

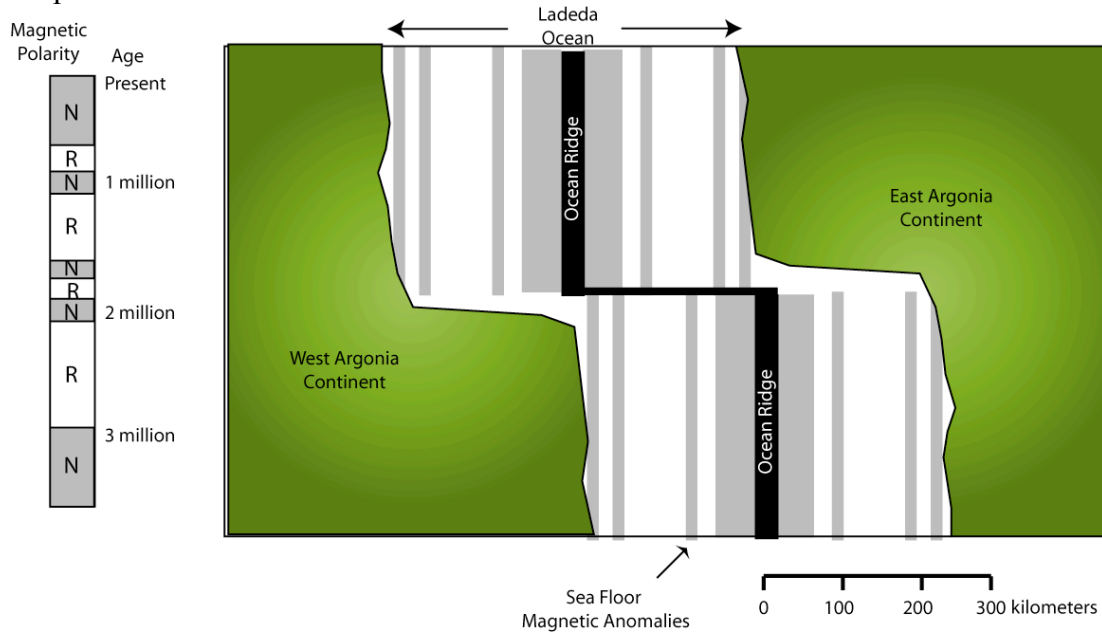
CHAPTER 1: GEOLOGY AS A SCIENCE, SCIENTIFIC PHILOSOPHY & METHOD

- (1) Define geology. (i.e. what are you studying in this class?)
- (2) Describe the philosophy of science.
- (3) What distinguishes science from religion?
- (4) Describe each step of the scientific method in the order in which it usually occurs.
- (5) What is the difference between a theory and a hypothesis?
- (6) Give an example of how the scientific method can be used in everyday life. The example may come from your experiences or something in the news but should include a detailed account of each step in the scientific method.

CHAPTER 2: PLATE TECTONICS

- (7a) What evidence led **Wegener** to propose that continents drifted?
- (7b) Why was Wegener's continental drift hypothesis not accepted in his lifetime?
- (8) What new discoveries led to a rekindling of interest in continental drift after WWII?
- (9) Draw a cross section of the Earth showing its **compositional** layers.
- (10) Draw a cross section of the Earth showing its **mechanical** layers.
- (11) What is the basic premise of the Plate Tectonic Theory?
- (12) Describe each type of plate boundary. Include in your description: (1) the relative motion of the plates; (2) the geographic features that are produced; (3) the geologic hazards; and (4) a real world example of the boundary.
 - (12a) Divergent boundary (all types)
 - (12b) Convergent boundary (all types)
 - (12c) Transform boundary

(13) Answer the following questions with respect to the following diagram depicting a map view of a hypothetical portion of the Earth's surface. Water has been removed in the ocean.



(13a) How many plates are there in the diagram?

(13b) What kind of plate boundaries are shown?

(13c) What is the motion of a tree on West Argonia relative to a tree on East Argonia?

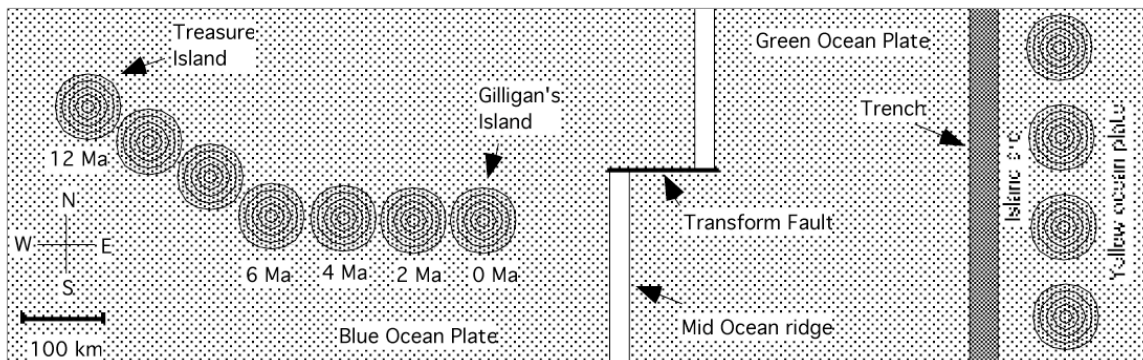
(13d) When did East Argonia begin to separate from West Argonia?

(13e) Write an equation describing the approximate velocity of the East Argonian Plate. [You need not solve it- but do use real numbers in your equation.]

(14) What causes plates to move?

(15) How might you distinguish a chain of volcanoes formed from a hot spot from a chain formed over a subduction zone?

(16) Answer the following questions with respect to the following diagram depicting a map view of a hypothetical portion of the Earth's surface. Water has been removed in the ocean.



(16a) In what direction has the Blue Ocean plate moved from 6 million years ago to present?

(16b) Write an equation describing the approximate velocity of the Blue Ocean Plate. [You need not solve it- but do use real numbers in your equation.]

(16c) In what direction did the Blue Ocean plate move from 12 to 6 million years ago?

- (17) In the interior of the oceanic part of the Indian-Australian plate, just south of India, there is a chain of submarine volcanoes that form a line oriented north-south. The only active volcano is the southernmost volcano in the chain. The extinct volcanoes are progressively older as one travels northward from the active volcano towards India. Given this information:
- (17a) What causes this kind of volcanic chain to form?
 - (17b) Which way is the Indo-Australian plate moving?
 - (17c) Where will the next volcano in the chain form??

CHAPTER 1: BASIC CONCEPTS (CONTINUED)

- (18a) Describe the components of the hydrologic cycle. I.e. how does water move between the hydrosphere and atmosphere?
- (18b) What forces drive the cycle?
- (18c) What does the cycle do that's geologically important?
- (19) Name and briefly describe the three major types of rocks and the subcategories (if any) of each type.
- (20a) What is the principle of Uniformitarianism?
- (20b) Give an example of how the Principle of Uniformitarianism is used in geology.

CHAPTER 3: MINERALS

- (21) What is the geologic definition of a mineral? Use examples to help distinguish minerals and non-minerals.
- (22a) Describe (not just list) 6 different physical properties of minerals. Be careful not to include different aspects of the same physical property. For example, metallic, submetallic, non-metallic, earthy, glassy are all examples of the same physical property- luster.
- (22b) Arrange the following minerals/items in order from least hard to most hard relative Mohs Hardness Scale.
Gypsum, Diamond, Glass, Quartz, Fingernail, Topaz, Calcite, Ruby/Sapphire
- (23) Define the following chemical terms
- (23a) **element** versus **compound**
 - (23b) **protons** versus **neutrons** versus **electrons**
 - (23c) **atomic number** versus **atomic mass number** versus **atomic weight**
 - (23c) **isotopes**
- (24) Using the **Periodic Table of Elements**, be able to give the following information about **any element**
- (24a) the number of protons
 - (24b) the number of electrons in a neutral atom of the substance
 - (24c) the usual number of neutrons
- (25) Using the **Periodic Table of Elements**, be able to give the following information about a **specific isotope whose atomic mass is given (i.e. ^{18}O , ^{40}K , ^{90}Sr , etc):**
- (25a) the number of protons
 - (25b) the number of electrons in a neutral atom of the substance
 - (25c) the exact number of neutrons

- (26a) What are ions?
- (26b) Why do elements ionize?
- (26c) What is an ionic bond?
- (26d) Give an example of an ionically bonded substance?
- (27) Name and briefly describe 4 of the basic kinds of chemical bonding
- (28) Tell whether the following chemicals are silicates, carbonates, native elements, sulfides, chlorides or oxides
- (28a) CaCO_3
- (28b) MgSiO_4
- (28c) Fe_3O_4
- (28d) MgS
- (28e) S
- (28f) CaSO_4
- (28g) KCl
- (29) What are the factors that influence/govern the formation of minerals?
- (30a) What are the processes of crystallization in minerals?
- (30b) Name three minerals that form from the evaporation of water on Earth's surface.
- (31a) What are the most common elements in the Earth's crust?
- (31b) What is the most common mineral group in the Earth's crust?
- (32) Give an example (i.e. name a mineral) from each of the following mineral groups:
Silicate, carbonate, native element, sulfide, chloride. oxide
- (33a) Which common silicate minerals are the most stable at normal Earth surface conditions?
- (33b) Which common silicate minerals are least stable at normal Earth surface conditions?
- (34a) Identify 5 minerals used in the construction of a modern building.
- (34b) For each mineral, specify for what material in the building that it is used.