

IN-CLASS Lesson Plan Template- Workshopping it!

concept:

onics

Objectives for preparatory work:

- 1. Summarize the concept of Continental Drift.
- 2. Present the evidence that Alfred Wegner used to support Continental Drift.
- 3. Explain the difference between Continental Drift and Plate Tectonics.
- 4. Identify Earth's compositional and mechanical layers.
- 5. Identify Earth's mechanical layers.
- 6. Recognize the difference between the lithosphere and upper mantle.
- 7. Identify the three basic types of plate tectonic boundaries and recognize their subtypes.

Advanced objectives for classwork & after class work:

1. Describe the roles of the lithosphere and asthenosphere in Plate Tectonic activity.
2. Describe the tectonic settings for each of the three types of plate boundaries and the processes that create each type of plate boundary.
3. Using the characteristics, processes, products, and geographic settings, differentiate between the three main types of plate tectonic boundaries.
 - Subdivide the three main types of boundaries into subtypes based upon geographic setting.
 - Delineate the characteristics that make each type of plate boundary unique.

	Time planned	Activity and rationale	Resources needed
of d	5 minutes	<p>Questions from the Guided Practice</p> <p>Clear up any "muddy" concepts from questions that students bring in after having done the pre-class work.</p>	Copy of the Guided Practice

of d	5 minutes	<p>How does Plate Tectonics differ from Continental Drift?</p> <ol style="list-style-type: none"> 1. In groups, compare statements of differences between Continental Drift and Plate Tectonics. 2. Groups report back—summarizing differences between Continental Drift and Plate Tectonics. 	<p>Students' statements (pre-class work) on the differences between Continental Drift and Plate Tectonics.</p>
	10 minutes	<p>Draw, Pair, Share: What is the Lithosphere?</p> <ol style="list-style-type: none"> 1. Sketch, label, and describe the parts of the lithosphere. 2. Share drawings with neighbors and improve descriptions collaboratively. 	<p>Projected image of the lithosphere for students to compare</p> <p>Paper (for students without)</p> <p>Colored pencils for students who like adding color</p>
	45 minutes	<p>What happens at each plate boundary?</p> <ol style="list-style-type: none"> 1. Label the diagrams of each plate boundary. 2. Model each boundary type. 3. Sketch and label each model with Plate tectonic labels. 	<p>Graphic organizer: Chart with unlabeled diagrams of each type of plate boundary, spaces in which to draw the models used in class, and spaces for notes.</p> <p>Supplies for modeling plate boundaries: beakers, corn syrup, non-pareil candies, candles, matches, trays, crackers, cheese crackers, oreos, marshmallows.</p>
od	5 minutes	<p>Finalize the plate boundary sketches by adding definitions and describing processes.</p> <ol style="list-style-type: none"> 1. On each plate tectonic boundary diagram, define its components and describe the processes at each plate boundary. For example, define what a subduction zone is and describe the process that leads to magma formation. 	<p>Graphic organizer</p>
od	5 minutes	<p>Preview Advanced Practice:</p> <ol style="list-style-type: none"> 1. Create an organizational outline/chart that groups the plate boundaries into types and subtypes of plate boundaries. 2. Evaluate the effectiveness of the models used in class to differentiate the three major plate tectonic boundaries. 	<p>Advanced Practice Handout</p>

BEFORE CLASS Work Plan Template

Learning objective	Activity and rationale	Instructions to students
<p>between the concept of Continental Drift and Plate Tectonics.</p> <p>between Earth's compositional and mechanical layers.</p> <p>between the components and processes of each type of plate tectonic boundary and the processes that form them.</p>	<p>Explain the origin and evidence for Continental Drift. (knowledge & comprehension)</p> <p>Explain the difference between Continental Drift and Plate Tectonics. (knowledge & comprehension)</p> <p>Identify and describe the compositional layers of Earth. (knowledge & comprehension)</p> <p>Identify and describe the mechanical layers of Earth. (knowledge & comprehension)</p> <p>Label the parts of the lithosphere. (knowledge & comprehension)</p> <p>Label a diagram of each type of tectonic boundary that identifies the components and characteristics of each boundary (knowledge & comprehension)</p>	<p>Become familiar with the concept of Continental Drift and the theory of Plate Tectonics.</p> <ol style="list-style-type: none"> Read sections 1.7 and 1.8 in "Chapter 1: Earth in Context." Read "Chapter 2: The Way the Earth Works: Plate Tectonics." Watch the following via the Chapter 2 module in Canvas (in "CH 02 Videos Animations") or by clicking on them in the textbook while reading: <ol style="list-style-type: none"> "Plate Boundaries" animation Both Narrative Art Videos Take the Chapter 1 and Chapter 2 "Reading Quizzes" in Canvas. These quizzes are open-book, but on the first attempt do the quiz closed-book so that you will have a quick self-assessment of what you already understand, and what you need to work on. You can take the quiz 3 times before the date and only the highest score will be recorded. Write and Bring to class: 1-3 sentences (1 sentence max!) explaining the difference between the concept of Continental Drift and the theory of Plate Tectonics. Bring to class any quiz question or question on a chapter concept that you feel you didn't quite understand. We

		will discuss these during the first 5 minutes of class.
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AFTER CLASS Work Plan Template

Learning objective	Activity and rationale	Instructions to students
<p>Describe the characteristics, processes, and geographic settings, and differences between the three major plate tectonic boundaries.</p> <p>Subdivide the three main types of boundaries into subtypes based upon geographic setting.</p> <p>Outline the characteristics that make each type of plate boundary unique.</p>	<ol style="list-style-type: none"> 1. Evaluate the effectiveness (strengths and weaknesses) of the models used in class to differentiate the three major plate tectonic boundaries. (evaluation) <p>And/or (depending on class)</p> <ol style="list-style-type: none"> 2. Create an organizational outline/chart that groups the plate boundaries into types and subtypes of plate boundaries. (synthesis) 	

ADVANCED PRACTICE

Class: Geol 2 Geology for Engineers

Date assigned:

Date due:

Time estimate to complete this assignment: 1 hour

Learning Objectives

Advanced objectives

Using the characteristics, processes, products, and geographic settings, differentiate between the three main types of plate tectonic boundaries.

- Subdivide the three main types of boundaries into subtypes based upon geographic setting.
- Delineate the characteristics that make each type of plate boundary unique.

Activities & deliverables

1. Use the provided chart to reflect on and evaluate the effectiveness (strengths and weaknesses) of the models used in class to illustrate the three major plate tectonic boundaries. Analyze which parts of each model were helpful in understanding the characteristics and processes at each type of plate boundary and which parts were not. Where possible, suggest improvements to the models. Turn in the completed chart at our next class meeting.
2. Create in an organizational outline/chart that groups the plate boundaries into types and subtypes of plate boundaries.
 - Your chart or outline can consist of labeled sketches or written descriptions, or both.
 - Your chart or outline can be handwritten/drawn or created using an app or online platform. (See resources below.)
 - The main objective of the chart or outline is to clearly show the relationship between the three general types of plate boundaries and their subtypes.
 - Turn in your outline or chart at our next class meeting.

Resources:

Mindmaps and Concept Maps:

- <https://mind42.com> (Free!)
- <https://bubbl.us>
- <http://popplet.com> (Free trial)
- <https://simplemind.eu> (Free version available)

Questions?

Ask me! LeAnne Teruya (leanne.teruya@sjsu.edu)

Name: _____

Geol 2

Plate Tectonics Advanced Practice: Evaluation of Models of Plate Boundaries

Directions: Evaluate the strengths and weaknesses of the models we used in class to illustrate the different types of plate boundaries. Suggest changes for improvement to the models where possible (you may receive extra credit for an exceptionally good or unique suggestion!). Fill out the chart with words or detailed labeled diagrams (like we did in class).

Labeled Sketch or Description of How We Modeled the Boundary	Strengths of the Model:	Weaknesses of the Model and Suggestions for Improvement:
Oceanic Divergent Boundary:		
Continental Divergent Boundary:		

Ocean-Continent Convergent Boundary:		
Transform Boundary (with Divergent Boundary also):		

GUIDED PRACTICE

Class: Geol 2—Geology for Engineers

Date assigned:

Date due:

Time estimate to complete this assignment:

Overview/Introduction

Earth is constantly undergoing geological change. These changes start with processes taking place within the Earth that influence changes at the surface. The landscape around us is the result of a dynamic interplay of forces within and at the surface of the Earth. In this unit you will learn about the fundamental theory that explains how the physical Earth works. In this pre-class assignment, you will learn about Earth's structure, how the concept of Continental Drift led to Plate Tectonics, some basic vocabulary associated with Plate Tectonics, and basic knowledge of plate tectonic boundaries. In class we will apply and further build upon the pre-class work. You will need the course textbook and online access to Canvas to complete this assignment.

Listed below are the learning objectives for the unit on Plate Tectonics. The basic objectives will be accomplished through this pre-class assignment in preparation for the work we will do in class. The advanced objectives will be achieved through in-class activities and post-class in the advanced practice assignment.

Learning Objectives

Basic objectives

1. Explain the origin and evidence for Continental Drift.
2. Explain the difference between Continental Drift and Plate Tectonics.
3. Identify and describe the compositional layers of Earth.
4. Identify and describe the mechanical layers of Earth.
5. Draw a labeled sketch of the lithosphere that includes descriptions of the components of the lithosphere.

Advanced objectives

1. Draw a labeled sketch of each type of tectonic boundary that labels and describes the components, products, and processes that occur at each boundary
2. Distinguish between tectonic settings and processes that take place at each type of plate boundary.
3. Create an organizational outline/chart that groups the plate boundaries into types and subtypes of plate boundaries.
4. Evaluate the effectiveness (strengths and weaknesses) of the models used in class to differentiate the three major plate tectonic boundaries.

Preparatory Activities and Resources:

1. **Read** sections 1.7 and 1.8 in “Chapter 1: The Earth in Context.”
2. **Read** “Chapter 2: The Way the Earth Works: Plate Tectonics.”
3. **Watch** the following via the Chapter 2 module in Canvas (in “CH 02 Videos Animations”) or by clicking on them in the e-textbook while reading:
 - a. “Plate Boundaries” animation
 - b. Both Narrative Art Videos

Exercises: Please complete by _____.

- **Take** the Chapter 1 and Chapter 2 “Reading Quizzes” in Canvas. These quizzes are open-book, but on the first attempt do the quiz closed-book so that you will have a quick self-assessment of what you already understand, and what you need to work on. You can take the quiz 3 times before the due date and only the highest score will be recorded.
- **Write** and **Bring** to class: 1-3 sentences (3 sentence max!) explaining the difference between the concept of Continental Drift and the theory of Plate Tectonics.
- **Bring** to class any quiz question or question on a chapter concept that you feel you didn’t quite understand. We will discuss these during the first 5 minutes of class.

Questions?

Contact LeAnne Teruya (leanne.teruya@sjsu.edu)