

Geology of the Northwest
Linfield College – PHY 103
Fall Term – 2003 - Eugene

Instructor: Allen Throop 541 753-1804 – 2340 NW Arthur Av., Corvallis, Oregon 97330. Often available between 8 and 10 P.M. E-mail address throopa@peak.org

Course Description: This is a field-based geology course for non-science majors. The class will visit a selection of the physiographic provinces of Oregon. We will study many of Oregon's well-known geographic features and try to understand what geologic processes have come into play to form the features. We will also look at the earth around us to get a better understanding of our relationship to the geological world on which we live.

Instructor biography: For 19 years, I was employed by Oregon's Department of Geology and Mineral Industries in the Mined Land Reclamation Program. I have worked throughout Oregon and Washington with metal, aggregate, and industrial minerals mines. I have also worked in the metal and coal mining industries in the United States, Canada, and Australia. I am a registered geologist in Oregon and a consultant to the mining industry. My recent teaching experience includes geology-related courses at various Linfield locations, geology courses at Linn-Benton Community College, and workshops on mined land reclamation and storm water control throughout the country. I have been active in preserving open spaces around Corvallis. I write occasional articles for the Venture Section of the *Corvallis Gazette-Times*. Until this year, I was an avid backpacker, bicyclist, and cross-country skier; my mobility is now greatly decreased.

Course Outline: Friday evenings will be spent in classroom discussions and activities. Each Saturday we will look at some aspect of Oregon's geology. The field trip destinations and focus will depend on the interest of the students. The first weekend we will go to McKenzie Pass. Other trips could include the Columbia River Gorge, the Oregon Coast, or areas south of Eugene. Your interests will influence what we will do this year. Come prepared for being out in Oregon's weather on every Saturday, including the first one. If you have special needs please contact me; we will find a solution.

Students will be responsible for preparing discussion questions for one or two chapters, for a presentation on a major geologic feature or features found in Oregon and for writing a summary report of each field trip.

Meeting schedule: Lane Community College, Eugene. Check the printed schedule or with your Linfield advisor for room location. Friday meetings run from 6:00 to 9:30 P.M. The Saturday classes will meet from 9:00 A.M. to 5:00 P.M. Plan on spending most of every Saturday outside. Dress appropriately!

Pre-class assignment: Read chapters 1, 2, and 3 in the book of essays. Come to class with written answers to the attached questions and be prepared for a discussion of those questions. Bring paper, pencil, a ruler and a hand calculator to class.

Objectives: The students should finish the course with a much greater appreciation of the rocks beneath our feet including: how the rocks got there; what is happening to them now;

and what is their long-term fate. Students should be able to integrate the geology that surrounds us into life decisions such as home-site selections or the debate about fish versus power generation.

Goals: Upon the completion of the course, the student should be able to:

- Be able to explain the basic concepts of plate tectonics.
- Describe the major evidence used to support the theories to explain the formation of one or more of Oregon's outstanding geological features.
- Understand and discuss aspects of one or more current national geology-related issues.

Textbook: Schneiderman, Jill S., 2000, **The Earth Around Us**, W. H. Freeman & Co. ISBN: 0-7167-3397-8 **The book was originally published by Freeman & Co. The part of the company that published this book has been sold to Henry Holt. The book is not now available from a publisher. The book seems to be readily available, in both new and used versions, at Amazon.com. I should be able to get it for \$10 or less but do we until the last minute to try and get one.**

Evaluation:

The success of the class depends on the participation of the students. Get in on the discussion!

<i>Three in-class exercises @ 7pts each</i>	<i>21 pts</i>	<i>A</i>	<i>> 93%</i>	<i>C-</i>	<i>70 –</i>
<i>72%</i>					
<i>Chapter presentations (1 or 2 each)</i>	<i>20 pts</i>	<i>A-</i>	<i>90 – 92%</i>	<i>D+</i>	<i>67 – 69%</i>
<i>Class participation</i>	<i>10 pts</i>	<i>B+</i>	<i>87 – 89%</i>	<i>D</i>	<i>63 – 66%</i>
<i>Field trip notes - 4 @ 10% each</i>	<i>40 pts</i>	<i>B</i>	<i>83 – 86%</i>	<i>D-</i>	<i>60 –</i>
<i>62%</i>					
<i>Commodity reports written</i>	<i><u>30 pts</u></i>	<i>B-</i>	<i>80 – 82%</i>	<i>F</i>	<i><60</i>
		<i>C+</i>	<i>77 – 79%</i>		
	<i>121 pts*</i>	<i>C</i>	<i>73 – 76%</i>		

**Number of presentations and total points will vary depending on the projects that we undertake and the size of the class.*

Incompletes (I) will be given only in emergency situations. Requests must be submitted in writing for pre-approval by me. Assignments are due at the start of the class. Late assignments will lose 1/3 of a grade per day until I receive them. Missing assignments will be counted as 0 when grades are compiled.

Course Attendance Policies: Students are expected to attend all of every class meeting. If you don't plan to make all the meetings including the Saturday meeting, you should not be taking this course. The instructor must approve any absences in advance. Since class participation is an integral part of this class, those who miss a session can expect a lower grade.

Any student found cheating or plagiarizing will receive an F for the course and may be

subject to further college sanctions.

This is not a traditional science or mathematics course where $1 + 1 = 2$ and any other answer are wrong. The readings are meant as a starting point for discussions. Do not assume that the author's view is correct and is not to be challenged. Some of the readings will take us to the area where science, politics and economics merge. My ideas may not mesh with yours. (My ideas this year are much different than what they were 20 years ago.) I will respect your views as long as they are supported with sound reasoning and research. In return, we all must be allowed to discuss the widest possible range of opinions without fearing retribution, ridicule or attack. We must treat everyone in the classroom with civility, courtesy, and respect.

Submission and return of course materials: I would prefer that most materials be submitted electronically. Procedures will be discussed in class. I attempt to get feedback to you before the next class meeting.

Need more information? I would be pleased to talk to you about the course. E-mail is the easiest way to make initial contact.

Linfield College
PHY 103 -Geology

Reading Assignment Questions

"The Earth Around Us" by Jill Schneiderman

See the comments on the class syllabus about book availability. Get your work early.

Before the first class, answer the questions below and be prepared to select one or two chapters for which you would lead a discussion. The number of chapters you do will depend upon how many students are in the class. Since another student may choose your first choice chapter before you do, pick out more than two possibilities.

As a general rule, critical thinking questions for this class should not be answered with a number or a few words. However, given the nature of these opening chapters and the limited geological background anticipated of the students, the first few questions break the rule. I think the answers will, in fact, generate some good discussion. The readings are designed to give you the background to help answer the questions. Answers are generally not in the book.

Chapter 1 -Geology: The Bifocal Science – *Susan Weiner Keiffer*

1. List one or two geological features familiar to us living in the Pacific Northwest that can be found in few other places in the United States. List two geological features from the Pacific Northwest that can be found in very few other places in the world. Don't spend a lot of time on this; my answers may not be at all obvious.

3. Assume that a generation lasts for 40 years. What major geological events have occurred in the Pacific Northwest that have been witnessed by your generation but not by your parents' generation and will start to become myths to your grandchildren?

4. The John Day fossil beds of Central Oregon contain an exquisite collection of fossils representing the life in that area over the last 40 million years. How would that collection of fossils fit into Kiefer's view of the geology? **Chapter 2 - Set Piece on Geologic Time - John McPhee**

John McPhee is arguably the present master of interpreting plate tectonic theory and the geologic history of the United States for non-geologists. I recommend his books, those on geology and those on other subjects, highly. He is an English professor at Princeton, not a geologist.

1. John McPhee relates the links of the Earth's history to that of your arm span. Another comparison is with the links of a football field. Go to:
http://www.cotf.edu/ete/modules/msese/earthsysflr/geo_activity.html (alternatively, do a Google search on earth floor - geologic Time and then click on the Geologic Time Activity button. Do the football field exercise before class.

2. The scientific method involves reviewing a collection of data, making an hypothesis of what conclusions the data suggests, doing experiments or making observations to test the hypothesis, and then revising the hypothesis if necessary based on the results of the further experiments or observations. Explain how Archbishop Ussher, the vice chancellor of Cambridge, Abraham Werner, and James Hutton each used the scientific method to suggest their own hypothesis about the formation and age of the Earth.

Chapter 3 - Stories of Land, Stories from Land - Laura Savoy

1. I like the opening paragraph of this essay because I always have a sore neck after an airplane flight on a clear day. I spend the entire trip studying the landscape and trying to discern the underlying geology. Is there a part of Oregon, the Northwest, or the United States that you have driven through or flown over and wondered why the land was shaped that way? If so, where is it? What is the fascination to you?
2. What sorts of changes have been imposed upon the landscape of the southern Willamette Valley since European settlement started in the 1840s?
3. Some geologic features can be altered easily. Others are so dominating that settlement of Oregon worked around them. The first route from Eugene to Bend was via McKenzie Pass. The present all-weather route, via Santiam Pass, is a longer distance. Why was this Santiam Pass route chosen?
4. Geomorphology is the study of the shape of the land. The underlying rocks almost always influence the shape. The geomorphology often affects political boundaries. For instance Lane and Douglas Counties stretch from the top of the Cascades to the coast. North of Lane County, Linn, Benton, and Lincoln County span a similar width. What geomorphologic features may have influenced the separation of the counties?