

Washtenaw Community College Comprehensive Report

GLG 202 Earth Science for Elementary Teachers Effective Term: Spring/Summer 2013

Course Cover

Division: Math, Science and Health

Department: Physical Sciences

Discipline: Geology

Course Number: 202

Org Number: 12330

Full Course Title: Earth Science for Elementary Teachers

Transcript Title: Earth Science for Elem Teacher

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: Course Change

Change Information:

Course description

Total Contact Hours

Objectives/Evaluation

Rationale: An additional hour of class contact time is necessary to complete the stated objectives for this course. The current allotted time (five contact hours) does not allow enough time for most students to fulfill the daily objectives in this education class. The extra time will allow students more in-class lab work with instructor assistance. The course objectives were also updated to reflect current studies and to help align WCC curriculum with transferring colleges.

Proposed Start Semester: Spring/Summer 2013

Course Description: This course utilizes laboratory activities, lecture and projects to present the content and methodology necessary for success in teaching Earth science in the elementary classroom. Topics include the formation of the solar system, minerals, rocks, geologic time, plate tectonics, earthquakes, volcanoes, mountain building, water, oceans, environmental issues, climate change and weather. Teaching methodology includes developing a portfolio of activity plans that coincides with the current grade level content expectations as set forth by the State of Michigan regarding Earth science education, presenting an activity from those plans and creating a bulletin board pertaining to an Earth science concept. This course is intended for early childhood and elementary education students only.

Course Credit Hours

Variable hours: No

Credits: 4

Lecture Hours: Instructor: 45 **Student:** 45

Lab: Instructor: 45 **Student:** 45

Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90

Repeatable for Credit: NO

Grading Methods: Letter Grades

Audit

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-Level Math

Requisites

General Education

MACRAO

MACRAO Science & Math

MACRAO Sci & Math Elementary Education

General Education Area 4 - Natural Science

Assoc in Arts - Area 4

for Elementary and Early Childhood

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

Assessment 1

Assessment Tool: departmental exams

Assessment Date: Fall 2009

Assessment Cycle: Every Three Years

Course section(s)/other population: random selected sample

Number students to be assessed: 50% from each section offered

How the assessment will be scored:

Standard of success to be used for this assessment:

Who will score and analyze the data:

2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.

Assessment 1

Assessment Tool: departmental exams

Assessment Date: Fall 2009

Assessment Cycle: Every Three Years

Course section(s)/other population: random selected sample

Number students to be assessed: 50% from each section offered

How the assessment will be scored:

Standard of success to be used for this assessment:

Who will score and analyze the data:

3. Students will employ appropriate teaching methodology to successfully create and present lesson plans.

Assessment 1

Assessment Tool: teaching presentations and lesson portfolio

Assessment Date: Fall 2009

Assessment Cycle: Every Three Years

Course section(s)/other population: random selected sample

Number students to be assessed: 50% from each section offered

How the assessment will be scored:

Standard of success to be used for this assessment:

Who will score and analyze the data:

Course Objectives

1. Describe the steps of the scientific method.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
2. Demonstrate the scientific method.
 - Matched Outcomes**
 - 2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
3. Describe the formation of the universe using the Big Bang theory.
 - Matched Outcomes**
 - 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
4. Explain the formation of our solar system using the Nebular theory.
 - Matched Outcomes**
 - 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
5. Understand the formation of Earth's moon using the Impact theory.
 - Matched Outcomes**
 - 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
6. Identify the phases of the moon.
 - Matched Outcomes**
 - 2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
7. Explain how the moon and sun generate tides on Earth.
 - Matched Outcomes**
 - 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
8. Distinguish between lunar and solar eclipses.
 - Matched Outcomes**
 - 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
9. Identify and classify minerals based on their physical and chemical properties.
 - Matched Outcomes**
 - 2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
10. Compare and contrast renewable and non-renewable resources.
 - Matched Outcomes**
 - 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
11. Identify the conditions necessary for coal and oil formation, the usage and depletion of these resources and possible fuel alternatives.
 - Matched Outcomes**
 - 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
12. Identify and classify rocks based on their physical and chemical properties.
 - Matched Outcomes**
 - 2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
13. Compare and contrast chemical and mechanical weathering.
 - Matched Outcomes**

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
14. Identify the texture of soil based on the calculated proportions of the components of a soil sample.
Matched Outcomes
 2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
15. Distinguish and apply absolute dating from relative dating techniques to determine the ages of various rock layers.
Matched Outcomes
 2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
16. Analyze trace fossils to determine clues on the lives of extinct organisms.
Matched Outcomes
 2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
17. Compare and contrast the hypothesis of continental drift to the theory of plate tectonics.
Matched Outcomes
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
18. Explain the key pieces of "evidence" used to support the theory of plate tectonics.
Matched Outcomes
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
19. Match plate boundaries with associated features and processes, including mountains, volcanoes and earthquakes.
Matched Outcomes
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
20. Locate examples of each plate boundary type throughout the world.
Matched Outcomes
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
21. Describe the layers of the Earth and identify the composition, pressure and temperature conditions associated with each.
Matched Outcomes
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
22. Classify major volcano types, including strato/composite cones, cinder cones and shield volcanoes.
Matched Outcomes
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
23. Classify types of mountains, including fold, fault-block, dome, etc.
Matched Outcomes
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
24. Create models of fault types, including normal, reverse and strike-slip.
Matched Outcomes

2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
25. Identify the methods used to predict and describe natural disasters involving the geosphere, including earthquakes and volcanism.
 - Matched Outcomes**
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
26. Identify the erosional, transportational and depositional qualities and features of running water.
 - Matched Outcomes**
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
27. Compare and contrast the features and properties of young and mature river systems.
 - Matched Outcomes**
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
28. Distinguish amongst ground hydrology terms, including: porosity, permeability, aquifer, aquitard, perched water table, water table, caverns, karst topography, etc.
 - Matched Outcomes**
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
29. Compare and contrast porosity and permeability in soils and relate these terms to groundwater flow.
 - Matched Outcomes**
 2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
30. Describe the features associated with geothermal energy, including geysers, hot springs and possible uses as an alternative energy source.
 - Matched Outcomes**
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
31. Explain the mechanics involving the formation, advancement and retreat of a glacier.
 - Matched Outcomes**
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
32. Describe the possible causes of glacial periods or ice ages, their effect on climate, living things and the topography of the land.
 - Matched Outcomes**
 1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
33. Interpret and identify erosional and depositional glacial features on maps and diagrams.
 - Matched Outcomes**
 2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
34. Describe the various periods of glacial and interglacial periods in Michigan using glacial maps.
 - Matched Outcomes**
 2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
35. Explain the Milankovitch theory and how it relates to the creation of ice ages on Earth.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
36. Identify possible outcomes of ice ages and their effects on humans and the environment.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
37. Analyze the effects of salinity and temperature differences on the density of seawater.

Matched Outcomes

2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.
38. Understand the physics and generation of waves on water.

Matched Outcomes

39. Identify various forms of beach/coastal destruction and protection.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
40. Identify the causes, consequences and possible prevention or detection of natural disasters involving the hydrosphere, including: flooding, sinkholes, tsunamis.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
41. Analyze negative human-related affects on the hydrosphere, including contamination and depletion of surface, ground and ocean water.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
42. Define the makeup and percentage of gases in the atmosphere.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
43. Given a structural diagram of the atmosphere, identify layers of the atmosphere based on characteristics unique to each layer and temperature changes found within each layer.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
44. Describe the concerns and causes for ozone depletion.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
45. Using a graph, identify how pressure changes with altitude.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.
46. Compare and contrast the various motions and their effects on the Earth, including rotation, revolution and precession.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts

of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

47. List the two reasons for the variation in solar energy reaching locations on Earth, causing Earth's seasons.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

48. Identify the seasons (in both hemispheres) by date, hours of sunlight received and the axial tilt of the Earth.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

49. Define the greenhouse effect, listing the positive and potential negative outcomes of this effect on Earth.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

50. Compare and contrast arguments relating to potential causes for climate change, including natural and anthropological causes.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

51. State and explain various controls of temperature and how they affect the temperature of various locations around Earth.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

52. Using a sling psychrometer, and related charts, calculate relative humidity and dew points.

Matched Outcomes

2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.

53. Explain the various processes and heat exchanges involved in the hydrologic cycle.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

54. Define and explain the mechanisms creating cloud formation, including the processes of collision-coalescence and the Bergeron Process.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

55. State and explain what causes wind using pressure gradient, Coriolis Effect and friction.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

56. Identify and label global winds and pressure zones on Earth.

Matched Outcomes

2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.

57. Identify symbols, define terms and describe the origin and movement of air masses and

fronts.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

58. Explain the process of cyclogenesis, or the formation of a mid-latitude cyclone.

Matched Outcomes

1. Students will be able to recognize and identify introductory principles and concepts of the earth sciences, including astronomy, geology, hydrology, and meteorology, as well as the environmental concerns associated with each.

59. Using weather maps, locate positions of fronts, air pressure zones, cyclones and anticyclones; also, state past, current and future weather for given locations on the weather map.

Matched Outcomes

2. Students will apply appropriate principles and concepts to solve problems, as well as construct and interpret maps, charts, diagrams and graphs.

60. Research the current Earth science curriculum standards for the state of Michigan.

Matched Outcomes

3. Students will employ appropriate teaching methodology to successfully create and present lesson plans.

61. Create a portfolio of lesson activities based on the current elementary level earth science benchmarks for the state of Michigan.

Matched Outcomes

3. Students will employ appropriate teaching methodology to successfully create and present lesson plans.

62. Demonstrate and discuss various teaching methods and strategies appropriate for elementary level teaching.

Matched Outcomes

3. Students will employ appropriate teaching methodology to successfully create and present lesson plans.

63. Create a bulletin board related to an Earth science topic appropriate for an elementary classroom.

Matched Outcomes

3. Students will employ appropriate teaching methodology to successfully create and present lesson plans.

64. Present a lesson activity to a classroom of peers.

Matched Outcomes

3. Students will employ appropriate teaching methodology to successfully create and present lesson plans.

New Resources for Course

Course Textbooks/Resources

Textbooks

Thompson, Graham and Turk, Jonathan. *Earth*, 1st ed. Brooks/Cole Cengage Learning, 2011, ISBN: 9780538740999.

Manuals

Periodicals

Software

Equipment/Facilities

Level III classroom

Data projector/computer

Reviewer

Faculty Preparer:

Suzanne Albach

Action

Faculty Preparer

Date

Nov 06, 2012

Department Chair/Area Director:

Kathleen Butcher

Recommend Approval

Nov 12, 2012

Dean:

Martha Showalter

Recommend Approval

Nov 12, 2012

Vice President for Instruction:

Stuart Blacklaw

Approve

Jan 10, 2013