Plate Boundary Drawings

Draw, color, and label the 3 types of plate boundaries on p. 255. Write a brief summary of what's happening at each plate boundary.

What if Pangaea Had Never Broken Up?

Introduction

During the Mesozoic era, the supercontinent of Pangaea broke apart. In this exercise, you will describe what your town or city might be like if plates weren't moving and Earth's land still formed one large continent.

Task

Design a diorama for a natural history museum. It will be a model view of your town or city as it would be if plate tectonics had not broken up Pangaea. Sketch a diorama that reflects the climate, vegetation, animal life, and geological features in your location city under those circumstances.

Resources and Process

1. You need to know where your town would be in an intact Pangaea—on a coast, inland, in the mountains, or even under water. Before you design your diorama, you should answer questions such as the following.

1st

- Did the world have a different climate during Pangaea's existence? Would it still have that climate today if Pangaea hadn't broken up?
- Would your town be nearer to the equator or to the ocean than it is today? How would that affect the climate and the animals and vegetation that live there? How would a change in these resources affect the human population?
- How would the geology of your area be affected? Would your elevation be different?

2. To find out where your town would be in an intact Pangaea, check these sites.

- Paleogeography Through Geologic Time: **http://jan.ucc.nau.edu/~rcb7/global_history.html**
- Color-Coded Continents: **http://www2.nature.nps.gov/geology/usgsnps/pltec/scplseqai.html**

3. To find out about the climate, inhabitants, and geology of Pangaea, check these sites.

- Time Machine Exhibit: **http://www.ucmp.berkeley.edu/help/timeform.html**
- Triassic Period: **http://www.dinoruss.com/de_4/5c5cae8.htm**
- Mesozoic Terrestrial Ecosystems: **http://www.es.ucsc.edu/~pkoch/lectures/lecture19.html**

Learning Advice

- Did you use information from multiple sources?
- Did you cross-check the information that you found?
- Did you incorporate the information into a sketch? (*) Each of you

Conclusion

(*) ~~Each of you~~ include climate, vegetation, animal life, geology

- How do you think your surroundings would be different if Pangaea were still a supercontinent? Explain your answer.

Volcano Drawings

Draw the volcano on p. 283, label the parts, & color it. Define all parts that are labelled using your book

name _____ **class** ____

NOVA: Japan's Killer Quake

Part I

1. The epicenter of the earthquake was ____ miles off the _____ coast.
2. The fastest waves, called ____ waves, travel at _____ miles per _____ .
3. The slower waves are called _____ waves and are _____ destructive.
4. Fukushima Daiichi has ____ reactors.
5. After the reactors were _____, there was no power to run the _____ .
6. There had never been an earthquake in Japan with a magnitude of more than _____ .
7. The earthquake happened ____ miles below the surface.
8. Japan lies on the border between the _____ and _____ plates.
9. Which plate is being subducted under Japan? _____
10. The energy had been building up for a couple of _____ years.
11. Tokyo had a warning ____ seco`nds before the quake reached the city.
12. The quake lasted for ____ minutes.
13. In *liquefaction*, loosely packed, waterlogged earth begins to behave like a _____ .
14. The earthquake was a magnitude of _____ , _____ times more powerful than the Haiti earthquake.
15. A tsunami can travel at the speed of a _____ _____ , at _____ miles per hour.
16. The tsunami hit first in the _____ , then in the _____, then in the _____ again.
17. The tsunami travels faster in _____ water.
18. The tsunami hit Ofunato ____ minutes after the earthquake.
19. Why were Miyako's high tsunami walls useless against this tsunami?

Part II

1. The Fukushima power plant's defense wall was _____ feet high.
2. The wave _____ the generators that were _____ the cores.
3. The backup batteries had a charge of _____ hours.
4. After everything that's happened so far, all of the water now went _____ .
5. By night, _____ raged across the wasteland.
6. This was the first big ocean-crossing tsunami in _____ years.
7. The tsunami wave that hit Hawaii was _____ feet high and surged for more than _____ _____ .
8. In Hawaii, the wave pulled _____ and _____ out to sea.
9. How many people died in Hawaii from the tsunami? _____
10. The tsunami hit California _____ hours later.
11. In Ofunatu, boats and cars were on top of buildings because the water was _____ , particularly where the streets were _____ .
12. The wave was like a _____ , or like a wall of debris.
13. _____ of the buildings in Minami Sanriku were destroyed and _____ percent of the people were missing.
14. In the week after the quake, there were over _____ aftershocks.
15. There were _____ of magnitude 5 aftershocks, _____ of magnitude 6s and a _____ of magnitude 7s.
16. The heat of the fuel rods generated _____ gas, which exploded.
17. Now, the fault lines near _____ are even more stressed.
18. It's difficult for science to _____ against earthquakes. All we can do is:

Name _____ Class _____ Date _____

Chapter 8 Earthquakes and Earth's Interior

Section 8.1 What Is an Earthquake?

This section explains what earthquakes and faults are and what causes earthquakes.

Reading Strategy

Building Vocabulary As you read this section, write a definition for each vocabulary term in your own words. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Vocabulary	Definition
earthquake	a.
b.	c.
d.	e.
f.	g.

1. Circle the letter of the approximate number of major earthquakes that take place each year.
   a. about 50 b. about 75
   c. about 3000 d. about 30,000

Earthquakes

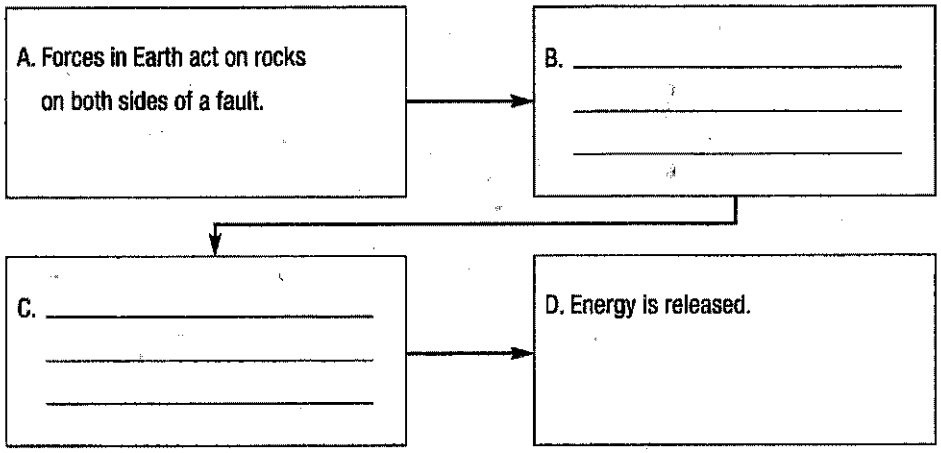
Match each description with its earthquake feature.

Description	Earthquake Feature
_____ 2. Earth vibration caused by rapid energy release	a. epicenter
_____ 3. energy that radiates in all directions from the earthquake origin	b. focus
_____ 4. fracture where movement has occurred	c. seismic wave
_____ 5. surface location directly above where an earthquake originates	d. fault
_____ 6. location within Earth where an earthquake originates	e. earthquake

Cause of Earthquakes

7. Is the following sentence true or false? It was not until after the 1906 San Francisco earthquake was studied that the actual cause of earthquakes was understood. _____

8. Complete the flowchart to show the sequence of events that occur when rocks are deformed along a fault.



9. The _____ hypothesis states that when rocks are deformed, they bend and then break, releasing stored energy.

10. What causes most earthquakes? _____

11. Is the following sentence true or false? Most earthquakes occur along existing faults. _____

12. Circle the letter of small Earth movements that occur following a major earthquake.
    a. foreshocks
    b. slippage
    c. aftershocks
    d. foci

13. The _____ has been studied more than any other fault system in the world.

14. What is fault creep? _____

Name _____ Class _____ Date _____

Chapter 8 Earthquakes and Earth's Interior

Section 8.2 Measuring Earthquakes

This section discusses types of seismic waves and how earthquakes are located and measured.

Reading Strategy

Outlining As you read, fill in the outline with the important ideas in this section. Use the green headings as the main topics and the blue headings as subtopics. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Measuring Earthquakes
I. Earthquake Waves
A. Surface Waves
B. _____
II. _____
A. _____
B. _____
C. _____
III. _____
A. _____
B. _____

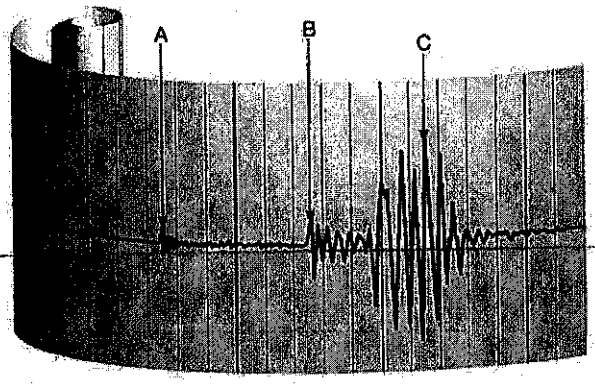
Earthquake Waves

1. The figure shows a typical recording of an earthquake. Select the appropriate letter in the figure that identifies each of the following types of earthquake waves.

_____ surface wave

_____ S wave

_____ P wave



2. Circle the letter of the name of the recording of the three types of earthquake waves in the figure.

a. seismograph

b. seismogram

c. seismic wave

d. travel-time graph

3. Circle the letter of the type of earthquake wave that shakes particles at right angles to their direction of travel.
   a. P waves b. S waves
   c. surface waves d. compression waves

Locating an Earthquake

4. Is the following sentence true or false? On a seismogram, the greater the interval is between the arrival of the first P wave and the first S wave, the greater the distance to the earthquake source. _____

5. Is the following sentence true or false? You can use travel-time graphs from two seismographs to find the exact location of an earthquake epicenter. _____

6. Most major earthquakes occur around the outer edge of the _____ Ocean.

7. List the active earthquake areas in the circum-Pacific belt. _____

Measuring Earthquakes

8. What two types of measurements do scientists use to describe the size of earthquakes? _____

Match each description with its term related to earthquake measurement.

Description	Term
_____ 9. derived from the amount of displacement that occurs along a fault zone	a. intensity
_____ 10. based on the amplitude of the largest seismic wave recorded on a seismogram	b. magnitude
_____ 11. measure of the size of seismic waves or amount of energy released at the earthquake source	c. Richter scale
_____ 12. measure of the amount of earthquake shaking at a location based on damage	d. moment magnitude scale

13. What is the most widely used measurement for earthquakes? _____

14. Why is the answer to question 13 the most widely used measurement for earthquakes? _____

Name _____ Class _____ Date _____

Chapter 8 Earthquakes and Earth's Interior

Section 8.3 Destruction from Earthquakes

This section discusses damage caused by earthquakes and explains how earthquakes are predicted.

Reading Strategy

Monitoring Your Understanding Preview the Key Concepts, topic headings, vocabulary, and figures in this section. List two things you expect to learn. After reading, state what you learned about each item you listed. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

What I Expect to Learn	What I Learned
a.	b.
c.	d.

Seismic Vibrations

1. List three factors that affect the degree of damage that occurs to structures as a result of earthquakes.

_____

_____

_____

2. Circle the letter of the structure that is least likely to be damaged in a major earthquake.

a. steel-frame building
b. nonflexible wood-frame building
c. unreinforced stone building
d. unreinforced brick building

3. What risk does liquefaction pose during an earthquake?

_____

_____

Name _____ Class _____ Date _____

Tsunamis

4. Complete the table about tsunamis.

Tsunamis		
Definition	**Causes**	**Areas Protected from Tsunamis by Warning System**
	a. b.	

5. Is the following sentence true or false? Most earthquakes generate tsunamis. _____

Other Dangers

6. The sinking of the ground caused by earthquake vibrations is called ground _____.

7. During an earthquake, violent shaking can cause soil and rock on slopes to fail, resulting in _____.

Predicting Earthquakes

8. Circle the letter of the things that scientists measure along faults or fractures when predicting future earthquakes.
   a. temperature of well water
   b. building damage
   c. carbon dioxide emissions
   d. radon gas emissions

9. Is the following sentence true or false? Methods used to make short-range earthquake predictions have not been successful. _____

10. Is the following sentence true or false? Scientists are able to make accurate long-term earthquake predictions based on their understanding of how earthquakes occur. _____

11. What do scientists call an area along a fault where no earthquake activity has occurred for a long time? _____

Name _____ Class _____ Date _____

Chapter 8 Earthquakes and Earth's Interior

Section 8.4 Earth's Layered Structure

This section describes Earth's layers and their composition.

Reading Strategy

Sequencing After you read, complete the sequence of layers in Earth's interior. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Earth's Internal Structure

Layers Defined by Composition

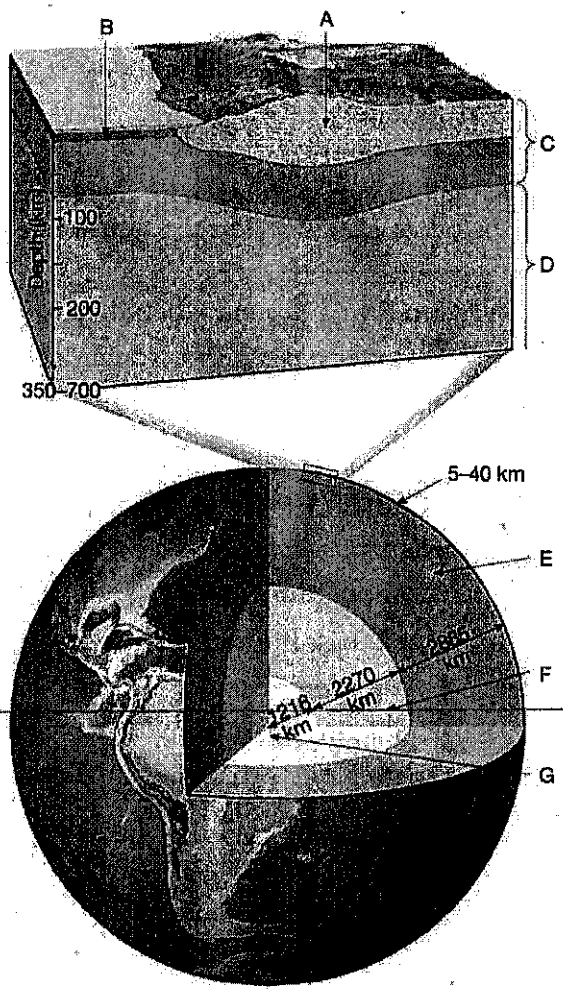
1. Use the figure of Earth's structure to write the letter(s) that represents each of the following layers.

mantle _____

continental crust _____

oceanic crust _____

core _____



Layers Defined by Physical Properties

2. Use the figure of Earth's structure on the previous page to write the letter that represents each of the following layers.

inner core _____

asthenosphere _____

outer core _____

lithosphere _____

Match each description with its Earth layer.

Description	Earth Layer
_____ 3. soft, weak rock with some melting	a. asthenosphere
_____ 4. liquid iron-nickel alloy that generates Earth's magnetic field	b. inner core
_____ 5. cool, rigid crust and uppermost mantle	c. outer core
_____ 6. solid iron-nickel alloy	d. lithosphere

Discovering Earth's Layers

7. The boundary called the _____ separates the crust from the mantle.

8. Is the following sentence true or false? Geologists concluded that the outer core was liquid because P waves could not travel through it. _____

9. Why do P waves bend when they travel into the outer core from the mantle? _____

_____

_____

Discovering Earth's Composition

Match each composition with its Earth layer.

Composition	Earth Layer
_____ 10. basaltic rock	a. continental crust
_____ 11. granitic rock	b. oceanic crust
_____ 12. similar to stony meteorites	c. core
_____ 13. similar to metallic meteorites	d. mantle

14. _____ that collide with Earth provide evidence of Earth's inner composition.

15. Is the following sentence true or false? Until the late 1960s, scientists had only seismic evidence they could use to determine the composition of oceanic crust. _____

Earthquake In The Classroom: Activity

1. You will receive an Earthquake Journal Sheet. Fill in the top left section with the following vocabulary words for the lesson: focus, epicenter, surface waves, body waves, P waves, S waves, aftershocks, seismograph, Richter scale, Mercalli scale. As you work today, record your observations on your Earthquake Journal.
2. Today you are an engineer. You will make models of buildings and conduct an experiment to test how well your structures stand up under the stress of an earthquake. This is similar to what some civil engineers do as their jobs.
3. This is an example of a model structure. It is made up of cubes and triangles using toothpicks and marshmallows. Cubes and triangles are like building blocks that may be stacked to make towers. The towers can have small or large "footprints" (or bases).
4. You will each receive 30 toothpicks and 30 marshmallows. Earth has limited resources, so therefore engineers also have limited resources when building structures.
5. Now it's time to build! Each student should build a structure following these rules: **You are limited to using only the materials you have been given to make structures. You may make large or small cubes or triangles by using full-size or broken toothpicks. You may use cross bracing to reinforce your structures. Buildings must be at least two toothpick levels high, buildings must contain at least one triangle, buildings must contain at least one square.**
6. When you have completed your structures, you will test each group member's structure to see how well it holds up during the experiment. Your observations will be used to help you design better "more earthquake proof" structures during the course of this activity.
7. Place one structure at a time on the pan of Jell-O®.
8. For each test you will tap the pan on the bottom to simulate compression or primary waves. Then, shake the pan back and forth in a shearing motion to simulate S or secondary waves.
9. After you test your structures, redesign and rebuild, and test them again. What can you do to make it stronger? Did it topple? Should you make the base bigger? Make the structure taller or shorter? Design and rebuild as many times as the class period allows.
10. Take a picture of your best design and send it to Mrs. Mabe on the Remind app.
11. You are engineers who work for a civil engineering company. Make a Google Slides presentation to advertise your design for an Earthquake-Proof Building. You are trying to sell this building to prospective companies around the world.
12. Make sure you have also finished filling out your Earthquake Journal Sheet and have defined all vocabulary terms.

Name: _____ Date: _____

Earthquake in the Classroom Activity – Earthquake Journal

Vocabulary	I've Learned
I've Observed	Questions I have

Ch 8 & 10 EQ & Volcanoes

Earthquakes Chapter 8 Study Guide

1. What causes an Earthquake? (p.219 – 220)

2. What is the focus of the Earthquake? (p. 218)

3. What is the epicenter of an Earthquake? How do you find the epicenter? (p. 219 and 224 - 225)

4. What is a fault? (p. 219)

5. What are the 3 types of Earthquake waves? What is the difference in the way the 3 types travel? (p. 223)

6. What types of disasters often follow an Earthquake? (p. 230 – 231)

Volcanoes Ch 10 Study Guide

1. What are the3 factors that affect volcanic eruptions? (p. 281)

2. What are types of materials come out of volcanoes? (pp. 282 – 283)

3. What are the three types of volcanoes? Describe each of the three types in terms of size, type of lava they produce, and how they erupt. (pp. 283 – 296)

4. Where does magma come from (origin)? (p. 291)

5. How are volcanoes formed at convergent boundaries? (p. 293)

6. How are volcanoes formed at divergent boundaries? (p. 294)

7. How are volcanoes formed within a plate? (P. 295)

Notebook Check

Date _____ Your Grade _____

The following issues were found with your notebook:

_____ You do not have tabbed dividers with the following sections: **Notes, Vocab/EQ's** (Vocabulary/Essential Questions), **Work** (Classwork/Homework/Worksheets), **Labs/Projects,Study Guides** (Returned Quizzes should go here as well)

_____ You do not have materials in the proper sections of your notebook

_____ You are missing materials (notes, worksheets, study guides, etc.)

_____ Other: _____

_____

_____

_____ Fix issues with your notebook and turn the notebook in by _____ I will re-grade it and you may receive a higher grade.

_____ Nice Job on your notebook! Thank you for doing what you are supposed to do :)