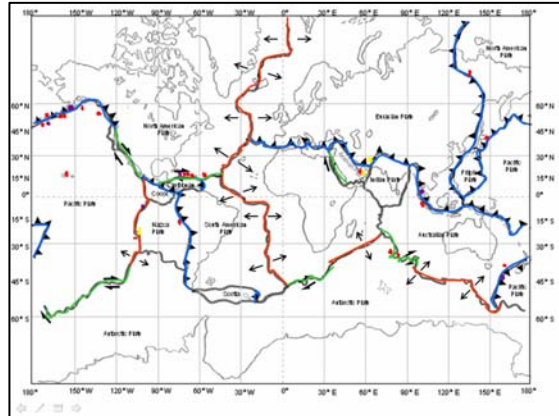


Teacher Notes- “Earthquakes-Plotting Recent Activity”

In this 2-day activity your students will first set up a World and U.S. map and then plot earthquakes that happened as recently as minutes ago on it.

On the surface it appears that students are just putting dots on a map. But because most of the dots end up near heavy black lines, they’ll learn on their own that most earthquakes occur along tectonic boundaries. If they don’t yet understand why this is so, you’ll just have to do some explaining. That’s what makes this an ideal activity to do at the beginning of an earthquake chapter.



Materials per student:

- Two-sided map: World on front, U.S. on back
- handout “How To Set Up Your Earthquake Map”
- Colored pencils
- Student internet access (optional)

additionally...

- 1-large classroom map or globe, or both (optional)
- 1-copy of the World Map to put on class screen on day 2. This is helpful when explaining to students how to dot their maps.
- PowerPoint

Beforehand:

1. Check the links to make sure they still work:
 - World Quakes, last 7 days:
http://earthquake.usgs.gov/eqcenter/recenteqsww/Quakes/quakes_all.php
 - USA Quakes, last 7 days:
http://earthquake.usgs.gov/eqcenter/recenteqsus/Quakes/quakes_big.php

If they don’t work, go back to <http://earthquake.usgs.gov> and work your way to the new links.

2. If your students aren’t using the internet, print the list of earthquakes from the website for them. If it’s a big deal to get internet access, go with copies on paper of recent earthquakes printed the morning of the activity. It is a ton easier this way, but you’ll miss out on earthquakes happening throughout the day.

3. Locate the page in your textbook that shows plate boundaries and their type (convergent, divergent, strike-slip). Write that page number in item 1 on the “How To Set Up...” sheet (shown to the right).
4. Set out colored pencils, if you’re providing them. Otherwise, have students to bring them.



5. Take the time to do this activity yourself a day or two early. That will give you a student perspective (which helps everyone!).

Procedure: presented in 2-day format

DAY 1- Outline the project and set up the map

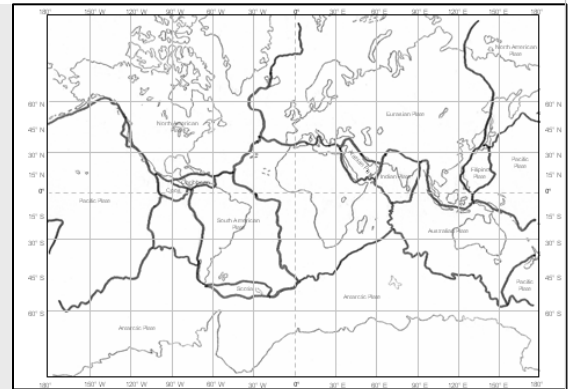
1. Start by flipping through the Earthquakes chapter while you do some out-loud thinking. Without going into too much detail, look at and respond to what you see. Just notice things. It’s a great focusing tool, sets the tone for the activity, and it gives you the opportunity to mention things you won’t be able to later. When you see the chapter title, ask “What causes an earthquake anyway?” If *focus* and *epicenter* are mentioned, ask what the difference is between them. (The website will list the focus as the depth.)
2. Make sure students have the handouts they need- the World/U.S. maps copied front and back and the half sheet “How To Set Up...”.
3. Take a long, slow first look at the world map. With all the information on it, ease through the information with your students:

“Students, the map I just gave you is very different from any other you’ve ever seen, so let’s go over how to read it properly. First of all, look for something familiar, like the continents. (*Mention some familiar continents and landmasses.*)

Notice those continent lines aren’t very dark, because on this exercise they’re not the most important thing. The heavy black lines are. That’s where you’ll be doing most of your work. What do you suppose they represent? (plate boundaries).

(*Spend a minute mentioning plate names. Notice how most either ride along the edge of a continent, or follow its outline at a distance. If you’ve recently covered plate tectonics, use this opportunity to remind them of those things.*)

Great. So we’ve got continents on the map. And plate boundaries. Oh, and something else. There’s longitude and latitude on the sides. Remind me what the zero latitude line is called? (the equator). Notice that it’s dotted, so it stands out.



Good. And how about zero longitude? (the prime meridian)
Well done. Now we know how to read the map, so we can begin.”

4. Now turn your attention to the half sheet “How To Set Up Your Earthquake Map”. Do just one item at a time at first. Explain item 1 (put symbols along boundaries), give them a few minutes to do it, then explain #2, and so forth. The PowerPoint is will lead you through this.

How To Set Up Your EARTHQUAKES Map

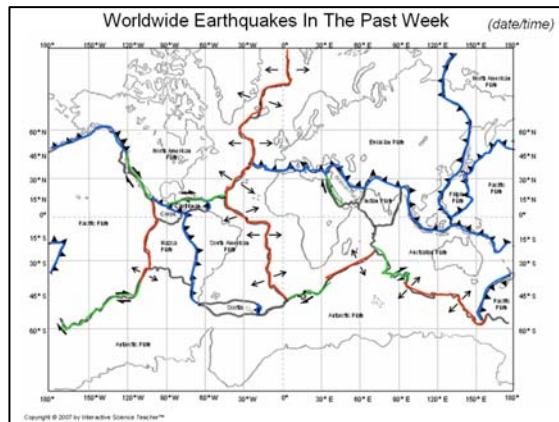
1. Label all plate boundaries using the same symbols as Figure _____ on page _____. Use pencil.
 - a. along convergent boundaries
 - b. along divergent boundaries
 - c. along strike-slip boundaries
2. Lightly color the plate boundary lines:
 - a. Convergent- blue
 - b. Divergent- red for the magma that rise up when the plates pull apart
 - c. Strike-Slip- green
3. Title atop center: “Worldwide Earthquakes In The Past Week”
4. Put tomorrow’s date and the time science class begins in the upper-right corner.
5. Put a minus sign (“-”) in front of all South and West longitude and latitude coordinates.
6. Put a key in the lower-right corner for magnitude:
 - o 2.5-3.9
 - o 4.0-5.9
 - o 6.0-+
7. Choose 3 colored pencils to represent each magnitude level. Put a different colored dot in front of each of the 3 levels.
8. In small print, label the following places on the world map using the map near the front of your agenda notebook: Iceland, Hawaii, St. Louis, Alaskan Island, New Zealand, Papua New Guinea, the Himalaya Mountains, & the Rocky Mountains.
9. On the back is a US map. Set it up the same way. Include boundary symbols, colored boundary lines, title (change “Worldwide” to “US”), date and time, a “-” sign by all south and west coordinates, and a key for magnitude.

Item 1-Label Boundaries with Symbols- Have students open their books and look at the map with them that they’ll be referring to for plate boundary symbols.*1

Point out that some plates may have more than one symbol along its boundary. This can occur when either the plate is slowly spinning or the plates bordering are moving differently.

Item 2-Color- Color the boundary as indicated by the symbols, *not* the symbols themselves.

Color really makes the boundaries stand out.*2 Later, when dots start going on the map, they should realize on their own that most earthquakes occur along convergent and strike-slip boundaries.



Item 4-Date & Time- Put tomorrow’s date and the time class begins in the upper-right hand corner. That’s when they’ll be accessing the website.

Item 5- Put “-“ by South and West- Student need put a minus sign next to all south and west coordinates on their maps. That’s because the website uses a negative symbol to distinguish north from south and east from west.*3

MAG	UTC DATE-TIME y/m/d h:m:s	LAT deg	LOX deg	DEPTH km	LOCATION
MAP 3.3	2009/02/25 11:09:21	19.098	-65.372	35.1	88 km (55 mi) N of
MAP 3.3	2009/02/25 06:16:43	19.046	-65.485	61.7	78 km (49 mi) NNE of
MAP 3.1	2009/02/25 05:14:13	63.452	-145.056	12.8	34 km (21 mi) SW of

Item 7-Color the key- Any 3 colors can be used other than the blue, red, and green already used to shade plate boundaries (so dots will be noticeable).

Item 8-Label places- Have each student put each country/place listed on their map.*⁴ They are all tectonically active. If you have some few globes, put them out for students to use.

Item 9- U.S. Map- On the back of the world map is a U.S. map. Have them go through steps 1-8 again for the U.S. region shown (or, at least those that apply). Most will have to finish this at home. The only difference, besides the area being smaller, is that there are 2 components to the scale: 3.0 – 4.4 (listed in bold on the site), and 4.5 and above (red).

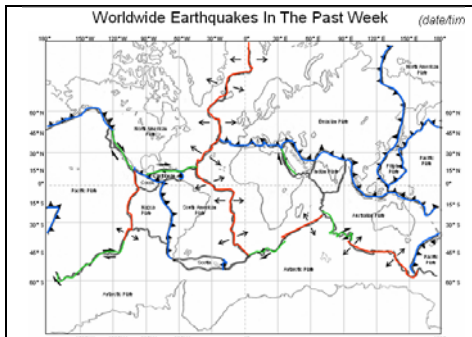
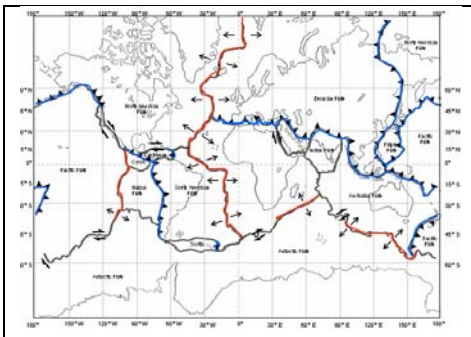
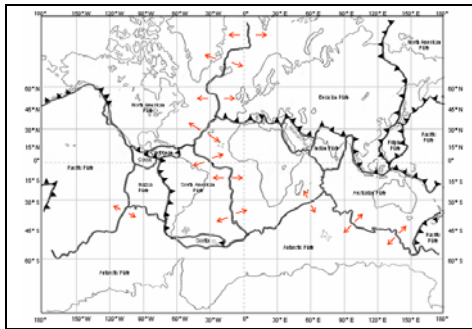
DAY 2- Plot the earthquakes

1. Have students take out their maps. Briefly review each detail to get their minds back in gear and to correct any mistakes.
2. Put a copy of the world map on front screen.

(end of Teacher Notes preview)

Come back and visit InteractiveScienceTeacher.com and for just .99¢ you can download the entire set of Teacher Notes right now, along with:

◆ PowerPoint (16 slides) - Don't have PowerPoint? Download it FREE: [Mac / PC](#)



Earthquakes Homework

1. What percent of all earthquakes on your world map occurred along or near (within an inch of a plate boundary)?

2. What 3 key processes or processes from page _____ best explain what causes an earthquake?

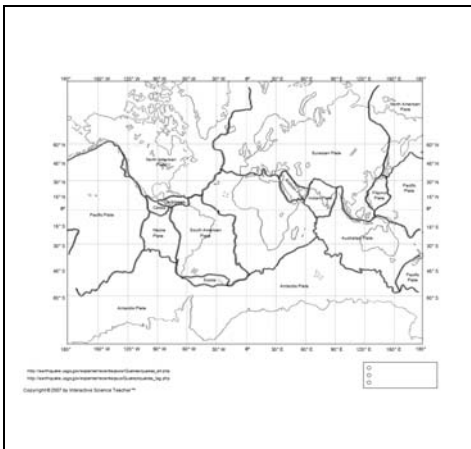
1. _____ 1. _____

2. _____ 2. _____

◆ Student Handout-
maps

◆ Student Handout-
setting up

◆ Quick Notes



- How To Set Up Your Earthquakes Map**
- Label all plate boundaries using the same symbols as Figure ____ on page _____. Use pencil.
 - do, do, do along convergent boundaries
 - open oval along divergent boundaries
 - along strike-slip boundaries
 - Lightly color over the plate boundary lines (do not color the plates, just the boundaries):
 - Convergent: blue
 - Divergent: red (for the margins that rises up when the plates pull apart)
 - Strike-Slip: green
 - Title at top center: "Worldwide Earthquakes In The Past Week"
 - Put tomorrow's date and the time science class begins in the upper-right corner.
 - Put a minus sign ("-") in front of all South and West longitude and latitude coordinates.
 - Put a key in the lower-right corner for magnitude:
 - 2.5 - 3.9
 - 4.0 - 5.9
 - 6.0 - 7.9
 - Choose 3 colored pencils to represent each magnitude level. Put a different colored dot in front of each of the 3 levels.
 - In small print, label the following places on the world map using the map near the front of your agenda notebook: Iceland, Hawaii, Sri Lanka, Aleutian Islands, New Zealand, Papua New Guinea, the Himalayas Mountains, & the Rocky Mountains.
 - On the back is a sample U.S. map. Set it up the same way. Include boundary symbols, colored boundary lines, etc (change "Worldwide" to "U.S."), date and time, a "-" sign by all south and west coordinates, and a key for magnitude.

Teacher Quick Notes - "Earthquakes-Plotting Recent Activity"

Material per student:
Two-sided map: World on front, U.S. on back
1-handout "How To Set Up Your Earthquake Map". (Copy these 2 to a page)
Colored pencils
Internet access (optional)

additional/...
1-large classroom map or globe, or both (optional)
1-copy of the World Map to put on class screen on day 2 when demonstrating how to dot earthquakes, using either multimedia projector on overhead transparency

Procedure:

DAY 1-Set Up Maps:




















- Read flip through Earthquakes chapter.
- Give students handouts: the World-U.S. maps and the half page "How To Set Up..."
- Clarify each item on the "How To Set Up Your Earthquake Map" sheet.
- Allow students the rest of class to finish setting up their world and U.S. maps.

DAY 2-Plot

- Review maps.
- Go to website-
http://earthquake.usgs.gov/occenter/recentocwww/Quakes/quakes_all.php
- Look at the first earthquake on the list and explain what information is in each column.

◆ Drawings & Pictures

◆ Extra Copies of
World & US maps

							
Dotted World Map-Sample	Setting Up Map-Sample	US Map- marked and colored	US Map-Convergent and Strike Slip marked	1. World Map	2. World Map & Boundaries	3. World Map-no plate names	World Map-with plate names (same as in...
							
US Map-Convergent marked	World Map-Convergent Boundary-Blue	World Map-Convergent, Divergent, Strike Slip-...	World Map-Convergent, Divergent, Strike Slip-...				
							
World Map-Convergent, Divergent, Strike Slip-...	World Map-Convergent, Divergent-Black	World Map-Convergent, Divergent-Red	World Map-Convergent-Black				
							
World Map-Convergent-Blue	World Map-Convergent-Bl...	World Map-Convergent-Bl...					