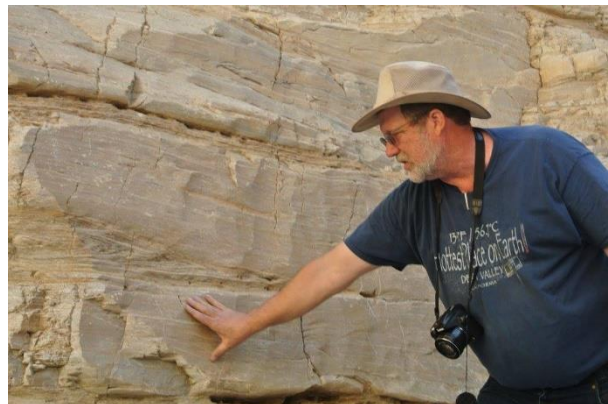


Welcome to the World of Geology!

“After sleeping through a hundred million centuries we have finally opened our eyes on a sumptuous planet, sparkling with color, bountiful with life. Within decades we must close our eyes again. Isn’t it a noble, an enlightened way of spending our brief time in the sun, to work at understanding the universe and how we have come to wake up in it? This is how I answer when I am asked—as I am surprisingly often—why I bother to get up in the mornings.” Richard Dawkins

Our world is a rich and mysterious place, and the science of physical geology is the place to discover it. In this class we will begin to understand the forces behind such phenomena as volcanic eruptions, earthquakes and tsunamis. We will discover what the world is made of, and learn about rocks that were formed billions of years ago. We will understand how minerals and crystals form, how glaciers carve solid rock, and how rivers cut canyons. By the time this course is over, you will have a new perspective every time you go outdoors.



To study geology is to experience adventures beyond belief. In my life, I've stood next to active lava flows in Hawaii, snorkeled on the Great Barrier Reef of Australia, walked among the ruins of Pompeii, dug for dinosaurs in the wilds of Montana and Utah, and picked up gemstones in any number of places. I've floated down the Colorado River in the Grand Canyon, all 225 miles of it. *And who did I share these adventures with? People like you: the students of Modesto Junior College!*

Instructor Information

Garry Hayes – Science Community Center 336 (Not currently accessible)

Phone and Voice Mail: 575-6294 (messages only for the time being)

Office hours: TTh 11:45-12:45, 5:30-6:30

E-mail: havesg@yosemite.edu (notes can also be sent through Canvas)

Web Page: <http://havesg.faculty.mjc.edu/>

The Geoblog: <http://geotripper.blogspot.com/>

What books do I need?

Physical Geology: Exploring the Earth, Carlson, Plummer and Hammersly (16th edition; 14th or 15th ok)

How will my grade be determined? (VERY Tentative)

Task	Points Possible	Percentage of Grade
Quizzes		25%
Laboratory		40%
Online Projects		10%
Final		25%
Total		100%

A: 90% B: 80% C: 70% D: 60% F: Less than 60%

This course will consist of a series of weekly modules completed through Canvas. Each week will include readings, discussions and other projects, as well as a laboratory section. Each module will end with a quiz. Try to get started early in the week, especially if you are in the Tuesday lab section.

Because of the national pandemic, this course, laboratory and all, will be held online. You will need to purchase the textbook, but any of the last three editions of the texts (14th, 15th, or 16th) will suffice for the course if you can get them for a low price. There are some lab materials that will be needed for the course, but these are being provided by MJC. They will be available for pickup on campus on **Friday August 21 from 8-10 am in parking lot 209 north of the Science Community Center, and on Monday August 24 from 7 to 8 pm.**

Course Learning Outcomes

What will you know when you finish this course? What new skills will you have? The following items are the Course Learning Outcomes (CLO's) for Physical Geology (along with some added explanations).

Upon successful completion of the course, you will be able to:

A. Analyze the elements of the scientific method and explain how these principles apply to the study of the earth. All sciences share a common methodology of attaining knowledge that seeks to eliminate bias and prejudice in research. You will know the difference between a hypothesis and a theory (and it may very well not be what you think!).

B. Explain the geologic processes of tectonism, erosion, and mineral and rock formation. You live in one of the most diverse landscapes in the world: there are few places where you can start driving in a hot desert, go up and ski for a few hours, and then go to the beach to work on your tan. Almost every important geologic process has an example taking place in this state, and you will understand how they work. Not to knock pop culture, but you will know more about geology than literally any television or newspaper reporter. You will be criticizing and critiquing the news regularly, especially when they make mistakes about earthquakes and volcanoes.

C. Use the basic geologic principle of uniformitarianism and the examples of present-day geologic processes to explain the formation and evolution of the features of the earth. Many people are surprised that a geologist can look at a few rocks in a roadcut or mountainside and then immediately tell a complete story of how those rocks came about. In this class, you will learn the set of principles that geologists use to tell the story of the rocks. You will have the ability to interpret the story in the rocks yourself, either in pictures and diagrams, or by visiting the localities yourself.

D. Assess and evaluate competing hypotheses regarding the concept of geologic time, the origin of the earth and solar system, and plate tectonics. Geologists are still arguing about geological processes. This is how science is meant to work, so we will be learning how controversies and arguments are settled in geologic research.

E. Explain the necessary role of the geologist in the modern technological society in areas such as urban planning, the search for new energy resources, and environmental research. Can we drill offshore of California and bring back \$2/gallon gas? Are politicians correct when they say global warming is not real? Do we have enough water for the population of the state? Should we be covering the agricultural soils of the Central Valley and building cities? Geologists have a lot to say about these issues, and you will understand how scientists approach these problems.

F. Test for the physical and chemical properties of minerals, and identify the most common minerals and igneous, sedimentary and metamorphic rocks. The nuts and bolts of geology is the ability to identify the most common rocks and minerals. You will know fully 95% of all the minerals and rocks anyone will ever ask you about!

G. Interpret geologic features and landforms from aerial photographs and topographic maps. You will learn how to read maps and identify geological features on aerial and satellite imagery. You will never have to feel ignorant when you are outdoors with this skill. And, it is more fun than it sounds (check out GoogleEarth sometime...).

H. Distinguish 3-dimensional rock structures and faults from geologic maps. You will be exercising your mind in this class; thinking in 3 dimensions is a rare and valuable skill that has many applications outside geology as well. And everyone should know their faults.

These course outcomes may look overwhelming. But together on this journey we are going to go at them one week at a time, and you will be surprised at how much you have mastered at the end of our sixteen weeks together.

Accommodations

The course is designed to be accessible for all. If you have a disability, please let me know through email or by phone. I can work with you. I do my best to make sure everyone who takes this course has a positive experience so they can be successful.

Outline of Course Content

Week

1	Zoom: Scientific Method -Origin of Earth	Lab: Mineral properties
2	Zoom: Plate Tectonics and History of Geology	Lab: Igneous rock-forming minerals
3	Zoom: Atoms and Minerals	Lab: Sedimentary and metamorphic minerals
4	Zoom: Magma and plutonic processes	Lab: Igneous rocks
5	Zoom: Volcanic rocks and volcanism	Lab: Igneous rocks
6	Zoom: Weathering and Sedimentary rocks	Lab: Sedimentary rocks
7	Zoom: Metamorphic rocks	Lab: Metamorphic rocks
8	Zoom: Earthquakes	Lab: Topographic maps and volcanism
9	Zoom: Continental Drift and Plate Tectonics	Lab: Faults and folds
10	Zoom: Earth Interior and Ocean Basins	Lab: Interpretation of 3-D Structure
11	Zoom: Geologic Structures and Mtn-building	Lab: Geologic Maps
12	Zoom: Mass Wasting	Lab: Geologic Maps
13	Zoom: Rivers	Lab: Rivers
14	Zoom: Groundwater and Glaciers	Lab: Glaciers
15	Zoom: Deserts and Shorelines	Lab: Shorelines
16	Final Examination	



Due Dates and Late Work

Use the [Canvas calendar \(Links to an external site.\)](#) and [To Do list \(Links to an external site.\)](#) to keep track of upcoming assignments in all of your courses.

Late assignments will be accepted for up to 60% of the total score, and only for one week past the due date. If you have circumstances that keep you from submitting an assignment, it's best to begin by sending me an email and letting me know. We can work together to help figure something out for you.

Overall, it's important to submit work on time. You'll want to be on the same page as your peers during group work and discussions.

Academic Honesty

At MJC, we expect academic honesty and integrity in all the work you submit. This means completing your own, original work for every assignment.

Course policy: Any assignment where academic dishonesty is involved will automatically receive an F (zero points), which may result in the student failing the course. A report may be filed. For additional information, see the [MJC Standards of Student Conduct webpage \(Links to an external site.\)](#).

In this course, **plagiarism*** detection software such as Turnitin may be used on assignments you submit.