

STUDENT LEARNING ASSESSMENT OVERVIEW

NATURAL SCIENCES

The Natural Science program at Mesalands Community College provides educational options in either paleontology or geology.

The option in paleontology provides a primary education in the earth and biological sciences with an emphasis on paleontology. Students will be exposed to the fundamentals of geology, biology, and paleontology. The paleontology option emphasizes practical knowledge of fossils through field trips and laboratory work. Courses take advantage of the rich natural resources of the mesalands country of eastern New Mexico, a high technology science laboratory, and the College's paleontology museum, the Mesalands Dinosaur Museum. The Paleontology option emphasizes fossils, particularly their collection and study.

The option in geology provides a primary education in the natural sciences. Students will be exposed to the fundamentals of geology, biology, and computer science. The geology program emphasizes practical knowledge through field trips and laboratory work. Courses take advantage of the rich natural resources of the mesa country of eastern New Mexico, a state-of-the-art, computer-interactive science laboratory, and the College's natural history museum, the Mesalands Dinosaur Museum.

Program Objectives:

Upon completion of the Natural Sciences Associate Degree Program:

- 1) The student will demonstrate an in-depth understanding of the concepts and associated geological processes of the Theory of Plate Tectonics, by scoring 80% or higher on 3 examinations
- 2) The student will identify common minerals and rocks, and explain their genesis and the environments in which they form, as demonstrated by passing 3 laboratory exercises
- 3) The student will demonstrate an understanding of geological time and the principles of stratigraphy, by scoring 80% or higher on 2 examinations and 1 laboratory exercise.
- 4) The student will correctly apply appropriate field and laboratory techniques, as demonstrated by successfully completing 3 field and laboratory assignments.
- 5) The student will demonstrate the skills to conduct and present a scientific research project under guidance of the instructor, by passing a research class with the grade B or higher

In addition, upon completion of the Natural Sciences Associate Degree Program with option Paleontology

- 6) The student will demonstrate an understanding of anatomical structures and their function in the principal groups of invertebrates and vertebrates, by scoring 80% or higher on 1 examination and passing 2 laboratory exercises.
- 7) The student will demonstrate a broad-based understanding of the components of the Theory of Evolution, by scoring 80% or higher on 1 examination and passing 2 laboratory exercises.
- 8) The student will demonstrate an understanding of the principles of museum displays and collections, and of conservation and curation of natural history specimens, by successfully completing 3 practical assignments.

In addition, upon completion of the Natural Sciences Associate Degree Program with option Geology

- 9) The student will demonstrate an understanding of the genesis, occurrence, and exploitation of geological resources (mineral, energy, water), by scoring 80% or higher on 1 examination and passing 2 laboratory exercises
- 10) The student will demonstrate an understanding of the nature of geological hazards, and demonstrate the ability to evaluate such hazards, by scoring 80% or higher on 1 examination and passing 2 laboratory exercises.

Program Objectives Assessment Plan:

All program objectives are measured with multiple tools. The following **Curriculum Map** outlines those measurement tools and courses in which the program objectives are presented and/or measured:

PROGRAM OBJECTIVE	MEASUREMENT TOOLS	COURSES IN WHICH PROGRAM OBJECTIVES ARE PRESENTED AND/OR MEASURED.
1) The student will demonstrate an in-depth understanding of the concepts and associated geological processes of the Theory of Plate Tectonics.	<ul style="list-style-type: none"> • Laboratory Exercises • Faculty-prepared Examination 	<ul style="list-style-type: none"> • GEOL 151 • GEOL 152
2) The student will identify common minerals	<ul style="list-style-type: none"> • Laboratory Exercises • Faculty-prepared 	<ul style="list-style-type: none"> • GEOL 151 • GEOL 152

and rocks, and explain their genesis and the environments in which they form.	Examination	<ul style="list-style-type: none"> • GEOL 190 • GEOL 290 • GEOL 293
3) The student will demonstrate an understanding of geological time and the principles of stratigraphy	<ul style="list-style-type: none"> • Laboratory Exercise • Faculty-prepared Examinations 	<ul style="list-style-type: none"> • GEOL 151 • GEOL 152 • GEOL 210
4) The student will correctly apply appropriate field and laboratory techniques to successfully complete assigned projects.	<ul style="list-style-type: none"> • Laboratory Exercise • Field Exercise • Program-specific Rubrics • Capstone Project • Museum and Laboratory Projects 	<ul style="list-style-type: none"> • GEOL 118 • GEOL 120 • GEOL 122 • GEOL 190 • GEOL 290 • GEOL 293 • Museum volunteer activities
5) The student will demonstrate the skills to conduct and present a scientific research project under guidance of the instructor.	<ul style="list-style-type: none"> • Research Project • Scientific Report • Oral and Poster Presentations 	<ul style="list-style-type: none"> • GEOL 190 • GEOL 290 • GEOL 289
6) The paleontology student will demonstrate an understanding of anatomical structures and their function in the principal groups of invertebrates and vertebrates.	<ul style="list-style-type: none"> • Laboratory Exercise • Faculty-prepared Examination • Class Presentations • Museum and Laboratory Projects 	<ul style="list-style-type: none"> • GEOL 152 • GEOL 120 • GEOL 190 • GEOL 210 • GEOL 289 • GEOL 293 • GEOL 293K • BIOL 113 • BIOL 250 • Museum volunteer activities
7) The paleontology student will demonstrate a broad-based understanding of the components of the Theory of Evolution.	<ul style="list-style-type: none"> • Class Presentations • Laboratory Exercise • Faculty-prepared Examination 	<ul style="list-style-type: none"> • BIOL 113 • GEOL 141 • GEOL 152 • GEOL 210
8) The paleontology student will demonstrate knowledge of the principles of museum displays and collections,	<ul style="list-style-type: none"> • Faculty-prepared Examination • Class Assignment • Museum and Laboratory Projects 	<ul style="list-style-type: none"> • GEOL 105 • GEOL 120 • GEOL 190 • GEOL 290 • GEOL 289

and of conservation and curation of natural history specimens.		<ul style="list-style-type: none"> • Museum volunteer activities
9) The geology student will demonstrate an understanding of the genesis, occurrence, and exploitation of geological resources (mineral, energy, water).	<ul style="list-style-type: none"> • Faculty-prepared Examination • Laboratory Exercises 	<ul style="list-style-type: none"> • GEOL 141 • GEOL 151 • GEOL 230
10) The geology student will demonstrate an understanding of the nature of geological hazards, and demonstrate the ability to evaluate such hazards.	<ul style="list-style-type: none"> • Faculty-prepared Examination • Laboratory Exercises • Case Study 	<ul style="list-style-type: none"> • GEOL 141 • GEOL 151 • GEOL 230

General Education Competencies:

Upon completion of the Natural Sciences Associate Degree Program and in addition to the above mentioned program objectives:

- 1) Students will read, write, listen and use verbal skills to organize and communicate information and ideas in personal and group settings (Communication).
- 2) Students will demonstrate mathematical principles and scientific reasoning by applying appropriate methods to the inquiry process (Mathematical and Scientific Reasoning).
- 3) Students will identify, evaluate and analyze evidence to guide decision making and communicate his/her beliefs clearly and accurately (Critical Thinking).

General Education Competencies Assessment Plan:

General education competencies are measured with multiple tools. The following **Curriculum Map** outlines those measurement tools and courses in which the program objectives are presented and/or measured:

GENERAL EDUCATION COMPETENCIES	MEASUREMENT TOOLS	COURSES IN WHICH PROGRAM OBJECTIVES ARE PRESENTED &/OR MEASURED.
<p>Communication: 1. Present ideas in writing. 2. Present ideas orally according to standard usage. 3. Demonstrate application of information technology.</p>	<ul style="list-style-type: none"> • CAAP • CAT • Class Presentation 	<ul style="list-style-type: none"> • ACS 100 • GEOL 105 • GEOL 151 • GEOL 152 • GEOL 210 • GEOL 230 • GEOL 190 • GEOL 290 • GEOL 293 • COM 102 • CIS 101 • ENG 102 • ENG 104 • Lab Science Elective • Soc. Sci./Humanities Elective
<p>Mathematical and Scientific Reasoning: 4. Demonstrate mathematical principles. 5. Demonstrate scientific reasoning. 6. Apply scientific methods to the inquiry process.</p>	<ul style="list-style-type: none"> • CAAP • Laboratory Exercise • Laboratory Report 	<ul style="list-style-type: none"> • GEOL 151 • GEOL 152 • GEOL 190 • GEOL 210 • GEOL 230 • GEOL 289 • GEOL 290 • BIOL 113 • BIOL 250 • Lab Science Elective
<p>Critical Thinking: 7. Read and analyze complex ideas. 8. Locate, evaluate and apply research information. 9. Evaluate and present</p>	<ul style="list-style-type: none"> • CAAP • Capstone Project • Laboratory Exercise 	<ul style="list-style-type: none"> • ACS 100 • GEOL 151 • GEOL 152 • GEOL 190 • GEOL 210 • GEOL 230

well-reasoned arguments.		<ul style="list-style-type: none">• GEOL 289• GEOL 290• BIOL 113• BIOL 250• Lab Science Elective• Soc. Sci./Humanities Elective
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Overview:

The Natural Sciences assessment plan is addressed via the plan→do→study→adjust cycle that begins every fall term and follows one Natural Sciences cohort from first term through graduation.