

Plan for Assessment of Earth & Planetary Sciences 101 in the UG General Education Core Curriculum

Department Name: Earth & Planetary Sciences

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I. Course Number and Title: EPS 101, How the Earth Works

A. Course Goal #1: Students will learn scientific inquiry through the study of Earth

B. Student Learning Outcomes (SLOs)¹:

1. SLO 1: By Evaluating a set of data, the student will define a problem, pose a hypothesis, and describe how the hypothesis can be tested.

Addresses UNM/HED Area _III_, Competencies: Students will be able to describe the process of scientific inquiry; Students will be able to solve problems scientifically; Students will be able to apply quantitative analysis to scientific problems

Course Goal #2: The student will learn about the geologic record and the geologic time scale, and be able to apply relative and absolute dating techniques

1. SLO 1: Students will be able to state the age of the Earth and describe how geologists measure absolute rock ages by radioactive decay

Addresses UNM/HED Area _III_, Competencies, Students will be able to describe the process of scientific inquiry; Students will be able to communicate scientific information

2. SLO 2: Students will be able to determine the relative order in which a series of geologic events occurred by applying the concepts of relative dating

Addresses UNM/HED Area _III_, Competencies, Students will be able to describe the process of scientific inquiry; Students will be able to communicate scientific information

Course Goal #3: Students will learn about the formation of the three major rock groups and the major layers of Earth.

1. SLO 1: Students will be able to describe the compositional (crust, mantle, core) and mechanical (lithosphere, asthenosphere, outer core, inner core) layers that exist in the Earth

Addresses UNM/HED Area _III_, Competencies, Students will be able to communicate scientific information

2. SLO 2: Students will be able to describe the three main rock types (igneous, sedimentary, and metamorphic) and how they form in the context of the rock cycle

Addresses UNM/HED Area _III_, Competencies, Students will be able to communicate scientific information

¹ See *Writing Measurable Learning Outcomes Faculty Workshop.pdf*, a manual.; Huba & Freed. (2000). *Learner-centered assessment on college campuses*. Boston: Allyn & Bacon. and Driscoll & Wood. (2007). *Developing outcomes-based assessment for learner-centered education: A faculty introduction*. Sterling, VA: Stylus.

Course Goal #4: The student will develop an understanding of Earth processes, both internally and at the Earth's surface (e.g. plate tectonics, isostasy)

1. SLO 1: Students will be able to explain the evidence for the plate tectonic processes that occur at each of the three types of plate boundaries

Addresses UNM/HED Area _III_, Competencies, Students will be able to solve problems scientifically; Students will be able to communicate scientific information

2. SLO 2: Students will be able to use the concept of isostasy to explain why continental crust is at a higher elevation than the oceanic crust

Addresses UNM/HED Area _III_, Competencies, Students will be able to describe the process of scientific inquiry; Students will be able to solve problems scientifically; Students will be able to communicate scientific information; Students will be able to apply quantitative analysis to scientific problems

Course Goal #5: Students will learn about scientific issues related to relevant societal issues (e.g. geologic resources, geologic hazards, climate change)

1. SLO 1: Students will be able to describe the geologic processes involved in formation and concentration of a significant geologic resource (examples include fossil fuels and metals)

Addresses UNM/HED Area _III_, Competencies, Students will be able to communicate scientific information; Students will be able to apply scientific thinking to real world problems

2. SLO 2: Students will describe the processes that are responsible for specific geologic hazards (e.g., earthquakes, volcanic eruptions, mass movement, flooding, etc.)

Addresses UNM/HED Area _III_, Competencies, Students will be able to communicate scientific information; Students will be able to apply scientific thinking to real world problems

C. How will evidence of learning be gathered?

1. What: For each SLO, identify one or more data collection points in the course. Preferably these are samples of student work already in the syllabus.

Questions are assessed within routine exams throughout the semester.

2. How: For this course, describe:

a. Will the assessment include evidence from all sections of the course, or some subset of sections? Address the validity of any proposed sample of sections.

Assessment will include evidence from a subset of sections, representing a majority of the students enrolled in the course.

b. Will the assessment include evidence from all students in the assessed sections or a sample? Address the validity of the proposed sample of students.

Assessment will include evidence from all students in the assessed sections, which will represent a majority of the students enrolled in the course.

- c. Will all student learning outcomes for this course be measured every time? If not, how will the complete set of SLOs for the course be subset for measurement a chunk at a time?

A subset of the SLOs for the course will be measured, but eventually, all SLOs will be evaluated within a rotation of the offerings of the course.

3. When:

- a. Is assessment of student learning outcomes already underway in this course? If not, in what term (e.g., Fall 2007) will assessment of student learning outcomes commence in this course?

Assessment of SLOs is already underway for most sections of the course, with a goal to include most/all sections of the course.

- b. With what frequency (e.g., every term, a different term each year, etc.) will assessment of student learning outcomes take place in this course?

Assessment of some/all of the SLOs will take place every semester.

- c. On what cycle will the complete set of SLOs for the course be assessed (e.g., all outcomes every term, a subset of outcomes each term with all outcomes every academic year,...)?

The goal is to assess the complete set of SLOs for most or all of the sections of the course, every academic year.

4. Who:

- a. Who will administer the measure or collect the student products?

Instructors of record for each section will administer the measure and collect the products.

- b. Who will review/mark the products relative to the SLO statements and established qualitative criteria?

Instructors who collect their data will evaluate the questions and rubrics.

- c. Where rubrics (or evaluative criteria) have been developed for assessing student learning for a given outcome, please enclose a copy of the rubric/qualitative criteria.

D. What process will be used to analyze/interpret the assessment data for this course?

1. Who will participate?

A faculty member will compile the data. The results will be reviewed by the Undergraduate Committee.

2. How will recommendations be communicated?

Recommendations will be communicated from the discussion with the whole faculty, or among those who teach this course.

3. When will interpretation and recommendations take place?

The goal will be to make recommended changes the following term.

E. How will results of assessment in this course be used for improvement?

1. Describe the process for consideration of the implications of assessment for change:

- a. to assessment mechanisms themselves,
 - b. to course design, and/or
 - c. to pedagogy
- ...in the interest of improving student learning.

Review of the quantitative data associated with the SLOs will be made. If the data indicate unsatisfactory achievement, this will require an evaluation of the assessment mechanism, the measure of assessment (questions asked, rubric), and potentially the pedagogy in teaching the content that was assessed. If many of the SLOs meet with unsatisfactory achievement (<70%), is this an indication of a need for a change in the course design to improve achievement?

2. Who participates in this discussion/decision making.

Primarily the instructors who teach the course, along with input from discussion of the undergraduate committee and whole faculty.

3. How will recommendations be communicated?

Recommendations will be communicated from the discussion with the whole faculty, or among those who teach this course.

4. When will this discussion/decision making take place?

Once discussed with the whole faculty, decisions will be finalized by undergraduate committee and approved by the faculty.