

Course Level Assessment

GSC 110 General Physical Science II

Spring 2009

Approved by LOT: September 21, 2009

Submitted by Debra H. Backus

June 10, 2009

The purpose of this report is to present the methodology and findings for the course level assessment of General Physical Science II (GSC 110). General Physical Science II serves as a general education lab science course for A.A.S., A.A. and A.S. programs. This course is a study of basic chemistry and geology with special emphasis on the local strata. To assure that General Physical Science II is meeting its intended purpose in the curriculum and that students are in fact achieving the defined course learning outcomes identified on the Master Course Record Form (See Attachment A), this course was selected for a course level assessment project to discern attainment of specified learning outcomes.

Methodology

General Physical Science II course outcomes were chosen by the faculty for the first data collection in spring 2009. Dependent upon assessment findings, some outcomes will be assessed over multiple years to validate effectiveness of changes in curriculum or course materials. Exam questions addressing the target learning outcomes serve as indicators of student attainment of course learning outcomes (See Appendix B). The minimum performance standard is set at 80%. At least 80% of the students completing the common indicators administered via the course examination will select the correct response. In the event that the minimum performance standard is not met, the unmet learning outcome will be targeted for further monitoring. The results may also trigger an evaluation of course materials supporting the learning outcome, revision of course materials or further curriculum revision.

In the spring 2009 semester, ten course learning outcomes were selected for assessment in the General Physical Science II course. The target learning outcomes listed on the course syllabus as “course goals” include: (NOTE: The goal numbers correspond to the numbering of performance objectives listed on the course syllabus.)

Goal 3: identify atom parts

Goal: 9: use periodic table

Goal 15: use valence numbers

Goal 16: build simple compounds

Goal 17: balance simple chemical equations

Goal 25: describe order of superposition

Goal 44: define plate tectonics

Goal 45: define weathering

Goal 46: define erosion

Goal 47: describe erosion effects

To assess these learning outcomes, eighteen (18) questions that covered the course outcomes identified from the master course record were administered as a portion of the final examination.

Twelve students completed the examination. Goal 3 included 9 questions, Goal 9 and 15 combined 3 questions, Goal 16, 17, and 25 had 1 question and Goal 44 had 3 questions. For each goal, the total number of responses was tallied and the percentage of correct and incorrect responses indicated as a percentage (See appendix B for examination questions).

Results

There were 9 questions (108 responses) which addressed Goal 3I. Eighty-three percent (83%) of the students responded correctly (90 correct responses) and seventeen (17%) percent responded incorrectly (18 incorrect responses). Students met the 80% performance standard indicator for Goal 3..

Students also met the performance standard indicator for Goal 9. Three questions (36 responses) were identified for Goal 9. There were 29 correct responses (81%) Nineteen percent gave incorrect answers.

Three questions (36 responses) provided data for Goal 15. Sixty-seven percent (67%) responded correctly and thirty-three percent responded incorrectly. Students did not meet the 80% performance standard for Outcome 15.

One question provided responses for Goal 16, 17 and 25. There were five correct responses or fifty-eight percent (58%), for Goal 16 and 17 and nine (9) correct responses or seventy-five percent (75%) for Goal 25. Students did not meet the 80% performance standard for Goal 16, 17, and 25.

Students did meet the performance standard on Goal 44. Three questions were used with a total of 36 responses. Thirty-five correct responses (97%) and one incorrect response (2%) were reported.

Goal 45 and Goal 46 each had two questions. Students responded correctly sixty-seven percent (67%) on Goal 45 and did not meet the minimum 80% performance standard. However on Goal 46 the correct response rate was eighty-eight percent (21 correct responses).

Only one question was tallied for Goal 47. There were 9 correct responses (75%) and 3 incorrect responses (25%). Students did not meet the minimum performance standard on Goal 47.

As a summary of all goals reported, there were a total of 30 questions that covered the course outcomes. The twelve (12) students gave a total of 240 correct responses for the possible 312 responses. The performance of the students as a percentage of the correct responses was 77% correct answers (See Figure 1 for Summary).

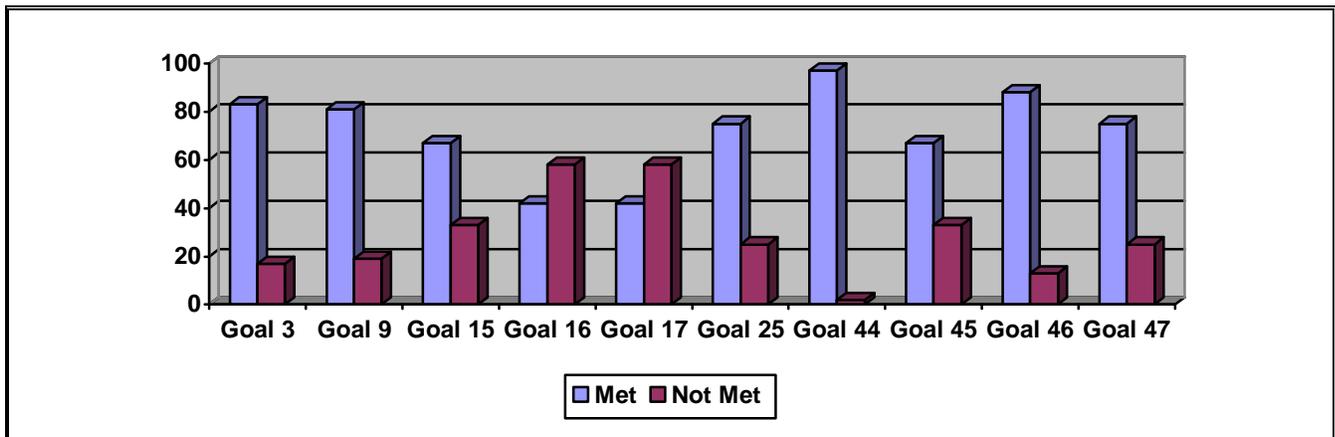


Figure 1: Attainment of Learning Outcomes

Conclusion and Action Plan

In conclusion, this course level assessment of General Physical Science II shows that students met four of the ten goals at the eighty percent (80%) or higher performance standard. For six outcomes, the students as a group did not meet the 80% minimum criteria. The plan is to continue to assess the same outcomes, over time, to increase the sample size prior to introducing changes in the course.

The participating faculty members have been made aware of the course level assessment and attainment of the outcomes for the classes they taught. No changes will be made to the course outcomes based on these assessments. During the next assessment cycle, additional indicators will be chosen to broaden the student learning outcomes assessment process. Faculty will continue to provide input as to which outcomes to monitor and recommendations for course revision will be utilized in future course level assessments.

The plan is to continue the study of this course during spring semester 2010. The ten outcomes and indicators chosen by the faculty will be assessed in all sections of General Physical Science II to provide a broader sample of student learning outcomes.

Appendix A: Master Course Record

Eastern WV Community & Technical College

Course Prefix and Number: GSC 110
Course Title: General Physical Science II
Recommended Transcript Title: General Physical Science II
Date Approved/Revised
Credit Hours: 4 Contact hours per week (Based on 15 week term): Lecture: 3 hrs. Lab: 2 hrs.
Prerequisite: RDG 090, ENL 099, MTH 090, MTH 095/MTH 096 or MTH 099 OR minimum acceptable test scores for placement in college-level English and math. Corequisite: Pre/Corequisite:
Grading Mode: Letter Grade
Catalog Description: Covers basic chemistry and geology with special emphasis on the local strata.
Course Outcomes: The following list of course outcomes will be addressed in the course. These outcomes are directly related to performance objectives. <ul style="list-style-type: none"> • Define course vocabulary • Use metric measurements • Identify atom parts • Define chemical properties • Define physical properties • Perform laboratory exercises • Display laboratory safety practices • Write laboratory exercise summaries • Use periodic table • Identify molecular formulas • Identify structural formulas • Define acid properties • Define base properties • Interpret law of definite proportions • Use valence numbers • Build simple compounds • Balance simple chemical equations • Recognize functional groups • Identify simple organic compounds • State organic compound uses • Write Internet reference summaries

- Define principle of uniformitarianism
- Define principle of original horizontality
- Describe order of superposition
- Define cross-cutting relationships
- Describe nitrification
- Describe sedimentary formations
- Examine local rock strata
- Identify local rocks
- Describe common rock-forming minerals
- Describe metamorphism
- Describe volcanism
- Describe extrusive volcanic occurrences
- Describe intrusive volcanic occurrences
- Describe igneous formation
- Describe recrystallization
- Describe volcanic cones
- Define diastrophism occurrences
- Label rock cycle
- Outline geologic time
- Define index fossils
- Define coal formation
- Define plate tectonics
- Define weathering
- Define erosion
- Describe erosion effects

Implementation Cycle: Spring

Role in College Curriculum: (Check all that apply)

General Education Core Natural Science

Technical Core (Specify Program)

Restricted Elective (Specify Program)

General Elective

Course Fee: \$15.00

Instructor's Qualifications: Master's degree with a minimum of 18 hours in science.

Expanded Course: This course is designed to be a study of basic chemistry and geology and to increase one's awareness of the physical universe.

The course is designed to show students how science is intricately interwoven into almost everything around us. The complete course (GSC 109 and GSC 110) is an abbreviated study in the following areas: physics, chemistry, astronomy, meteorology, and geology.

Prepared by: Debra H. Backus

Appendix B: Summary of Outcomes, Indicators, Performance Standards and Results

Learning Outcome	# of questions related to Outcome	# of correct responses	# of incorrect responses	Percent of Correct Responses	Percent of Incorrect Responses	Performance Standard Met (80%)
Goal 3: Identify atom parts	9 questions (108 responses)	90	18	83%	17%	Yes
Goal 9: Use periodic table	3 questions (36 responses)	29	7	81%	19%	Yes
Goal 15: Use valence numbers	3 questions (36 responses)	24	11	67%	33%	No
Goal 16: build simple compounds	1 question (12 responses)	5	7	42%	58%	No
Goal: 17: Balance simple equations	1 question (12 responses)	5	7	42%	58%	No
Goal 25: Describe order of superposition	1 question (12 responses)	9	3	75%	25%	No
Goal 44: Define plate tectonics	3 questions (36 responses)	35	1	97%	2%	Yes
Goal 45: Define weathering	2 questions (24 responses)	16	8	67%	33%	No
Goal 46: Define erosion	2 questions (24 responses)	21	3	88%	13%	Yes
Goal 47: Describe erosion effects	1 question (12 responses)	9	3	75%	25%	No

Appendix C: Identified Learning Outcomes with corresponding exam questions as indicators.

GOAL 3: Identify atom parts

1. Which of the three components of the atom has a mass that is so small that it is considered to be zero (0)?
 - a. Proton
 - b. Electron
 - c. Neutron
 - d. Photon
2. Nitrogen (N) has 7 protons, 7 electrons, and 7 neutrons. Its atomic mass number is:
 - a. 60
 - b. 18
 - c. 12
 - d. 14
7. The **atomic mass** of an element is determined by adding together the number of:
 - a. Protons & neutrons
 - b. Neutrons & electrons
 - c. Electrons & protons
 - d. Electrons & metalloids
8. The charge on the **nucleus** of an atom is _____?
 - a. Positive
 - b. Negative
 - c. Neutral
 - d. Newton
9. The **atomic number** of an element is determined by counting the number of _____ that are found in the nucleus
 - a. Electrons
 - b. Neutrons
 - c. Protons
 - d. Ions

_____24. Elements that gain or lose electrons can have only **one** oxidation number (either + or -). No element can have 2 different oxidation numbers.

31. Fill-in-the-blanks for box and draw Bohr Atom Model

32. Fill-in-the blanks for box and draw Bohr Atom Model

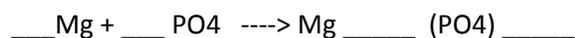
33. Fill-in-the blanks (You may use the Periodic Table/chart

GOAL 9: Use periodic table

- 31. Fill-in-the-blanks for box and draw Bohr Atom Model
- 32. Fill-in-the blanks for box and draw Bohr Atom Model
- 33. Fill-in-the blanks (You may use the Periodic Table/chart

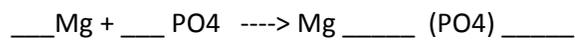
GOAL 15: Use valence numbers

- 32. Fill-in-the blanks for box and draw Bohr Atom Model
- 33. Fill-in-the blanks (You may use the Periodic Table/chart
- 34. BALANCE THE FOLLOWING EQUATION: You may use Oxidation Number sheet and make sure that you have equal numbers of atoms on both sides of the yield (_ sign.



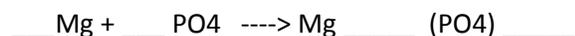
GOAL 16: Build simple compounds

- 34. BALANCE THE FOLLOWING EQUATION: You may use Oxidation Number sheet and make sure that you have equal numbers of atoms on both sides of the yield (_ sign.



Goal 17: Balance simple chemical equations

- 34. BALANCE THE FOLLOWING EQUATION: You may use Oxidation Number sheet and make sure that you have equal numbers of atoms on both sides of the yield (_ sign.



GOAL 25: Describe order of superposition

- 16. The diagram above is a geological cross-section of an area where a river has exposed a cliff of **undisturbed** rock layers. According to the figure, which rock layer is the **oldest**?
 - a. Layer Q
 - b. Layer R
 - c. Layer S
 - d. Layer T

GOAL 44: Define plate tectonics

13. Which of the following is **not the process** used by nature to in forming mountains?

- a. Volcanic eruption
- b. Tsunami or tidal wave
- c. folding of rack strata
- d. faulting or cracking of rack strata

_____ 29. **Plate tectonics** refers to the movement of terrestrial and oceanic sections of the planet that bump, slip, grind, and spread apart.

_____ 30. When two tectonic plates bump together (compression) the geologic formation resulting from action could be folded layers (strata) and/or folded mountains.

GOAL 45: Define weathering

14. Which of the following is **not** an example of **chemical weathering** that can occur with rocks?

- a. acid Precipitation
- b. Oxidation (reactions with O₂)
- c. Freezing and thawing
- d. Dissolving in water

15. The **talus** you saw at the bottom of the cliffs above the “Wildcat straight-stretch” was probably caused by:

- a. mechanical weathering
- b. chemical weathering
- c. animal activity
- d. flooding during 1985 flood

GOAL 46: Define erosion

18. Which of the following is **not** an agent (cause) of erosion?

- a. wind
- b. conglomerate
- c. water
- d. ice

35. What is the major agent (cause) of erosion in West Virginia?

- a. wind
- b. water
- c. ice
- d. sleet

GOAL 47: Describe erosion effects

16. The diagram above is a geological cross-section of an area where a river has exposed a cliff of **undisturbed** rock layers. According to the figure, which rock layer is the **oldest**?

- a. Layer Q
- b. Layer R
- c. Layer S
- d. Layer T