

## **Earth Science 110 – Introduction to Earth Science**

The student learning outcomes for Earth Science 110 are:

1. Students should develop the awareness that changes to the Earth are a result of physical and chemical processes.
2. Students should be able to demonstrate an understanding that astronomical, geological, oceanographic, and meteorological processes are based upon observation of Earth materials and features.

The chosen assessment for this course is a pre/post quiz written by the department and designed to be used in all sections of Earth Science 110 and Earth Science 115. A copy of the quiz is appended. The results of the assessment are in Table 3.



The questions in the quiz fall into 5 subject categories.

- 1) Understanding the scientific method – Question #4
- 2) Astronomy – Questions #11, 12, 13
- 3) Geology – Questions #1, 2, 3
- 4) Meteorology – Questions #5, 6, 10
- 5) Oceanography – Questions #7, 8, 9

SLO #1 addresses process awareness. Not all of the questions on the quiz address process awareness. For those that do, improvement was demonstrated.

- Questions #1 – on uniformitarianism – geology – 13%
- Question #3 – on the rock cycle – geology – 11%
- Question #4 – on the scientific method – 3%
- Question #7 – on the tides – oceanography – 52%
- Question #8 – on ocean currents – oceanography – 87%
- Question #9 – on the creation of ocean waves – oceanography – 22%
- Question #10 – global atmospheric circulation – meteorology – 55%
- Question #11 – the rotation of Earth – astronomy – 55%
- Question #12 – cause of the seasons – astronomy – 45%

SLO #2 addresses understanding the importance of observation. All of the question except for the one concerning the scientific method (#4) address observation. Improvement was demonstrated in all.

- Question #2 – on earthquakes – geology – 15%
- Question #5 – atmospheric composition – meteorology – 20%
- Question #6 – greenhouse gases – meteorology – 7%
- Question #13 – matter in the universe – 34%

At this time we have no plans to change the Earth Science 110 assessment. We would like to collect data for an entire year before we change anything because we do notice semester patterns in grades and completion rates and would like to see if similar patterns occur in the SLO assessment.

## Geology/Earth Science SLO Assessment Spring 2011

### Part 1) SLO Assessment

#### Background Departmental Curriculum Information

The curriculum for geology/Earth science in the Department of Earth, Space, and Physical Sciences consists of two degrees and 20 courses. The degrees are an Associates Degree in Geology or an Associates Degree in Sciences with a Geology Option. The Associates Degree in geology best serves students planning for a degree in k-12 education or students who wish to minor in geology. The Associates Degree in Science with a Geology Option best serves students who wish to become professional geoscientists. The geology/Earth science courses at SCC can be grouped into the following categories:

- 1) Four, 3-unit, no-prerequisite, general education lecture courses  
(Introductory Earth Science 110, Introductory Geology 101, Natural Disasters-Geology 142, Oceanography-Geology 150)
- 2) One, 1-unit, pre/co-requisite dependent, general education laboratory course  
(Introductory Geology Lab 101L)
- 3) Two, 4-unit, no-prerequisite, general education, lecture/lab combo courses  
(Earth Science for Educators 115, Historical Geology 201)
- 4) One, 4-unit, prerequisite dependent, sophomore-majors, lecture/lab combo course  
(Mineralogy-Geology 260)
- 5) Three, 1-unit, no-prerequisite, elective, specialty courses  
(Dinosaurs-Geology 111, Earthquakes-Geology 112, Volcanoes-Geology 113)
- 6) Nine, 1- or 2-unit, no-pre-requisite, elective, specialty fieldtrip courses  
(Geology field trips to various California locations – Mojave Desert-162, Eastern Sierras-164, Sierras-166, Owens Valley-168, Death Valley NP-173, Joshua Tree NP-174, San Bernardino and San Gabriel Mountains-176, Orange County-178, San Andreas Fault Zone-180)

Because of the ongoing/current budget problems, none of the classes listed under categories 4, 5, or 6 above has been offered during the last few years. Table 1 summarizes the curriculum, the values for units/LHE and the scheduling rotation.

Table 1) Santiago Canyon College Geology/Earth Science Curriculum and Scheduling Rotation

Department Course Offerings	UNITS	LHE	"Normal" Schedule for Course Offerings
Earth Science 110 (Introductory)	3 lecture	3	Every Semester
Geology 101 (Introductory)	3 lecture	3	Every Semester
Geology 101L (Introductory)	1 lab	2.55	Every Semester
Geology 201 (Historical)	4=3 lecture/1 lab	5.55	Every Fall
Geology 142 (Natural Disasters)	3 lecture	3	Alternate Falls with 150
Geology 150 (Oceanography)	3 lecture	3	Alternate falls with 142
Earth Science 115 (Introductory for Educators)	4=3 lecture/1 lab	5.55	Alternate Springs with 260 (Now every Spring)
<b>NOT CURRENTLY</b>	<b>BEING</b>		<b>OFFERED</b>
Geology 260 (Mineralogy)	4=2 lecture/2 lab	7.1	Currently not offered (Alternate Springs with ES 115)
Geology 111 (Dinosaurs)	1 lecture	1	#currently not offered
Geology 112 (Earthquakes)	1 lecture	1	#currently not offered
Geology 113 (Volcanoes)	1 lecture	1	#currently not offered
Geology 162 (Mojave)	1 lecture	1	* currently not offering
Geology 164 (Eastern Sierras)	2 lecture	2	* currently not offering
Geology 166 (Sierras)	2 lecture	2	* currently not offering
Geology 168 (Owens Valley)	1 lecture	1	* currently not offering
Geology 173 (Death Valley NP)	1 lecture	1	* currently not offering
Geology 174 (Joshua Tree NP)	1 lecture	1	* currently not offering
Geology 176 (San Bernardino and San Gabriel Mtns)	1 lecture	1	* currently not offering
Geology 178 (Orange County)	1 lecture	1	* currently not offering
Geology 180 (San Andreas FZ)	1 lecture	1	* currently not offering

\*Fieldtrip course – 2 offered every semester, rotating through all every 3 years

#Every 3 semesters these 3 classes were offered instead of a section of Earth Science 110

## **Part 2) SLO Assessment**

### **Timeline**

#### **SPRING 2011 – all steps completed**

- 1) The department agreed to begin assessment of the geology and Earth science courses starting with the major lecture and lab classes that are offered every semester – Earth Science 110, Geology 101, Geology 101L.
- 2) The department collaborated to create a pre/post quiz for use in the lecture courses Earth Science 110 and Geology 101.
- 3) The department collaborated to create a self –test for students to use in the lab course, Geology 101L.
- 4) Eric Hovanitz piloted the pre/post quiz in all his lecture sections of Earth Science 110 and Geology 101.
- 5) Debra Brooks piloted the self-test in all her labs for Geology 101L.
- 6) The department agreed to use the same assessments in Fall 2011 for Earth Science 110, Geology 101, Geology 101L.
- 7) The department agreed to develop assessments for all remaining courses the semester before they are offered. So when a course is scheduled for the next semester, if an assessment does not exist, one must be written.
- 8) Therefore, in preparation for Fall 2011, the department collaborated to create a pre/post quiz for use in Geology 201.

#### **FALL 2011 – completed**

- 9) In preparation for Spring 2012, the department agreed to use the same lecture assessment for Earth Science 115 as is used in Earth Science 110.
- 10) The department agreed to consider a re-write of the assessment for Geology 101L during summer 2012 in preparation for Fall 2012.
- 11) Pre-test quizzes were given in all lecture sections.

### Fall 2011 – ongoing

- 12) Self-tests ongoing in all mineral and rock labs.
- 13) Post-test to be given in all lecture sections during finals week.
- 14) Complete assessment of SLOs for Fall 2011 during flex week before Spring 2012.

### Part 3) SLO Assessment

#### Summary

Table 2) Summary of the assessments completed for ongoing courses during Spring 2011.

Ongoing Department Course Offerings	Spring 2011 Sections Offered	Spring 2011 Sections Assessed
Earth Science 110 (Introductory)	4	3
Geology 101 (Introductory)	3	2
Geology 101L (Introductory)	3	2
Geology 201 (Historical)	0	-
Geology 142 (Natural Disasters)	0	-
Geology 150 (Oceanography)	0	-
Earth Science 115 (Introductory for Educators)	1	0

Each course will be discussed individually.