant and sewage treatment plant. We will take a tour of these facilities in order to learn how they work and how they effect the river.	By the end of this week, you should begin to be able to parse photographic images and understand their landscape content, begin to be familiar with the *Learning Landscapes* web site, understand how both hydroelectric and sewage treatment plants work, and understand the specific and more general effects of these types of plants on rivers beyond the borders of Vermont.	By the end of this week, you should understand the spectrum of uses of rivers, begin to understand concepts of energy and mass transfer into and out of rivers as well as human impact on river systems.
Do Learning Landscapes, module 2, *Shapes*	12-Sep	**River morphology and process class;** we will review the most important elements of river taxonomy, consider the graded profile and examine the germane processes that control the shape of river channels. We will consider the impact of floods and tectonic setting on river channels.	**Read** *Streams and Drainage Systems* in *The Dynamic Earth*, Skinner and Porter, p. 217-239.	14-Sep	**Winooski River float trip** - We will be floating the Winooski River in canoes in order to practice identifying fluvial forms and processes. We will be mapping the location of these forms and our route using GPS.	By the end of this week, you should be able to recognize important fluvial landforms in photographs and in the field and use GPS to plot their locations on a map. You should be able to recognize evidence for past changes in river discharge and stage as well as current and past uses of rivers. You should be able to identify human modification to a river and river corridor as well as the impacts of one river on human constructs.	By the end of this week, you should be able to understand spatial relationships between different fluvial landforms in the field, tell simple landscape history stories based on observing field evidence, have a better local sense of place, and a sense of how the Winooski River functions as a link between land and lake. You should understand that rivers are dynamic and change over time leaving evidence of past behavior.
Do Learning Landscapes, module 3, *Conveyors*	19-Sep (CL)	**Fluxes of water, sediment, and elements**; we will prepare for lab by introducing the instrumentation we will be using as well as the type of calculations we will be making. We will set our measurements in context by examining flux data from other watersheds.	**Read** *A Manual of Field Hydrology*, Sanders, p. 49-74	21-Sep	**River monitoring lab** - We will visit the Huntington River in order to learn how to characterize the channel and measure the discharge of water, sediment and dissolved constituents.	By the end of the week, you should know how to use an auto level and tape to measure a channel cross-section as well as a flow meter to measure velocity. Using both field and lab data, you should be able to make a discharge calculation for water, suspended sediment, and dissolved load as well as be facile with Manning's equation including the ability to calculate a roughness value. You should be able to identify bankful stage in the field and find evidence of the height to which water rose in past floods.	By the end of the week, you should understand the concepts of flux (for water, sediment, and dissolved load), dimensional analysis, velocity and discharge. You should begin to feel more comfortable with the idea of using simple mathematical models to represent complex natural systems. You should be able to recognize and explain spatial variability of water flow patterns in the field.

115 Questions; given pre and post; posted on class web site; keyed by week and Bloom level

Week	Bloom level	Question	none	I could answer this question well and in its entirety. (3 pts)	I could answer this question partially or with help. (2 pts)	I could not answer this question today. (1 pt)	average
1	2	Explain the history of the landscape between Delehanty Hall and the Winooski River	1	0	25	3	1.89
1	3	Read UTM coordinates of a point on a map	0	11	7	11	2.00
1	3	Program a GPS to find a specific point on a map using UTM coordinates	0	6	16	7	1.97
1	2	Explain how GPS works	0	7	17	5	2.07
1	3	Use a GPS to map locations in the field	0	10	12	7	2.10
1	3	Plot a GPS-derived location on a map using UTM coordinates	1	9	11	8	2.04
1	3	Measure a distance on a map	1	22	6	0	2.79
1	3	Measure a distance using GPS	0	6	16	7	1.97
1	2	Explain the UTM coordinate system	0	1	11	17	1.45
1	2	Explain the symbols on a topographic map	0	16	13	0	2.55

Gain on all questions; largest gain in core of course. Learning or confidence?




2005
Frequency
25
20
15
10
5
0
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
1.10
1.20
1.30
1.40
1.50
1.60
1.70
More
fractional gain

Least Gains (4 to 15%; all week 1 except…)

Measure a distance on a map
Explain the symbols on a topographic map
Read elevation from a topographic map
Give an example of how people influence landscapes
Give an example of how landscapes influence people
Recognize major volcanic and tectonic landforms (last week)

Greatest Gains (130 to 150%; middle weeks)

Knowing you are standing on a cut bank, predict where the point bar would be found
Use an autolevel to survey a stream channel
Use Manning's equation to calculate a roughness coefficient
What can you do with a Munsell chart
Understand the physical meaning of each variable and constant in the mathematical force balance equations describing slope stability
Explain how an autolevel works