Course Level Assessment

GSC 109 General Physical Science I
Fall 2008
Approved by LOT May 18, 2009

Submitted by Debra H. Backus

The purpose of this report is to present the methodology and findings for the course level assessment of General Physical Science I (GSC 109). General Physical Science I 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 physics and astronomy designed to increase a student's awareness of the physical universe. To assure that General Physical Science I 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 course outcomes were chosen by the faculty for the first data collection in fall 2008. 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 fall 2008 semester, six course learning outcomes were selected for assessment in the General Physical Science I course. The target learning outcomes include:

I. describe stellar formation
II. use **Hertzsprung/Russell** diagram
III. describe solar system make-up
IV. describe solar eclipses
V. describe Earth/Moon relationships
VI. describe lunar eclipses

To assess these learning outcomes, thirty questions that covered the course outcomes identified from the master course record were administered as a portion of the final examination. Fourteen students completed the examination. Outcome I included 11 questions, Outcome II and III combined 4 questions, Outcome IV had 2 questions, Outcome V had 5 questions and Outcome VI had 1 question. For each outcome, 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 11 questions (154 responses) which addressed Outcome I. Seventy-three percent (73%) of the students responded correctly (112 correct responses) and twenty-seven (27%) percent responded incorrectly (42 incorrect responses). Students did not meet the 80% performance standard indicator for Outcome I.

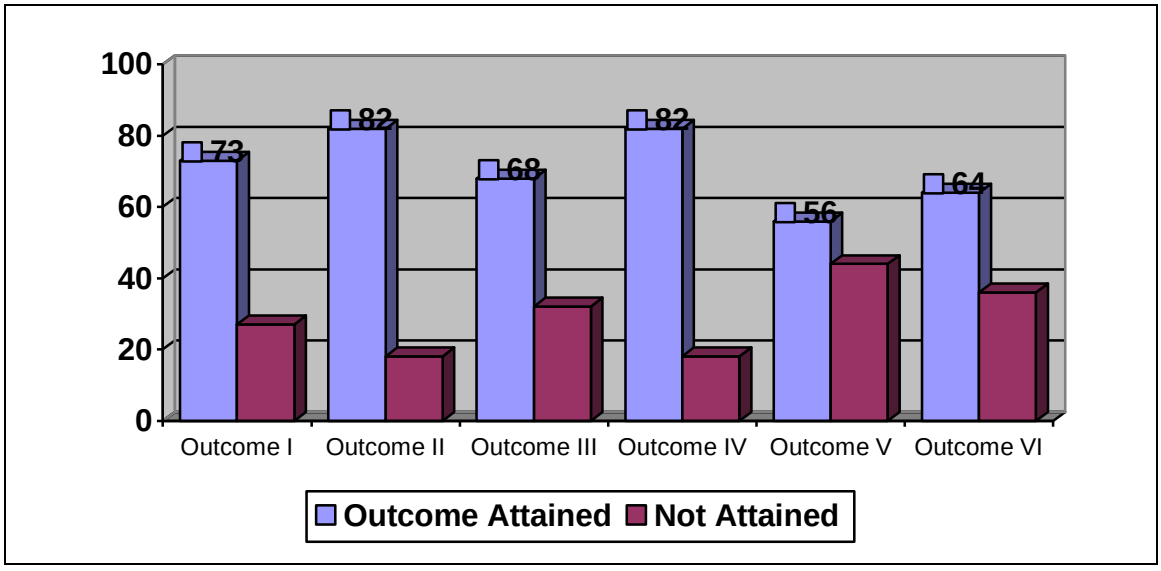
Students did meet the performance standard indicator for Outcome II. Four questions (56 responses) were identified for Outcome II. Forty-six students (82%) of students answered correctly. Ten students (18%) gave incorrect answers.

Four questions provided responses for Outcome III. Of the 56 responses thee were 38 correct (68%) and 18 (32%) responses. Students did not meet the 80% performance standard for Outcome III.

Students did meet the performance standard on Outcome IV. Two questions will used with a total of 28 responses. Twenty-three correct responses (82%) and five incorrect responses (18%) were reported.

Outcome V and Outcome VI were both below the performance standard. On five questions for Goal V, students responded correctly fifty-six percent (56%) and incorrectly forty-four percent (44%). Only one question was tallied for Outcome VI with nine (64%) correct and five (36%) incorrect responses.

As a summary of all outcomes reported, there were a total of 30 questions that covered the course outcomes. The fourteen (14) students gave a total of 297 correct responses for the possible 420 responses. The performance of the students as a percentage of the correct responses was 70.7% correct answers.



Conclusion and Action Plan

In conclusion, this course level assessment of General Physical Science I shows that students met two of the six outcomes at the eighty percent (80%) performance standard. For all 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 fall semester 2009. The six outcomes and indicators chosen by the faculty will be assessed in all sections of General Physical Science I to provide a broader sample of student learning outcomes.

Attachment A: Master Course Record Form

Eastern WV Community & Technical College
Master Course Record

Course Prefix and Number: GSC 109
Course Title: General Physical Science I
Recommended Transcript Title: General Physical Science I
Date Approved/Revised
Credit Hours: 4 **Contact hours per week (Based on 15 week term):** **Lecture:** 3 **Lab:** 2
Prerequisite: RDG 090, ENL 099, MTH 090, AND 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: A study of basic physics and astronomy designed to increase one's awareness of the physical universe.
Course Outcomes: 1. apply mathematic principles 2. use metric measurements 3. translate mathematic formulas 4. use mathematic formulas 5. identify givens 6. perform laboratory exercises 7. display laboratory safety practices 8. write laboratory exercise summaries 9. analyze word problems 10. solve word problems 11. define basic motion terminology 12. examine the concept of time 13. apply **first law** of motion 14. calculate speed 15. calculate velocity 16. calculate acceleration 17. calculate distance problems 18. apply **second law** of motion 19. calculate force problems 20. apply **third law** of motion 21. calculate momentum problems 22. apply law of gravity 23. analyze calculated data 24. apply calculated data 25. use Internet to find information

26. write Internet source summaries
27. define astronomical terminology
28. describe Big Bang theory
29. describe stellar formation
30. use Hertzsprung/Russell diagram
31. describe solar system formation
32. describe solar system make-up
33. describe solar system mechanics
34. describe planetary formation
35. describe planetary make-up
36. describe solar eclipses
37. describe Earth/Moon relationships
38. describe lunar eclipses
39. identify stellar constellations
40. identify visible planets

Implementation Cycle: Fall

Role in College Curriculum: (Check all that apply)

Ξ General Education Core Lab Science
□ Technical Core (Specify Program)
□ Restricted Elective (Specify Program)
Ξ General Elective

Course Fee: $15.00

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

Expanded Course: This course is designed to be a study of basic physics and astronomy and to increase one's awareness of the physical universe.
This course is designed to show students how science is intricately interwoven into almost everything around us. Upon completion of GSC 109 and GSC 110 the student will have an abbreviated study in the following science areas: physics, chemistry, astronomy, meteorology, and geology.

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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%)
Outcome I: Describe stellar formation	11 questions (154 responses)	112	42	73%	27%	No
Outcome II: Use Hertzsprung/Russell diagram	4 questions (56 responses	46	10	82%	18%	Yes
Outcome III: Describe solar system make-up	4 questions (56 responses)	38	18	68%	32%	No
Outcome IV: Describe solar eclipses	2 questions (28 responses)	23	5	82%	18%	Yes
Outcome V: Describe Earth/Moon relationships	5 questions (70 responses)	39	31	56%	44%	No
Outcome VI: Describe lunar eclipses	1 questions (14 responses)	9	5	64%	36%	No
Overall Performance on all Outcomes	30 questions (420 responses)	297	123	71%	29%	No

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

Outcome I: Describe stellar formation

__B__ 7. What is the fuel source (energy supply) for the Sun or any other stars in the universe?

A. Oxygen, B. Hydrogen, C. Uranium, D. Helium

_ D_ 10. The ***interior*** (core) of the Sun is believed to be in the **___?___** state/phase.

A. solid, B. liquid, C. gaseous, D. plasma

__A_ 12. *What type of **nuclear reaction*** is responsible for the *radiant energy* that is generated by the Sun?

A. fission, B. fusion, C. sublimation, D. refraction.

__False_ 17. The two major components of the photosphere of the Sun are nitrogen (N_2) & oxygen (O_2).

__True_ 18. The interior of the Sun is believed to be in the plasma state/phase of matter.

___False _ 23. The ***blue shift*** in the spectral lines of light coming in from distant galaxies seems to support the conclusion that the universe is continuing to expand.

29. How are an ***astronomical unit*** **(AU)** and a ***light year*** **(ly)** different?

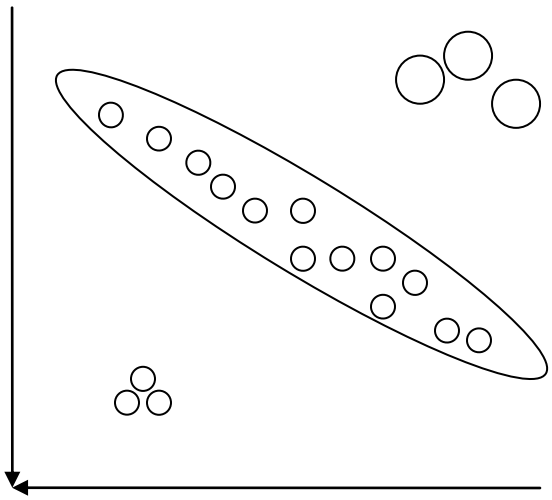
AU = astronomical unit, which is the average distance between the Sun and the Earth, which is about 93 million miles or 150 million kilometers. This unit is used to measure the distance objects within our solar system are from the Sun.

LY = light year, which is the distance light travels in one year when light is traveling at 186,000 miles/second or 300,000 kilometers/second. This unit is used to measure distances of objects found outside our solar system. It is used to measure distances in the deep space.

31. What is the reasoning behind giving the name ***"black holes"*** to certain regions in space?

It is believed that black holes exist in space where/when stars have become so densely compacted that their immense gravitational field attracts all objects (large or small) to this area. The gravitational attraction is so great that even light can not escape this area—thus the name black hole. It is believed that this condition can occur after a star has gone through the evolutionary or growth stages in its development and this is the last stage in a star's lifecycle.

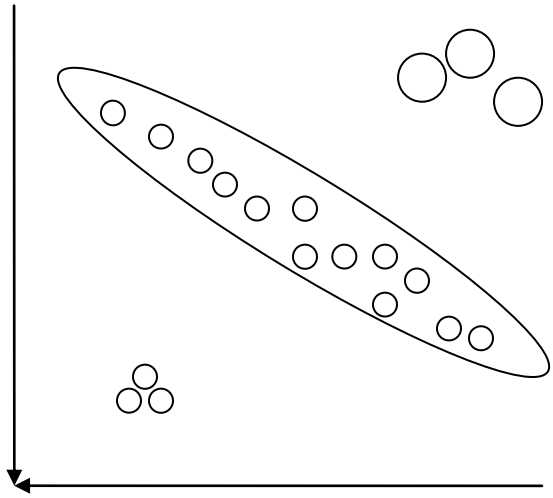
38. **—** 40. **Color** and **label** the H-R diagram below: **Label X & Y axes & ID different sections on diagram**, & **put in <u>color</u> array for stars.**



Outcome II: use Hertzsprng/Russell diagram

__True__24. The Hertzsprung-Russell diagram plots the absolute magnitude verses the temperature of the photospheres of stars.

38. **—** 40. **Color** and **label** the H-R diagram below: **Label X & Y axes & ID different sections on diagram**, & **put in <u>color</u> array for stars.**



Outcome III: Describe solar system make-up.

__A_ 13. When one examines the Earth it shows that it wobbles on its axis, this wobbling motion is called:

A. precession, B. declination, C. eclipse, D. pulsar.

__False 22. Between Mars and Jupiter orbit thousands of small planetary objects called meteoroids.

__True__ 25. A better and more exact explanation of how our solar system actually works was called the heliocentric model and was first put forth by Copernicus

29. How are an ***astronomical unit*** **(AU)** and a ***light year*** **(ly)** different?

AU = astronomical unit, which is the average distance between the Sun and the Earth, which is about 93 million miles or 150 million kilometers. This unit is used to measure the distance objects within our solar system are from the Sun.

LY _ light year, which is the distance light travels in one year when light is traveling at 186,000 miles/hour or 300,000 kilometers/hour. This unit is used to measure distances of objects found outside our solar system. It is used to measure distances in the deep space.

Outcome IV: Describe solar eclipses

____2. The light from the Moon is really reflected light from ___?___.

A. the Sun, B. Jupiter, C. Alpha Centuri, D. Saturn.

____6. *Solar eclipses* occur when the Moon is at the ___?___ phase.

A. New Moon, B. 1st Quarter, C. Full Moon, D. 3rd Quarter

Outcome V: Describe Earth/Moon relationships.

__A__2. The light from the Moon is really reflected light from ___?___.

A. the Sun, B. Jupiter, C. Alpha Centuri, D. Saturn.

___C_4. What phase of the Moon occurs when the Sun, the Earth, and the Moon are in the same plane with the Earth positioned between the Sun and the Moon?

A. New Moon, B. 1st Quarter, C. Full Moon, D. 3rd Quarter

__C_ 5. When discussing the Moon's phases, the ***phases*** from New Moon to Gibbous before Full Moon is called:

A. waning, B. sidereal, C. waxing, D. synodic

27. What is different between in the positioning of the Sun, Earth, & Moon during the **A)** ***new*** and the **B) full *moon phases***? (DRAW/LABEL NEW AND FULL MOON ***ALINEMENT***)

A. New SUN moon Earth
B. Full SUN Earth moon

Outcome VI: Describe lunar eclipses.

__A__6. *Solar eclipses* occur when the Moon is at the ___?___ phase.

A. New Moon, B. 1st Quarter, C. Full Moon, D. 3rd Quarter