

SciEd 202 - Matter and Energy in Earth Systems

SPRING 2022 SYLLABUS

Instructor: Ben Fackler-Adams, Ph.D.

Phone: (360) 483-7627 (emergencies only please)

Email: bfackler-adams@skagit.edu

Office Hours: T & Th 12-1 pm in person SMATE LRC

TA: Lindsey Gard

Email: gardl@wwu.edu

Office Hours: Mondays 2-3pm in person, SMATE LRC

Class Meetings: Tues & Thurs 1:00-4:00 pm in **SL210**

Required text: 1. SciEd 202 Spring 2022 Course Book “**Geology and Everyday Thinking**”, WWU bookstore;

NOTE: *You will bring it to class each day.*

2. **E-book chapter. Exploring Geology**, Chapter 3 - Plate Tectonics (via Canvas)

Prerequisite: SCED 201 (Physics and Everyday Thinking)

REQUIRED FIELD TRIP: Saturday, May 28th, 8:30 am – approx. 3:00 pm (Mark Your Calendar!)

FINAL EXAM: TBD

Course Overview

A guided inquiry-based study of geology and the processes occurring all around us. We will focus on the amazing transfers of energy and mass inside earth that cause rocks to change form, plates to collide, volcanoes to erupt, and earthquakes to destroy buildings. This is an activity-based and discussion-oriented course with three major goals:

- A. **Geologic Content:** To help you develop a deep understanding of geologic ideas that can be used to explain natural phenomena, and that are included in elementary/middle education science curricula;
 - B. **Nature of Science:** To help you practice and develop an understanding of: a) how knowledge is developed within a scientific community, b) how doing science involves using evidence and creative thinking, c) that knowledge is established through collaboration and consensus, and, d) that science knowledge can change over time;
 - C. **Learning about Learning:** To help you become aware of how your own understanding of geology has changed and developed over time, and how the structure of a learning environment and curriculum can facilitate these changes.
-

Student Learning Outcomes:

By the end of this course you will:

1. Appreciate that science is a universal language that can transcend race, cultures, and geography.
2. Experience different learning modalities through group work in discussion and laboratory activities.
3. Believe that scientific literacy is possible for any person
4. Read and interpret scientific data presented graphically
5. Formulate hypotheses and predictions
6. Construct models explaining the components of Earth systems and their interactions
7. Use the concept of energy as a powerful tool for looking at the relationships of Earth systems and their changes over time.
8. Be able to pick up a rock and, using your observations about that rock, make inferences about the processes that formed that rock and where it formed.
9. Explain why the Earth has variable topography.
10. Explain how the transfer of heat from the interior of the Earth toward the surface causes slow changes in the position of the Earth's plates (e.g., formations of mountains and ocean basins) and relatively rapid changes at the surface (e.g., volcanic eruptions and earthquakes).
11. Describe how physical evidence, such as fossils, relationships between rock units, and radioisotopic dating, provide evidence for the Earth's evolution and development (and use these relationships to develop a “story” about the geologic history of our region.

Course Format

This course will meet synchronously and face-to-face in SL210.

This course is based on a collaborative learning model that centers on small group discussions. The goal of using this model is to leverage the wide range of prior knowledge and different styles of thinking and problem solving that we, as a learning community, possess.

NOTE: The course format and this syllabus is subject to change. Changes, if any, will be announced in class. Students will be held responsible for all changes announced in class.

Attendance Policies

Collaborative learning requires a commitment from everybody involved. In other words, your success relies on your classmates participation and engagement, and theirs relies on yours in return. We are learning together. For this reason, **you are expected to attend all class meetings**. We will be taking attendance each class meeting.

Missed Class: If you need to miss a class, you must inform the instructor or the TA that you will be missing as soon as you know. This will be considered an excused absence. Because communication is a pretty low bar for an excused absence, **each unexcused absence will drop your course grade by 3%**. However, if you have more than unexcused 3 absences, you will not be able to pass the class.

If you do miss a class, you must make up the work prior to the next class period, and assigned homework is still due at the assigned time unless otherwise agreed upon with your instructor.

Late Arrivals/Early Departure: Due to the intensely collaborative nature of this class, it is critical that everyone arrives to class on time and ready to go. Late arrivals will negatively impact your participation grade. The same criteria hold true for leaving class early. Please call/email in advance and/or have a valid emergency for a late arrival or early departure to be excused.

Religious Accommodation

Western provides reasonable accommodation for students to take holidays for reasons of faith or conscience or for organized activities conducted under the auspices of a religious denomination, church, or religious organization. Students seeking such accommodation must provide written notice to their faculty within the first two weeks of the course, citing the specific dates for which they will be absent. "Reasonable accommodation" means that faculty will coordinate with the student on scheduling examinations or other activities necessary for completion of the course or program and includes rescheduling examinations or activities or offering different times for examinations or activities. Additional information about this accommodation can be found in [SB 5166: Providing religious accommodations for postsecondary students](#).

Grades and Grading Policy

Your final grade will be based on the following components and weights (NOTE: see policy above for grade deduction for unexcused absences):

Attendance	<i>REQUIRED</i>	<u>Your class grade is determined using the following scale:</u>		
Participation	15%	100% ≥ A > 93%	83% ≥ B- > 80%	70% ≥ D+ > 67%
Homework	15%	93% ≥ A- > 90%	80% ≥ C+ > 77%	67% ≥ D > 63%
Field Trip	15%	90% ≥ B+ > 87%	77% ≥ C > 73%	63% ≥ D- > 60%
Reflective Essays	15%	87% ≥ B > 83%	73% ≥ C- > 70%	60% ≥ F > 0%
Quizzes	40%			
TOTAL	100%			

NOTE: If your average is borderline between two grades, the instructor has the discretion to use your progress and effort in the course as the deciding factor to determine your final grade.

Details of Grading Policies

Participation (15% of course grade): Because this is an inquiry-based class, you will be developing your own understanding of the material through the lab experiences, and as such, must be engaged, questioning and contributing to the group for success. Therefore, participation is a key element in this course and in the final grade. Periodically, you will be evaluating your group and yourself, as well as doing a reflective evaluation of your learning at the end of each chapter and at the end of the course. In order to receive full credit for participation, complete and up-to-date workbooks are required.

Your participation grade will be based on the following:

- Active participation in small group discussions (and evaluation by your small group peers). Do you actively contribute to group work? Are you engaged with your peers and the activities?
- Active participation in class discussions:
 - Do you pose clarifying questions to the class?
 - Do you paraphrase what other say? (“So, If I am understanding you correctly...”)
 - Do you ask for help from the class when you are confused? Share what you do understand?
- Maintaining an up-to-date and complete workbook during the course

Awarding participation points: You will be awarded 100 percent if you are a strong contributor to both small group and classroom discussions (equivalent to an A+). If you are a good active participant in both, you will receive 95 percent (equivalent to an A). If you are stronger in one than the other, you may receive 90 percent (equivalent to an A-). If you are active in your group but your only contribution to the class discussions is to present your whiteboard, then your participation grade will not be higher than 85 percent (equivalent to a B). Lower percents are possible, but if this is the case, you will be given notice during the quarter by the instructor.

Homework (15% of course grade): Homework will be assigned throughout each chapter and may require viewing videos, watching demonstrations, visiting websites, etc. Homework should be completed individually, and should be your own work. Due dates for assigned work will be announced in class and posted on the course website. *All assignments are due at the beginning of class (or they are late).* Work submitted late will receive a 10% deduction per calendar day, and no work will be accepted after 2 days beyond the due date.

Field Trip (15% of course grade): There will be an all-day *required* Field Trip to Larrabee State Park and Clayton Beach on **Saturday, May 28th, 8:30 am – approx. 3:00 pm (Mark Your Calendar!)**. There will be a pre-trip assignment, post-trip quiz and summative report associated with this field trip.

Chapter Quizzes (40% of course grade): Attendance on quiz dates is required unless you have a valid medical or family emergency excuse and/or have communicated with the course administrator (via phone or email) prior to the quiz. The final quiz will probably consist of the Chapter 5, 6 and Chapter 7 quizzes (plus some cumulative questions) and the Content/NOS Post-tests. *It is scheduled during finalsweek.*

Reflective Essays (15% of course grade): At the end of each chapter, you will be asked to review what you have learned from one of the following perspectives:

“In the form of a short essay, write about ...”

1. A particular concept or concepts that you learned. Compare your understanding now with what you thought before using evidence from your initial ideas writing.
2. How you learned a particular concept (or what hindered your learning). What particular activity or discussion got you to an “ah-ha” moment? You'll need to cite evidence from the activity and use examples from your writing.
3. The final reflective essay will have its own distinct prompt

These essays will not be graded on how much Earth Science you learned, but on how well you elucidate your learning process(es), and how well you utilize evidence to support your claims.

N O T E : See rubric on Canvas for more insight on how to effectively complete these reflections.

Disability, Equitable Access, and Accommodations

This course is intended for all WWU students, including those with visible or invisible disabilities. Students with disabilities will be provided equitable access to educational experiences and opportunities. If, at any point in the quarter, you find yourself not able to fully access the space, content, and experience of this course, please first contact the Disability Access Center (DAC) to discuss potential accommodations. Faculty and staff partner with the DAC in the implementation of accommodations.

Disability Access Center: telephone 650-3083; email drs@wwu.edu; and on the web at <https://disability.wwu.edu>

Integrity and Academic Honesty

As a community, Western is committed to integrity in all aspects of academic and campus life. An excellent resource on integrity for faculty and students is the Western Coalition for Integrity. (See www.wwu.edu/integrity/) In addition to providing resources concerning common problems related to academic integrity, such as plagiarism and cheating on exams, the Coalition website also addresses related issues such as collaborative work, the use of language translators, and submitting the same paper in different classes. In addition to this site, the University Catalog in Appendix D—Academic Honesty Policy and Procedure—delineates rights and responsibilities. (<http://catalog.wwu.edu/content.php?catoid=10&navoid=1794>)

All work you submit for the course should be your own. Students who turn in work other than their own (or who knowingly help another to turn in work that is not their own) will receive a minimum of zero on that assignment and may fail the course.

Student Services

Western encourages students to seek assistance and support at the onset of an illness, difficulty, or crisis.

- In the case of a medical concern or question, please contact the Health Center: 650-3400 or www.wwu.edu/chw/student_health/
 - In the case of an emotional or psychological concern or question, please contact the Counseling Center: 650-3400 or www.wwu.edu/counseling
 - In the case of a health and safety concern, please contact the University Police: 650-3555 or www.wwu.edu/ps/police/index.shtml
 - In the case of a family or personal crisis or emergency, please contact the Dean of Students: 650-3450 or <https://wp.wwu.edu/students/>
 - To seek confidential support related to sexual violence, please contact CASAS (650-3700; www.wwu.edu/pws/about_casas.shtml), the Student health Center, and/or the Counseling Center. To report sexual violence, please contact University Police, Bellingham Police, and/or the Title IX Coordinator in Western's Equal Opportunity Office (650-3307; wp.wwu.edu/sexualviolence). Faculty are responsible employees who are required to report sex discrimination, including sexual violence that they learn about to the Title IX Coordinator.
-

Final Comment

This course emphasizes learning through collaboration and consensus—a method proven effective by extensive research and the way we hope you will teach. The approach may be different than science courses you have taken. Importantly, mutual respect for everyone is a key to ensuring a safe learning environment in which all students feel comfortable sharing their thinking. If you are unsure why I am doing what I am doing, or have concerns about anything related to the course, don't hesitate to ask! I am interested in talking to you about Earth science concepts, the nature of learning and teaching, and your personal experience in the class.

On a broader level, I am committed to establishing and maintaining a classroom climate that is inclusive and respectful for all students. Learning includes being able to voice a variety of perspectives, and classroom discussion is encouraged. While students' expressed ideas may vary and/or be opposed to one another, it is important for all of us to listen and engage respectfully with each other. In this class I expect students to make their best efforts to pronounce one another's names correctly, and to respect one another's personal pronouns. Please speak with me with any questions or concerns related to these expectations.