

Name: \_\_\_\_\_

Unit 4: Plate Tectonics

## Layers of the Earth

Date: \_\_\_\_\_

SWABT: Identify and describe the layers of the Earth and their characteristics

### CRUST

Composition: \_\_\_\_\_

Thickness: \_\_\_\_\_

State of Matter: \_\_\_\_\_

- \_\_\_\_\_ :
- Mostly Basalt

### MANTLE

Composition: \_\_\_\_\_

Thickness: \_\_\_\_\_

State of Matter: \_\_\_\_\_

- \_\_\_\_\_ :
- Rigid layer

### OUTER CORE

Composition: \_\_\_\_\_

Thickness: \_\_\_\_\_

State of Matter: \_\_\_\_\_

- Provides magnetic field

Temperature and Pressure: \_\_\_\_\_

\_\_\_\_\_

2 Main Types of Seismic Waves: \_\_\_\_\_

### INNER CORE

Composition: \_\_\_\_\_

Thickness: \_\_\_\_\_

State of Matter: \_\_\_\_\_

- Due to intense pressure

S Waves won't pass through: \_\_\_\_\_

\_\_\_\_\_

area between crust and mantle where the velocity of seismic waves increases abruptly.

Neither the sun's heat nor winter cold penetrates the Earth below: \_\_\_\_\_

Below 20m, the temperature increases 1° every 40m.

## Continental Drift Theory and Plate Tectonics Theory

Date:

SWBAT: List evidence for continental drift and plate tectonics theories.

### Continental Drift Theory

- Started with the observation of the similarities \_\_\_\_\_ of the west coast of Africa and the east coast of South America ( \_\_\_\_\_ ).
- This led to the suggestion is that these two continents were once \_\_\_\_\_ that had broken and moved apart.

\_\_\_\_\_ : German scientist. Proposed the most famous version of the continental drift theory, but he could not explain why or how the continents drifted apart.

- His three evidences included:

1.	2.	3.
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### Pangaea

- The last " \_\_\_\_\_ " (250 mya) all of the continents hooked together.
- It took over 200 million years for the continents to move to their present locations.

### Plate Tectonics Theory (1965)

- Study of the theory that the earth's crust is \_\_\_\_\_ (solid pieces) that move \_\_\_\_\_
- Approximately 12 major plates
- Larger plates include \_\_\_\_\_
- Evidences include:

1. _____ :	2. _____ : <ul style="list-style-type: none"><li>Seafloor moves away from ridge (crack in crust)</li><li>Hot _____ comes up through crack and cools to form _____.</li><li>Scientists took core samples and found that the youngest rock is near the spreading center and the oldest rock is the farthest away.</li></ul>	3. _____ : <ul style="list-style-type: none"><li>As hot magma cools it becomes solid rock and iron-bearing minerals become fixed and magnetized towards magnetic north</li><li>Scientists discovered that some rocks have reverse magnetism.</li><li>The pattern of magnetism on either side of the spreading center is: _____</li></ul>
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What do the two theories have in common?

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## Unit 4: Plate Tectonics

**Plate Boundaries**

Date:

SWBAT: Identify and describe the different types of plate boundaries and where they occur.

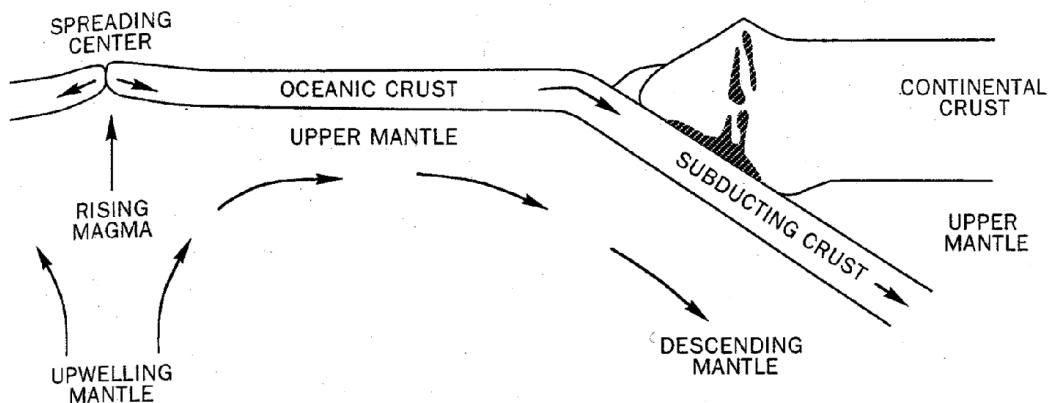
Type of Plate Boundary	Sketch	Description	Features Formed	Examples
<b>Divergent</b>				
<b>Convergent</b>	Continental-Oceanic			
	Continental-Continental			
	Oceanic-Oceanic			
<b>Transform</b>				

Ridge Push:

Gravity Pull (Slab-Pull):

Convection Currents: cycle of hot material rising, cool material sinking.

- This slow cyclic movement causes the plates to move like groceries on a conveyor belt.



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## Unit 4: Plate Tectonics

**Deformation of the Earth's Crust**

Date:

SWBAT: Match the forces to the boundary they produce and differentiate between various faults.

TYPES OF STRESS:	<b>COMPRESSION</b>	<b>TENSION</b>	<b>SHEARING</b>
ROCK MOVEMENT:		<ul style="list-style-type: none"> <li>• Rocks become thinner</li> </ul>	<ul style="list-style-type: none"> <li>• Causes rocks to twist, bend, or break</li> </ul>
PLATE BOUNDARY:			
SKETCH:			
<b>Response to Stress</b>			
FOLD	Anticline 		
	Syncline 		
<b>FRACTURE</b>			
TYPES OF FAULTS	Reverse Fault 	Normal Fault 	Strike-Slip Fault 

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Unit 4: Plate Tectonics

**Earthquakes**

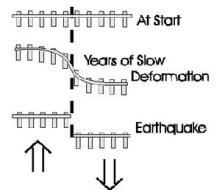
Date:

SWBAT: Differentiate between earthquake measurement scales and describe the mechanics of an earthquake.

Earthquakes: \_\_\_\_\_ of the earth's crust

- Usually occurs when rocks under stress suddenly shift along a fault.

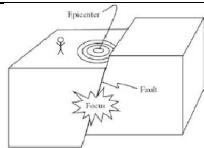
- Earthquakes are caused \_\_\_\_\_



- Stress builds between two plates that are locked in place by friction.
- Plates overcome friction causing plates to move (earthquake).
- Plates snap back to their former shape.

**Parts of an Earthquake**

\_\_\_\_\_ :

point on the **fault** at which the first movement occurs.

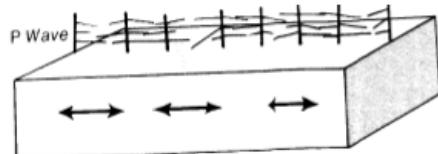
\_\_\_\_\_ :

point on the **surface** directly above the focus.**Seismic Waves**

- Vibrations are called seismic waves. They radiate outward in all directions.

**3 Types of Seismic Waves:****'P' Waves**

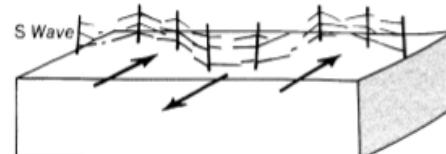
( \_\_\_\_\_ ):



Wave Motion:

**'S' Waves**

( \_\_\_\_\_ ):



Travel Through:

Wave Motion:

Speed:

Travel Through:

Speed:

**'L' Waves**

( \_\_\_\_\_ ):



Wave Motion:

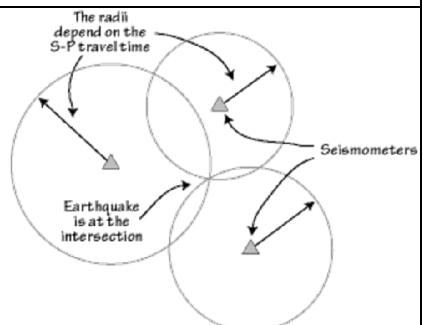
Travel Through:

Speed:

\_\_\_\_\_ : Instrument that detects and records

earthquake waves.

- Seismographs can tell how far away the epicenter is and how strong the earthquake is
- Need \_\_\_\_\_ seismographs to determine exact location.

**Scales to Measure Earthquakes****Richter Scale**

- Measures \_\_\_\_\_
- Amount of energy released

**Mercalli Scale**

- Measures \_\_\_\_\_

**Rossi-Forel Scale**

- Measures \_\_\_\_\_

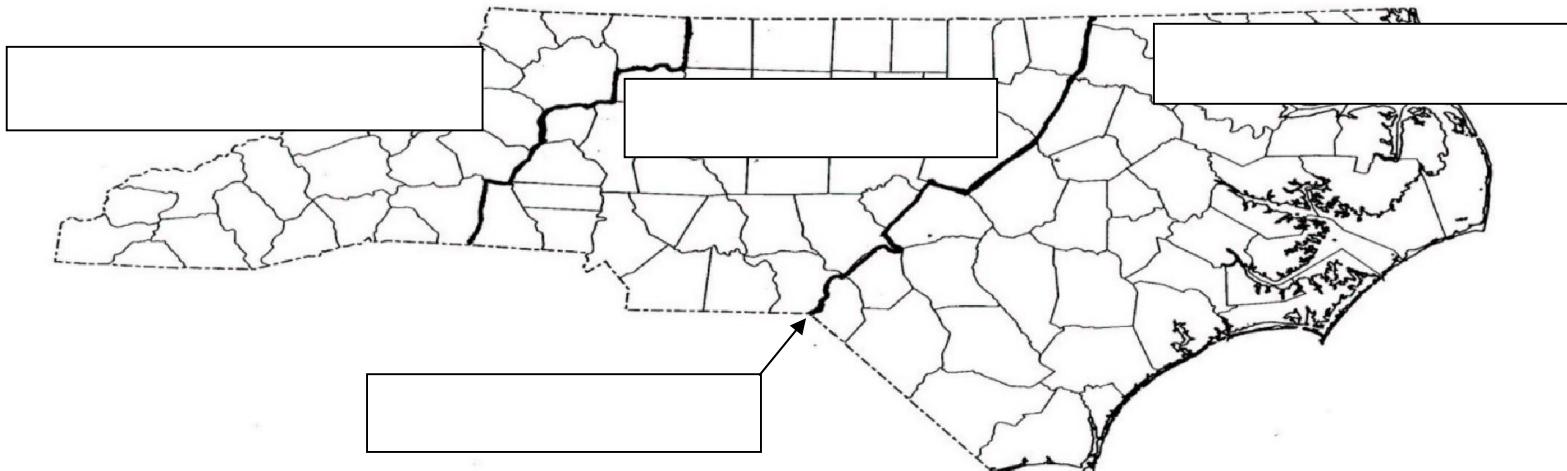
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**NC Geology**

Date: \_\_\_\_\_

SWBAT: Connect major types of geologic processes to landforms in NC and SE United States.



• Blue Ridge Mountains, part of the Appalachian Mts ○ Known for their _____ • Created from _____  • Started growing around 400 mya (Paleozoic Era) • Stopped growing around 270 mya	• Italian word for: " _____" • Area less steep than the mountains but steeper than the coastal plain. • Created by _____	• Flatter than the piedmont. • Created from _____				
		<table border="1" data-bbox="1374 915 2029 1176"><tr><td data-bbox="1374 915 1706 1008">Inner Coastal Plain</td><td data-bbox="1706 915 2029 1008">Outer Coastal Plain</td></tr><tr><td data-bbox="1374 1008 1706 1176">• steeper and dryer than the outer coastal plain • Contains _____</td><td data-bbox="1706 1008 2029 1176">• Contains _____</td></tr></table>	Inner Coastal Plain	Outer Coastal Plain	• steeper and dryer than the outer coastal plain • Contains _____	• Contains _____
Inner Coastal Plain	Outer Coastal Plain					
• steeper and dryer than the outer coastal plain • Contains _____	• Contains _____					

\_\_\_\_\_ : the boundary between these two different types of bedrock.

- Piedmont and Coastal plains contain different types of bedrock.
- Piedmont is \_\_\_\_\_
- Coastal Plain is \_\_\_\_\_

NC Geologic Timeline

1.7 BYA: NC land forms

444 MYA: NC and Europe begin to collide

320 MYA: Pangaea forms with NC in heart

250 MYA: Pangaea breaks, Mountains start to weather

145 MYA: Oceans recede, Coastal plain visible

145 MYA – Present: Ocean advances and recedes multiple times

**Topographic Maps**

Date:

SWBAT: Interpret and construct topographic map. Predict geologic formations based off topographic maps.

**Topographic Maps**

- Show the \_\_\_\_\_ of the Earth.

Examples of features: hills, rivers, valleys...

**Topographic Maps**

Topographic Maps	
Contour Lines	<ul style="list-style-type: none"> <li>• Connect all the points at _____.</li> <li>• <b>Lines never cross!</b></li> <li>• The closer the lines, the _____.</li> <li>• "V" lines indicate a valley</li> <li>• "V" lines always point upstream (rivers flow from high to low elevation)</li> <li>• _____ indicates hills or mountains.</li> </ul>
Depression Contours	<ul style="list-style-type: none"> <li>• Show a _____.</li> <li>• Are dashed</li> </ul>
Contour Interval	<ul style="list-style-type: none"> <li>• The difference in elevation between _____.</li> </ul>
Contour Index	<ul style="list-style-type: none"> <li>• Every _____ contour line is in _____ and labeled with the elevation number</li> <li>• Difference between 2 contour index lines divided by 5 = contour interval</li> </ul>
Relief	<ul style="list-style-type: none"> <li>• Difference between the _____.</li> <li>• Example: 150 ft. (highest) - 50 feet (lowest) = 100 feet (relief)</li> </ul>

The top of this drawing is a contour map showing the hills that are illustrated at the bottom.

- On this map, the vertical distance between each contour line is 10 feet.

1. Which is higher, Able Hill or Baker Hill?

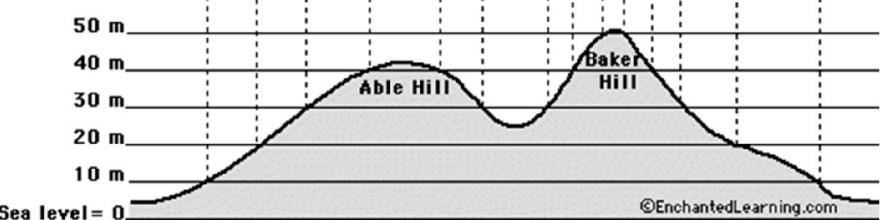
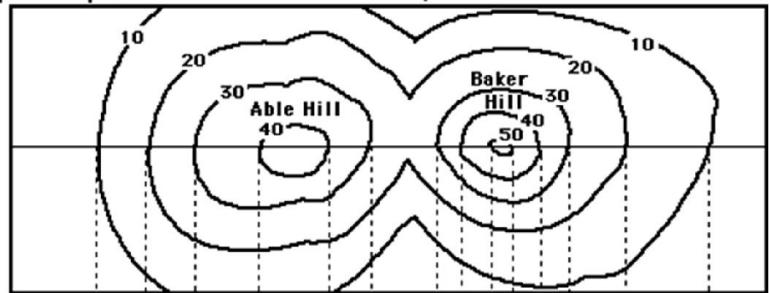
2. Which is steeper, Able Hill or Baker Hill?

3. How many feet of elevation are there between contour lines?

4. How high is Able Hill?

5. How high is Baker Hill?

6. Are the contour lines closer together on Able Hill or Baker Hill?

**Topographic Map (with contour lines that show points that are on the same level)**

The two hills seen from the side, with elevations marked and dotted lines pointing to the corresponding contour lines.

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## Unit 4: Plate Tectonics

**Mountain Building**

Date:

SWBAT: Differentiate between mountain types. Explain the conditions for formation.

Mountains are classified by the forces that create them.

- Mountains erode slowly through action of \_\_\_\_\_
- High elevations on mountains are \_\_\_\_\_ than at sea level, which affect the \_\_\_\_\_ of mountains with different elevation
- Highest Mountain: Mount Everest (Himalayas)

Mountain Type	Formation	Description	Example
Folded		<ul style="list-style-type: none"> <li>Tectonic movements have squeezed rock layers together.</li> </ul> <p>Evidence of _____</p>	
Fault Block		<ul style="list-style-type: none"> <li>These blocks were then lifted above the surrounding crust.</li> </ul> <p>Faulting _____</p>	
Dome		<ul style="list-style-type: none"> <li>Resulting in:</li> </ul>	
Eroded		<ul style="list-style-type: none"> <li>Leaves mountains standing between valleys.</li> </ul>	
Volcanic		<ul style="list-style-type: none"> <li>May develop on:</li> </ul>	

## Volcanoes

Date:

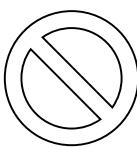
SWBAT: Identify 3 types of volcanoes and tell where/how they form.

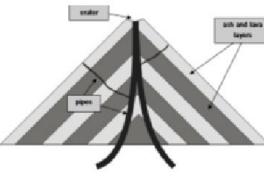
Volcanoes: An opening in the earth's crust through which magma erupts.

Magma:

Lava:

Type of Magma	Felsic	Mafic
Composition		
Characteristics		
Rock Formed		
Viscosity- ability of a liquid to resist flowing	<ul style="list-style-type: none"><li>• High Viscosity<ul style="list-style-type: none"><li>○ Example: Corn Syrup</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Low Viscosity<ul style="list-style-type: none"><li>○ Example: Baby Oil</li></ul></li></ul>

Type of Eruption	Boundary Type	Where it Occurs	Description	Example
Rift			<ul style="list-style-type: none"><li>• Non-explosive eruption</li><li>• Mafic lava</li></ul>	
Subduction Boundary			<ul style="list-style-type: none"><li>• Explosive eruption</li><li>• Felsic lava</li><li>• Lava, steam, &amp; ash ejected</li><li>• Most common</li></ul>	
Hot Spot			<ul style="list-style-type: none"><li>• Eruptions can be explosive or non-explosive</li><li>• Cause unclear</li></ul>	

Type of Volcano	Illustration	Type of Boundary	Type of Eruption	Type of Lava	Description	Example
Cinder Cone					<ul style="list-style-type: none"> <li>• Explosive</li> <li>• Cinders and rock particles are blown into the air</li> </ul>	
Shield					<ul style="list-style-type: none"> <li>• Non-explosive</li> <li>• Lava quietly flows from the vent</li> <li>• The mountain covers a large area; gently sloped sides</li> </ul>	
Composite Cone/ Stratovolcano					<ul style="list-style-type: none"> <li>• Explosive and non-explosive</li> <li>• A violent eruption sends up volcanic bombs, cinders and ash.</li> <li>• A quiet volcanic flow follows the explosion.</li> </ul>	
<b>Other dangers of volcanoes</b>		<b>Description</b>				
_____ Mixture of water, rock fragments and sediment that flow down the slopes of a volcano		<ul style="list-style-type: none"> <li>○ Looks like a mass of wet concrete</li> <li>○ Eruptions may trigger one or more lahars by quickly melting snow/ice or ejecting water from a crater lake</li> <li>○ Can easily grow to more than 10 times their initial size</li> <li>○ Typically associated with _____</li> </ul>				
_____ Made up of tiny, dust-like fragments of jagged rock, minerals and volcanic glass.		<ul style="list-style-type: none"> <li>○ Hard, abrasive, and does not dissolve in water</li> <li>○ After a violent eruption, the ash in the air can be thick enough to block sunlight and lower temperatures worldwide</li> </ul>				
_____ Current of superheated volcanic ash, lava, and gas that flows from a volcano.		<ul style="list-style-type: none"> <li>○ Moves _____</li> <li>○ Caused when an eruption column collapses or when a dome collapses</li> </ul>				

