



Course Syllabus

Geology 1404: Historical Geology

Contact information:

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- I. Texas Core Curriculum Statement of Purpose:** Through the Texas Core Curriculum, students will gain a foundation of knowledge, human foundation of knowledge, human cultures, physical and natural world, develop principles and social responsibility for living in a diverse world, and advance intellectual and practical skills that are essential for all learning.
- II. Course Description:** A comprehensive survey of the history of life and major events in the physical development of Earth as interpreted from rocks and fossils.
- III. Required Background:** There are no stated prerequisites.
- IV. Required Course Materials:** Geology 2 (2013) by Reed Wicander and James. S. Moor, Brooks/Cole, Cengage Learning, 20 Davis Dr., Belmont, CA, 94002-3098
- V. Course Purpose:** This course focuses on describing, explaining and predicting natural phenomena, using the scientific method. The course involves understanding of interactions among natural phenomenal and the implications of scientific principles on the physical world and on human experiences.
- VI. Learning Outcomes:**

Upon successful completion of this course, students will:

- Describe how the application of the scientific method has led to our current understanding of Earth history.
- Explain the historical development of Geology as a science and how it was influenced by early interpretations of fossils and the theory of evolution.
- Communicate how principles of relative and numerical age dating have been used to develop the Geologic Time Scale.

- Describe the processes involved in the formation and differentiation of the Earth and identify major milestones in the physical evolution of the planet.
- Identify the major milestones in the evolution of life from its initial inorganic states, through development of the major animal and plant groups, to mass extinction.
- Explain how rocks and fossils are used to interpret ancient environments.
- Identify the major tectonic events in the geologic evolution of North America.

VII. Core Objectives: This course directly meets following of the six Core Objectives (bold).

- 1. Critical Thinking Skills: to include creative thinking, innovations, inquiry, and analysis, evaluation, and synthesis of information.**
- 2. Communication Skills: to include effective development, interpretation and expression of ideas through written, oral, and visual communication.**
- 3. Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.**
- 4. Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.**
5. Personal Responsibility: to include the ability to connect choices, actions, and consequences to ethical decision-making.
6. Social Responsibility: to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities.

VIII. Methods of Instruction: Class notes, class discussion, lab experiences, and videos.

IX. Methods of Assessment:

- A. Grading: This course **will** accumulate @600 points. The following scale will then be applied to calculate individual grades:

A= 90-100; B=80-89; C=70-79; D=60-69; F=59 or less

B. Division of Points:

A. Class work= @ 35%

1. Daily Group Work= 5 points each
2. There will be ample opportunity to complete the required number of assignments.
3. These cannot be done outside of class; excessive excused absences will be given alternate activities to make up the points.

B. Assessments= @35%

1. One every week; these will be short-answer, discussion questions.
2. There will be 12 assessments, each worth 20 points.
3. Missed assessments will have to made-up during instructor's office hours; it is the student's responsibility to make these arrangements.

C. Lab=@20%

1. Lab will meet twice a week for 1.5 hour each session. There will be a five-point assignment for each lab session for a total of 10 points per week.
2. Twelve lab grades are required at 10 points each.

D. Final Exam=@10%

1. This will consist of multiple-choice vocabulary terms/concepts from the entire semester.
2. I will give a review list of possible terms one week before the final.

X. Classroom Policies:

- A. Academic Dishonesty: Any assignment reflecting cheating, plagiarism, or any other form of academic dishonesty will receive a grade of zero. A second instance will result in automatic failure of the class and a report being submitted to Ranger College's Vice President of Instruction.**
- B. Class attendance and participation are strongly encouraged for optimal learning.
- C. Use of cell phones is discouraged unless researching class information.

D. Attendance: Attendance does not contribute points to your grade. If you are going to miss class, please notify me at alewis@rangercollege.edu prior to the class meeting if at all possible. Students missing more than three lectures or two labs may be dropped from the course by the instructor.

XI. Time-Line for Historical Geology

Core Objectives 1-4

Each item on this list of weekly assignments meets the corresponding numbered core objectives listed on page 1 above.

Week 1: History of Historical Geology

1. **Evaluate** early scientific teachings of Ussher, Buffon, Hutton, Lyell, Steno, and Darwin as their reliability and validity; **construct** philosophy of science in regards to theory vs. fact.
2. **Orally interview** classmates as to their views on earth history.

Week 2: Scientific Theory of the Origin of our Universe and Solar System

1. **Explore** “Big Bang Theory” and **evaluate** its strengths and weaknesses.
2. **Present** a 5-minute power point on other selected propositions such as Edwin Hubble's “Expanding Universe Theory” and Stephen Hawking's “A Brief History of Time.”

Week 3: Scientific Theory of the Three Stages in Earth's Development

- 3, 4. **Calibrate** densities of known minerals to **predict** composition of Earth's layers. **Share** results with other lab group to confirm data. **Present** in proper scientific format.

Week 4: Major Principle of Historical Geology: Relative Dating

1. **Explore** Steno's principles of relative dating by **illustrating** with diagrams one's understanding of the principles.
2. **Analyze** various fossils from lab “Fossil Excavation” and **record** observable facts in proper scientific form.

Week 5: Major Principle of Historical Geology: Absolute Dating

1. **Discuss** limitations of Carbon-14 dating; contrast with uranium to lead
3. Using manipulatives, **reproduce** half-life of radioactive materials.

Week 6: Major Principle of Historical Geology: Geologic Time-line; Climate Change

- 3, 4. With a partner, **construct** a five-meter time of earth history; create an appropriate scale and label divisions; this time-line will be “filled-in” as the semester progresses with appropriate events.

Week 7: Solid Earth: Precambrian-Paleozoic Eras (Evolution of North America)

1. **Identify** milestones in the evolution of the solid Earth such as creation of continents and emphasize evolution of North America.
2. Using lab “Geology of a Changing Planet,” **explore** this time period.

Week 8: Solid Earth: History of Paleozoic mobile belts and microplates; Pangaea

1. **Progress** forward in time to the orogenic activity in mobile belts and relate how this influenced the craton and formation of Pangaea.
2. **Present** a five-minute power point on one of the mobile belts or role of microplates or break-up of Pangaea.

Week 9: Solid Earth: Mesozoic History of North America; Cenozoic Earth History

1. **View** video “Making of North America” and **compare** and **contrast** class notes in a VENN diagram.
2. **Demonstrate understanding** of sea-floor spreading with completion of lab “Sea-Floor Spreading” and **apply conclusions** to present-day plate tectonics.

Week 10: Introduction to Paleontology

1. **Evaluate** use of fossils to help us understand past of Planet Earth and **interpret** ancient environments.
- 2, 3. **Analyze** lab “Biochemical Soup” to possibly explain evolution of life from initial inorganic states.

Week 11: Living Earth: Precambrian and Paleozoic Eras

1. **Trace** development of plant and animal species from single cells to vertebrates; explore milestones such as “Cambrian Explosion” and “Permian Mass Extinction.”
- 2, 3. Using labs, “How Fossils Form” and “Introductory Fossil Collection,” **simulate** possible explanation of this process.

Week 12: Living Earth: Mesozoic Era

1. **Research** why this era is called the “Age of the Dinosaurs.” **Present** findings in class discussion.
- 2, 3. **View** video “Dinosaurs” and **evaluate** information presented; **discuss** background knowledge brought to class from previous schooling or exposures.

Week 13: Living Earth: Cenozoic Era

1. **Describe** evolution of mammals and diversity of plants, birds and marine invertebrates during this time period.
2. **Correlate** distribution of life on Earth with Plate Tectonics.

Week 14: Theory of Human Evolution

1. **Discuss** primate evolution; since human evolution is controversial and sensitive, **allow** students to research areas of possible human evolution of their choice and present findings to the class.

Week 15: Applied Historical Geology and Paleontology

1. **Research** use of historical geology as a tutor for present-day physical geology. **Summarize** human impact on the Earth's environments, covering such topics as natural resources, energy resources, rise of carbon economy, global energy consumption and sustainability.

Week 16: Final Exam

- XII. Non-discrimination Statement:** No person shall be excluded from participation in, denied the benefits of, or be subjected to discrimination under any program or activity sponsored by Range College on any basis prohibited by applicable law, including, but not limited to race, color, national origin, religion, gender, age or disability.
- XIII. ADA Compliance:** Ranger College abides by Section 504 of the Rehabilitation Act of 1973, which stipulates that no otherwise qualified student shall be denied the benefits of an education “solely by reason of a handicap.” If you have a documented disability that may impact your performance in this class and for which you may be requesting accommodation, you must be registered with and provide documentation of your disability. Arrangements will be made for students needing special accommodations.