

# Pre/Co-Requisite Challenge for Field Courses

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In order to register for any field course through Earth and Planetary Sciences, a student must satisfy one of the following requirements:

- 1) Be currently enrolled or have taken one of the following courses: **ERTH 111, 112, 113, 114, 115, 122, 125, 126, 131, 132, 141, 151 or ENVS 115 or GEOG 101**
- 2) Have taken an equivalent to one of the above classes at another school. In this case, Pre-Requisite Challenge Form A is required, and can be downloaded from the SBCC website.
- 3) Must pass the Pre/Co-requisite quiz and complete Pre-Requisite Challenge Form B. Due to the fact that the Earth Science Field Courses are short courses that start well into the semester, the Pre-Requisite Challenge Deadline does not apply. However, challenging takes a significant amount of time and should be started as early as possible.

## Taking the Pre/Co-Requisite Quiz

All students without the pre/co-requisite MUST meet with or email an instructor of the field course to discuss preparing for the quiz and registering for the class. It is encouraged that the student meet with a geology tutor for an hour or two, in order to be introduced to some essential background material for successful completion of the course. The student should have a basic understanding of (1) Rocks and the Rock Cycle, (2) Plate Tectonics, and (3) Geologic Time (see Topics of Study below). To aid in studying, direct the student to the list of Related Web Pages for Self Study below. The student then takes the Pre/Co-requisite quiz in the main office; see or call (965-0581 x2315) Libby to make an appointment, as soon as possible. Quiz results will be sent via email. As a courtesy, the instructor may provide the student with a letter stating that they passed the test to include with their Pre-Requisite Challenge form.

## Topics of Study:

### 1. **Rocks and the Rock Cycle:**

What is a rock? Characteristics of felsic vs. mafic rocks. How do igneous (plutonic/intrusive and volcanic/extrusive), sedimentary (clastic and non-clastic) and metamorphic rocks form? How does one rock type convert to another? What are the fundamental rock types in each category? Know the rock type category for each of the following: granite, rhyolite, andesite, basalt, conglomerate, sandstone, shale, limestone, gneiss, quartzite, and marble. Study the General Rock Classification Chart (*see attached*).

## 2. **Plate tectonics:**

Know the processes and features associated with the three main types of plate tectonic boundaries - Divergent, Convergent and Transform. Know the upper layers of the earth that are involved in plate tectonics (lithosphere and asthenosphere, oceanic and continental crust, and their characteristics).

## 3. **Geologic Time:**

You must learn the Eras, Periods, and Epochs of the Geologic time scale (names, not numbers). You will be quizzed on all of these the first morning of the trip. Know the Eras for the short quiz before the trip.

## **Related Web Pages For Self-Study**

### **Plate tectonics:**

#### 1. Earth Like a Puzzle:

[http://aquarium.ucsd.edu/Education/Learning\\_Resources/Voyager\\_for\\_Kids/earth\\_puzzle/](http://aquarium.ucsd.edu/Education/Learning_Resources/Voyager_for_Kids/earth_puzzle/) Type in "Earth Like a Puzzle" in the Birch Aquarium search field to get to the puzzle. Go through all four pages and click the animations along the way (very cool interactive map on the third page).

#### 2. Plate Tectonics: the Mechanism:

<http://www.ucmp.berkeley.edu/geology/tecmech.html>

Read through this short summary on features of plate boundaries.

#### 3. This Dynamic Earth:

<http://pubs.usgs.gov/gip/dynamic/dynamic.html>

Click through the different chapters in the "Table of Contents" shown. Look for information on the three fundamental types of plate boundaries - Divergent, Convergent and Transform.

### **Geologic Time:**

#### 1. Plate tectonic animation and Geologic Time:

<http://www.ucmp.berkeley.edu/geology/anim1.html>

Watch this animation of plate tectonic motions.

#### 2. Detailed chart on Geologic Time:

<http://www.ucmp.berkeley.edu/help/timeform.html>

Click on each link to learn more about a particular time period.

### **The Rock Cycle:**

#### 1. Wikipedia:

[http://en.wikipedia.org/wiki/Rock\\_cycle](http://en.wikipedia.org/wiki/Rock_cycle)

Read through this to learn about different rock types and how they are formed.

## **Registering and Paying Course Fee**

Once the student passes the Pre/Co-requisite quiz and completes and submits the appropriate Prerequisite Challenge Form, he or she will be notified via their SBCC Pipeline email account when the decision is made regarding their registration status. Once the student obtains authorization to register, he or she will need to be given a CRN and ADD CODE from a field course instructor. At that point, the student must register for the course via Pipeline, and pay the course fee at the Cashier's Office. Proof of registration in EARTH 131/132 is required to pay course fee.

**Only after the student completes all of the above procedure is he or she able to go on the field course. A lot of work, but worth it!**

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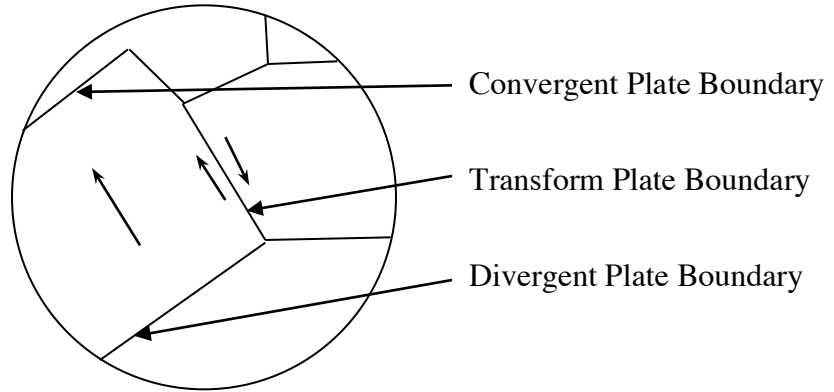
**General Rock Classification**

IGNEOUS ROCKS					
Igneous Type	Texture	Rock Types			
extrusive/volcanic (cooled quickly)	Glass pyroclastic	<b>Obsidian</b> <b>Pumice</b> <b>tuff</b>		<b>scoria</b>	
extrusive/volcanic (cooled quickly)	fine-grained	<b>rhyolite</b> light-colored	<b>andesite</b> intermediate	<b>basalt</b> dark/black	
intrusive/plutonic (cooled slowly)	coarse-grained	<b>granite</b> light-colored felsic minerals	<b>diorite</b> "salt and pepper"	<b>gabbro</b> dark-colored mafic minerals and feldspar	<b>peridotite</b> v. dark mafic minerals only
		continental crust		oceanic crust	upper mantle
		felsic	intermediate	mafic	ultramafic
		high silica low Fe and Mg low density	—————→	low silica high Fe/Mg high density	

SEDIMENTARY ROCKS		
Clastic		Non-Clastic
Sediment Size	Rock Type	
> sand size	<b>conglomerate</b> rounded pebbles	<b>limestone</b> soft; fizzes in acid
sand size (1/16 to 2 mm)	<b>sandstone</b>	<b>dolomite</b>
< sand size	<b>shale/mudstone</b>	<b>chert</b> hard, SiO <sub>2</sub>
		<b>evaporites</b> (e.g. salt)

METAMORPHIC ROCKS	
Foliated	Non-foliated
<b>slate</b> (baked shale)	<b>marble</b> (metamorphosed limestone)
<b>schist</b> visible micas	<b>quartzite</b> (metamorphosed quartz sandstone)
<b>gneiss</b> banded	<b>serpentine (serpentinite)</b> (metamorphosed peridotite)

# Plate Boundaries of the World and their Varieties



<b>Convergent Plate Boundary</b> (3 sub-types)	<b>Subduction</b>	<b>A</b> <b>Ocean →← Ocean</b> Example: Japan, W 1/2 Aleutian Islands	Side view 
		<b>B</b> <b>Ocean →← Continent</b> Example: Andes Mountains*, Cascade Mountains	Side view 
	<b>Collision</b>	<b>C</b> <b>Continent →← Continent</b> Example: Himalayan Mountains*	Side view 
<b>Divergent Plate Boundary</b> (2 sub-types)		<b>D</b> <b>Continent ↔ Continent</b> Example: East African Rift*	Side view 
		<b>E<sub>1</sub></b> <b>Ocean ↔ Ocean</b> Example: Youthful - Red Sea, Gulf of California  Example: Mature - Mid-Atlantic Ridge*/East Pacific Rise <b>E<sub>2</sub></b>	Side view 
<b>Transform Plate Boundary</b> (2 sub-types)		<b>F</b> <b>Ocean →↔ Ocean*</b>	Map view <b>Ocean →↔ Ocean</b> Transform Ocean →↔ Ocean plate boundary 
		<b>Continent →↔ Continent</b> Example: San Andreas Fault*	Map view <b>(Continent →↔ Continent)</b> 

\* (shown in the video *Continental Drift and Plate Tectonics*)

## Time Units of the Geologic Time Scale

(In millions of years unless otherwise noted.)

Eras	Periods	Epochs
Cenozoic	Quaternary	Holocene/Recent ----- 10,000 years ago Pleistocene ----- 1.8
	Tertiary	Pliocene ----- 5.3 Miocene ----- 23.8 Oligocene ----- 33.7 Eocene ----- 55.5 Paleocene ----- 65
Mesozoic	Cretaceous ----- 145 Jurassic ----- 213 Triassic ----- 248	
Paleozoic	Permian ----- 286 Pennsylvanian ----- 325 Mississippian ----- 360 Devonian ----- 410 Silurian ----- 440 Ordovician ----- 505 Cambrian ----- 544	
Precambrian	Proterozoic ----- 2.5 billion years ago Archean ----- 4.6 billion years ago	