

## GEO 105 Exam 1 Study Guide

### Earth's structure

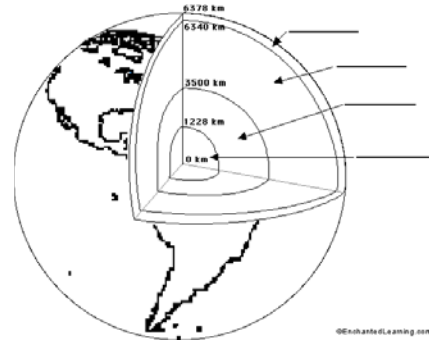
Label the diagram to the right.

What constitutes the lithosphere? What is the asthenosphere?

What is the composition of the earth's core?

What do we mean when we say the earth is dynamic?

What are some examples of natural disasters caused by the earth's internal heat engine?



### Stratigraphy, geologic time, age dating

Who is considered to be the first real geologist?

What is the principle of uniformitarianism?

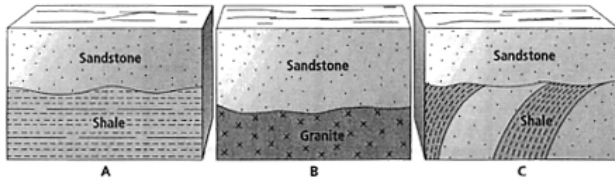
What stratigraphic principle states that sedimentary rocks are deposited horizontally?

What stratigraphic principle states that an intrusion or fault is younger than rocks it cuts across?

What stratigraphic principle states (in an undisturbed sequence) older rocks are on the bottom and the younger are on the top?

What are unconformities and how are they formed?

Which of the figures below displays a disconformity and what does it represent?



What is a nonconformity?

Define *relative age dating* & *absolute age dating*.

How are index fossils used to determine the ages of rocks?

Understand the principles of radiometric age dating: parent and daughter isotopes, half lives

Be able to calculate the age of a rock by using number of parent/daughter isotopes & its half life.

### Continental Drift Hypothesis

Who proposed the idea of continental drift and why was it not readily accepted?

What are the four main pieces of evidence to support this hypothesis?

Be familiar with the terms *Pangea*, *Laurasia*, *Gondwanaland*, *Tethys Sea* and what they represent.

## **Seafloor Spreading Hypothesis & Paleomagnetism**

Who proposed the seafloor spreading hypothesis and what is the evidence to support it?

How does latitude affect the earth's magnetic field?

How is magnetic orientation recorded in volcanic rocks?

How does paleomagnetic evidence support the hypothesis of continental drift?

What are polar wandering curves and magnetic reversals?

How do magnetic reversals/anomalies correlate with rock ages?

Be able to identify mid-ocean ridges & know how pillow basalts form.

What are the typical range of ocean spreading rates?

Be able to calculate spreading rate ( $\text{spreading rate} = \text{distance}(\text{cm}) / \text{age}(\text{years})$ ). *You will need convert between cm/m/km, etc!*

How did the Glomar Challenger test the seafloor spreading hypothesis? What drilling ship was its replacement?

Where is rifting occurring today?

## **Subduction**

Why is there no ocean crust older than 200 million years?

What is the process by which oceanic crust is recycled into the mantle?

Name locations of active subduction zones and ocean trenches (*Note that they are mostly associated with the Pacific Ocean!*)

What is the Benioff zone?

What are the two main types of subduction zones? What is produced at each one? Give examples.

## **Tectonic Plates, Hot Spots & Mantle Plumes**

Know the three main types of plate margins (*spreading, converging and transform*) & locations of each.

Understand what controls distribution of earthquakes and volcanic zones & know the current locations of these occurrences.

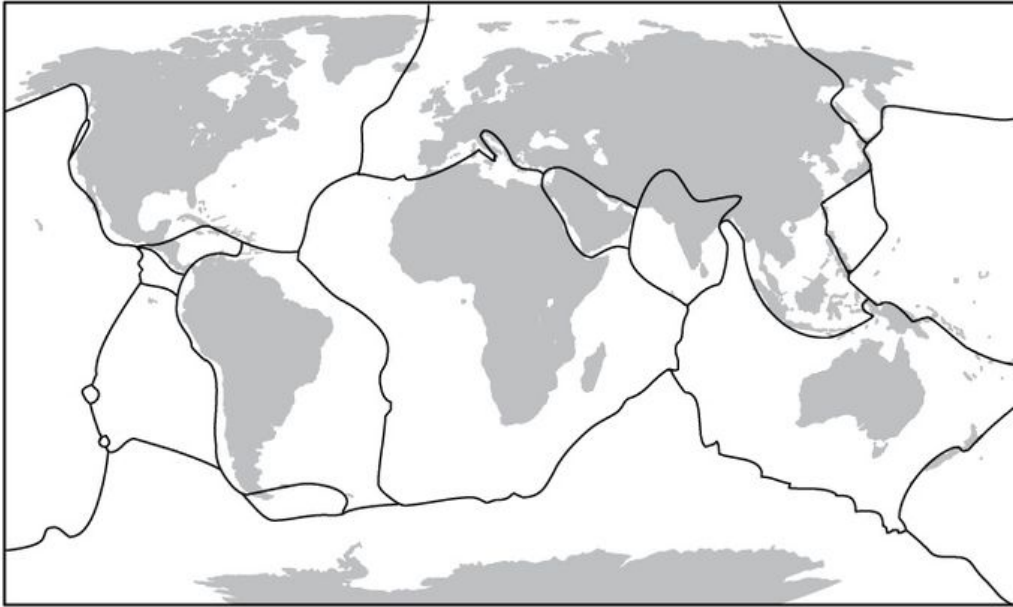
What are accreted terranes? What are fracture zones?

What are the major plates and plate boundaries? (Be able to label on a map!)

What are "hot spots"? Where are they located? (Give examples)

What is the mantle plume hypothesis?

### Tectonic Plates



\* Number (or colour code) the tectonic plates listed below, then label them (or colour them) on the map.

- |   |   |   |   |                                       |
|---|---|---|---|---------------------------------------|
| <input type="checkbox"/> Pacific Plate  | <input type="checkbox"/> Arabian Plate    | <input type="checkbox"/> North American Plate | <input type="checkbox"/> Indian Plate     | <input type="checkbox"/> Nazca Plate  |
| <input type="checkbox"/> African Plate  | <input type="checkbox"/> Australian Plate | <input type="checkbox"/> South American Plate | <input type="checkbox"/> Antarctic Plate  | <input type="checkbox"/> Cocos Plate  |
| <input type="checkbox"/> Eurasian Plate | <input type="checkbox"/> Caribbean Plate  | <input type="checkbox"/> Juan de Fuca Plate   | <input type="checkbox"/> Philippine Plate | <input type="checkbox"/> Scotia Plate |

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