

Plate Tectonics and Internal Earth Web Quest

Name: _____ Period: _____ Date: _____

*For this exercise you may record **answers only**.*

A. Internal Earth and moving plates.

<http://www.learner.org/interactives/dynamicearth/structure.html>

1. Use the preceding site to review **Internal Earth**. No writing required.

<http://education.sdsc.edu/optiputer/flash/convection.htm>

2. What appears to **move lithospheric plates**?

3. What happens when two **continental** plates (shown in green) collide?

Provide an idea for **WHY** this happens.

<http://www.absorblearning.com/media/attachment.action?quick=12p&att=2775> (click on the animation)

4. What appears to cause the **sea floor** (continents too for that matter) **to separate**?

5. When **continental and oceanic crust collide** which **subducts**? Why?

6. During collision of ocean and continental crust what is formed on the continent?

7. In which layer within Earth do convection currents occur?

<http://www.nature.nps.gov/geology/usgsnps/pltec/PSwaveEarthInterior.gif>

B. Look at the result of numerous earthquake waves and how earth layers were discovered. Check when done.

C. Use the next sites to observe Earth's Magnetic Fields.

<http://pubs.usgs.gov/gip/dynamic/developing.html> Scroll down to Magnetic Striping and Polar Reversals

1. Where is the youngest material located?

Scroll down to SIDEBAR and click on ([Magnetic Stripes and Isotopic Clocks](#))

2. Notice the actual data line and the line expected if the ocean floor were diverging.

Colors indicate age.

<http://www.nature.nps.gov/geology/usgsnps/animate/A47.gif>

3. What is being created as a **ship drags a magnetometer** across the ocean?

http://www.classzone.com/books/earth_science/terc/content/visualizations/es0803/es0803page01.cfm?chapter_no=visualization

4. What is normal polarity?

5. What is reverse polarity?

A record of current polarity becomes preserved in rock when the molten rock cools and magnetite crystals align

<http://www.edumedia-share.com/media.php?id=1325>

6. How is the age of rocks determined?

- D. **Continental Drift** proposes the movement of continents across Earth's surface over time. Use the next website to
1. **Observe** evidence Wegener and others use to support continental drift...

<http://loki.stockton.edu/~hozikm/geol/Courses/The%20Earth/Content%20Web%20Pages/Bugielski/webpage.htm>

*continents fitting together

*location of glacial till deposits

*animals on India and Madagascar similarities

*Fossil reptile *Lystrosaurus* locations

*Similar Mtn Ranges separated by oceans

*Pattern of Paleomagnetism

<http://jan.ucc.nau.edu/rcb7/Devonian.html> Then click on **Triassic then 250 MYA**.

2. With Pangea (all land masses connected) there were 3 oceans, the Pacific, the Panthalassa and the _____

- E. The **Earth is broken into numerous plates**. Use the next site to determine **WHERE** and **WHAT** different plates are.

<http://www.learner.org/interactives/dynamicearth/plate.html>

1. What is the small plate to the west of Washington State?
2. What plate is the United States on?
3. What plate is Australia on?
4. What is the larger of the 2 plates located between South American and Pacific Plates?

Scroll down and place the cursor over the key to determine the **TYPES OF BOUNDARIES** that occur

5. between the Nazca Plate and the South American Plate:
6. between Africa and the Arabian Plate:
7. between Japan and the Pacific Plate:
8. on Iceland:

Locate the famous Transform Boundary in California. Find **ANOTHER** in Western North America.

<http://www.nature.nps.gov/geology/usgsnps/pltec/pltec2.html>

9. How fast do plates move?

Notice not all plates are either ocean crust or continental crust; some have both on one plate!

- F. Types of Plate Boundaries.** All of the websites have the same information; choose the one you like best.

<http://www.nature.nps.gov/geology/usgsnps/pltec/pltec3.html> and/or

<http://pubs.usgs.gov/gip/dynamic/understanding.html#anchor6715825>

(usgs understanding plate motions) Different boundaries. Ignore the fourth boundary.

1. Indicate the **direction of plate movement** using arrows for each of the plate boundaries listed below.
Divergent:
Convergent:
Transform:

Provide the following for **divergent boundaries**: <http://www.nature.nps.gov/geology/usgsnps/animate/A48.gif>
and <http://www.learner.org/interactives/dynamicearth/slip3.html>

2. What is happening here?
3. Where is the youngest material located?
4. What is located on either side of the rift valley?

Go back to <http://www.nature.nps.gov/geology/usgsnps/pltec/pltec3.html>

or

<http://pubs.usgs.gov/gip/dynamic/understanding.html#anchor6715825> (scroll down)

Provide the following for **transform boundaries**:

5. What is a common activity that happens at transform boundaries?

Go back to <http://www.nature.nps.gov/geology/usgsnps/pltec/pltec3.html> then click here to learn more AND <http://pubs.usgs.gov/gip/dynamic/understanding.html#anchor6715825> then scroll down.

6. Provide the following for **convergent boundaries**:

The three types of convergent boundaries.

	Continent x Ocean	Ocean x Ocean	Continent x Continent
Locations			
Physical features			
Common processes			

When **two ocean crusts collide, which one subducts, the more dense crust subducts...why?** Extra Credit

<http://pubs.usgs.gov/gip/dynamic/himalaya.html>

7. Describe **how the Himalayans were created**. Are volcanoes currently involved?

http://planetseed.com/files/flash/science/features/earth/livingplanet/plate_boundaries/en/index1.html?width=570&height=475&popup=true

8. Review animations for all plate boundaries: Just place a check mark when completed.

<http://pubs.usgs.gov/gip/dynamic/Vigil.html>

9. What is the name given to volcanic activity happening in the middle of a plate?

G. Hotspot Volcanoes.

http://www.geo.cornell.edu/hawaii/220/PRI/PRI_PT_hotspot.html

<http://pubs.usgs.gov/gip/dynamic/hotspots.html#anchor19316266>

1. Where in a plate do hot spots form?

2. What direction is the Pacific Plate moving over the Hawaiian hot spot?

3. Which one of the islands is youngest?

<http://pubs.usgs.gov/gip/dynamic/Hawaiian.html> (Pattern of Hawaiian Volcanoes)

4. The island of Hawaii is the youngest of the long chain that eventually becomes the Emperor Sea Mounts. Why does the island chain eventually terminate to the north, what does the chain run into?

5. Observe animations of the Hawaiian Islands forming. Check the box when task is completed.

<http://education.sdsc.edu/optiputer/flash/hotSpots.htm>

http://www.classzone.com/books/earth_science/terc/content/investigations/es0810/es0810page03.cfm

H. Pangea <http://www.learner.org/interactives/dynamicearth/drift2.html>

1. What is Pangea?

<http://www.uwgb.edu/dutchs/platetec/plhist94.htm#000my>

2. When was Pangea created?

3. When did Pangea break-up?

4. Look back 750 million years ago. LA is an abbreviation for Laurentide and represents pre-North America. Describe why there might be coal deposits in Montana after viewing this map.

5. 750 million years ago geologists call a land mass Rodinia. Describe its make-up.

http://www.classzone.com/books/earth_science/terc/content/visualizations/es0807/es0807page01.cfm?chapter_no=visualization

6. Look to see what is predicted for the future configuration of the continents. Check when done.

I. Accretion

http://www.classzone.com/books/earth_science/terc/content/visualizations/es0808/es0808page01.cfm?chapter_no=visualization

1. View the animation and describe the process...also called accretion. What is happening?

http://www.fas.org/irp/imint/docs/rst/Sect2/Sect2_1b.html

(look for Accreted Terranes, scroll down to almost the bottom of the page)

2. Where was the previous coastline of western North America prior to accretion?

3. What types of material can be added to a continent? (key: explanation in first colored diagram)

J. New Madrid

http://en.wikipedia.org/wiki/1812_New_Madrid_earthquake

http://www.google.com/search?q=new+madrid+earthquake&hl=en&client=firefox-a&sa=X&rls=org.mozilla:en-US:official&channel=np&biw=1280&bih=614&prmd=imvnsI&tbm=isch&tbo=u&source=univ&ei=kGC_TtWYA4aniQLf4LCWAw&ved=0CEkQsAQ

1. What is unique about earthquakes that occurred at New Madrid in 1811-1812?

2. Why is this area such a concern now? (look for current information)

Your required work is done. Check out these ACTIVITIES or photos for further investigations, simply check the boxes upon completion

a. Interactive for **practice on naming plates and boundaries**

<http://www.learner.org/interactives/dynamicearth/plate2.html>

b. Try your luck at reconstructing Pangea. Try to achieve the correct location for the giant continent as well

http://www.geo.cornell.edu/hawaii/220/PRI/continental_puzzle.html

c. Observe a gallery of auroras:

<http://www.pbs.org/wgbh/nova/earth/gallery-auroras.html>

e. Earth's Magnetic Field protecting Earth from the Solar Wind.

<http://en.wikipedia.org/wiki/File:Animati3.gif>