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**Background:**
Two of the earliest pieces of evidence supporting Alfred Wegener's hypothesis of continental drift were from fossils and glacial deposits. In this activity, you will examine records of fossils and glacial deposits in order to understand how these types of evidence helped explain the movement of plates.

**Key Question:**
How do records of fossils and glacial deposits help explain the movement of plates?
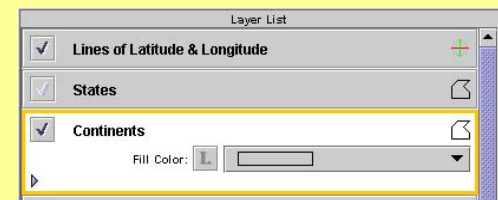
**My World Skills:**
*Review Skills*
- Show & hide layers and reorder layers
- Activating a layer
- Classify layers
- Show & hide legends
- Open and sort data tables

**Data Layers:**
- Continents
- Evidence from Fossils
- Glacial Movement
- Glacial Deposits

**Show/Hide vs. Activating Layers Tip:** Showing & hiding a layer is not the same as activating a layer.

Activate a layer by checking on the layer's name. The layer will change from gray to white and a yellow box will appear around the edges. In the example below, Lines of Latitude & Longitude and Continents are showing but only the Continents layer is active.



**Setup:**
➢ Launch My World

➢ Make sure you are in Construct mode ("Construct" tab at top of screen).

➢ In the Data Library, choose "Plate Tectonics" from the menu.

➢ Drag the required datasets (above) to your layer list

➢ Enter Visualize mode by clicking the "Visualize" tab.

**Layer Order Tip:** When creating your map, remember that the order is important. Layers on the top will cover up layers beneath. For example, make sure Glacial Movement is above Glacial Deposits, or else you will not be able to see it.

<u>Evidence from Fossils:</u>
***What does this dataset contain?***

This layer shows fossils of the same type of plants and animals found scattered on different continents.  There are two ways to view the contents of the dataset:

➢ In the layer list, classify the layer by choosing "Name" from the pulldown menu in the Fossils layer.  Then click "L" to create a legend
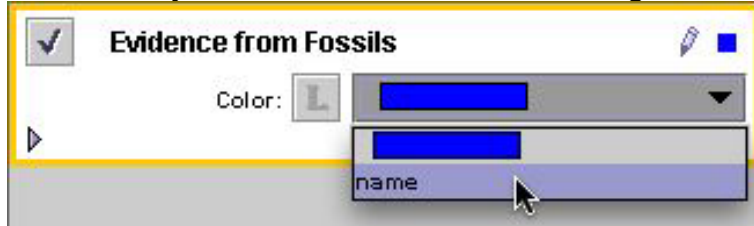


➢ Open the **table** for this selected layer to investigate its contents.

> *Here is a key to the names in the table and legend:*
> - ○ Mesosaurus is an aquatic reptile that lived in fresh water only
> - ○ Lystrosaurus is a mammal-like plant-eating reptile
> - ○ Cynognathus was a carnivorous land-dwelling reptile
>   (these animals would have been incapable of swimming long distances in salt water oceans)
> - ○ Glossopteris a land plant, like a fern, which grows in warm climates

> **Table Tips:** You can **open** a activated layer's table using the using the pulldown menu "Layer" and selecting "Show Layer Table..." or selecting the "Show Table of Selected Layer"  icon ⊞ .
>
> **Sort** a field by clicking on the field name.  Each click will sort the field, ascending ≣ descending ≡, and then back to unsorted.

***What is the pattern in this data?***

1. What pattern(s) are revealed when the data is plotted on a world map?

2. Notice where each type of fossil was found.  What do these locations have in common?  In what ways do they differ?

> **Hint:** *When answering, you should consider geographic location, climate, etc.*

3. In light of your answer to the previous question, what further questions arise?

> **Hint:** *Does it make sense for any one of these animals and plants to have lived in such different locations?  Why or why not?  Think about the characteristics of each type of plant/animal.*

4. What is the best explanation for why fossils for the same type of animal are found so far apart?  Provide at least one theory.  (Extra credit: provide a second theory.)


➢  When you are finished, turn off this layer by clicking the checkbox.


Evidence from Glacial Deposits:

***What does this dataset contain?***

- The *Glacial Deposits* layer shows places that were covered by ice sheets but are no longer (note: Antarctica is not included here because it is still covered by ice, but you should consider the ice in Antarctica in this analysis).

- The *Glacial Movement* layer arrows represent the direction of glacial grooves carved by the movement of ancient glaciers across this area. Scientists discovered these grooves in the surface and determined that they are evidence of past glacier movement.


***What is the pattern in the data?***

1. Explain why glaciers no longer exist in these regions.


2. How can you account for the existence of glaciers in these regions at one time?


3. What would have been necessary for glaciers to have existed in these regions?


4. Can an area where the ice flow originated be determined?


5. How can this data help explain the movement of continents?


Summary:
For each boundary type, list evidence you've discovered that describes plate movement.

**Background:**

Changes in land surface elevation and sea-floor depth can provide clues to the movement of the Earth's plates.  In this activity, you will examine the distribution of the highest and lowest areas on the land and on the ocean's floor in order to determine their relationship to plate boundaries.

**Key Question:**
How do changes in the land's surface and the ocean's floor help us understand the movement of plates?

**My World Skills:**
*New Skills*
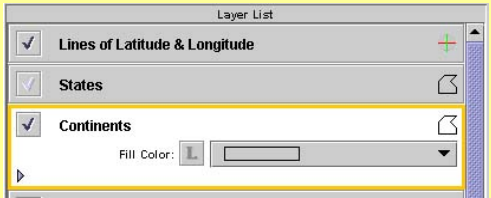• Create Selections using Analyze mode

*Review Skills*
• Show & hide layers and reorder layers
• Activating a layer
• Show & hide legends
• Open and sort data tables

**Data Layers:**
• Continents
• Plate Boundary types
• Elevation & Bathymetry *(Depth)*

**Show/Hide vs. Activating Layers Tip:** Showing & hiding a layer is not the same as activating a layer.

Activate a layer by checking on the layer's name.  The layer will change from gray to white and a yellow box will appear around the edges.  In the example below, Lines of Latitude & Longitude and Continents are showing but only the Continents layer is active.



**Setup:**
➢ Launch My World

➢ Make sure you are in Construct mode ("Construct" tab at top of screen).

➢ In the Data Library, choose "Plate Tectonics" from the menu.

➢ Drag the required datasets (above) to your layer list.

➢ Enter Visualize mode by clicking the "Visualize" tab.

**Layer Order Tip:** When creating your map, remember that the order is important. Layers on the top will cover up layers beneath. For example, make sure Glacial Movement is above Glacial Deposits, or else you will not be able to see the Glacial Movement layer.

Investigation of Elevation & Bathymetry

### *What does this dataset contain?*

The Elevation & Bathymetry layer contains information about the distance (in meters) above or below sea-level for the entire Earth's surface.

➢ Begin by examining the contents of the Elevation & Bathymetry (Depth) layer table.  Sort the "Elevation & Bathymetry" field.

1. What is the range of values from lowest to highest?

2. Do the oceans or the land have the greatest range from sea-level?

> **Table Tips:** You can **open** a activated layer's table using the using the pulldown menu "Layer" and selecting "Show Layer Table..." or selecting the "Show
>
> Table of Selected Layer" icon ⊞ .
>
> **Sort** a field by clicking on the field name.  Each click
>
> will sort the field, ascending ≡ descending ≡, and then back to unsorted.

➢ Close the table when finished.

### *What is the pattern in the data?*

3. What is the pattern of the location of mountain ranges, oceanic ridges, and ocean trenches in this layer?

Explore the data by identifying the areas of the different elevation and depth around the world.

> **Pointer Tool Tip:** Use the Pointer Tool ⬉ to identify the depth of the ocean floor along the oceanic ridges.  Notice that the depth will appear on the Elevation & Bathymetry legend located below the map.

4. Where are the deepest regions of the sea floor?  Is it different for different ocean basins?

5. Where are the highest regions on land?

Create specific selections of the deepest and highest regions on the Earth using the select by value in Analyze mode.

➢ Select items from "Elevation & Bathymetry" whose "Elevation & Bathymetry" is deeper than "-5000" (below sea level).  Provide a result name that will describe the selection.
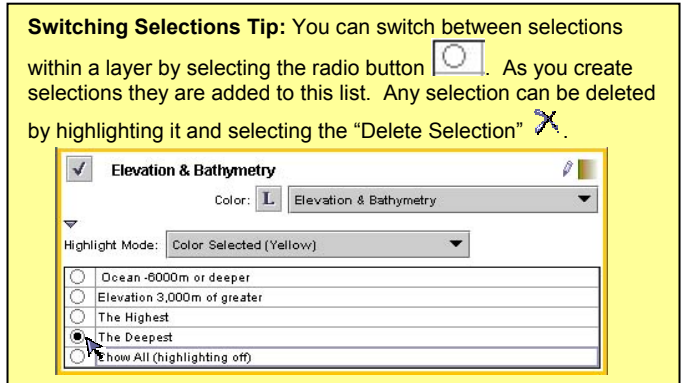
➢ Return to Analyze mode and create a second section that is greater than or equal to "3000". Provide a result name that will describe the selection.

➢ Use the ranges from question #1 to create a two more selections that locate the highest and deepest areas on Earth.

Switch between the different selections and make observations of where the deepest and highest areas are located.

6. Where are the deepest and the highest areas on Earth located? Why do you think these patterns occur where they do?

**Switching Selections Tip:** You can switch between selections within a layer by selecting the radio button ⬭. As you create selections they are added to this list. Any selection can be deleted by highlighting it and selecting the "Delete Selection" ✕.

✓ **Elevation & Bathymetry**
Color: **L** Elevation & Bathymetry ▼
Highlight Mode: Color Selected (Yellow) ▼
○ Ocean -6000m or deeper
○ Elevation 3,000m of greater
○ The Highest
● The Deepest
○ Show All (highlighting off)

7. Where are the oceanic ridges located?

8. What are the depths along these ridges?

➢ Turn on the "Plate Boundary Types" layer. Determine whether there is any relationship between plate boundaries at the highest and deepest regions of the sea-floor.

➢ Change the legend of the "Plate Boundary Types" layer to "Margin Type".

✓ **Plate Boundary types** 〰
Color: **L** ⬛ ▼
▷ ⬛
Length (computed)
Margin Type
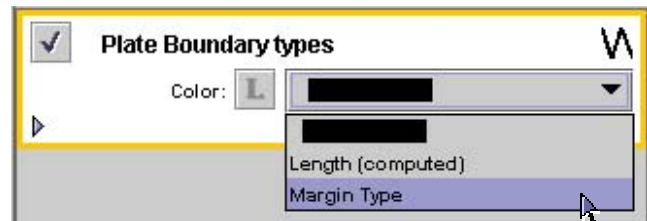
9. Is there a pattern of elevation and depth with divergent vs. convergent boundaries?

Summary:
For each boundary type, list evidence you've discovered that describes plate movement.

**Background:**
The age of the sea-floor can provide clues to the movement of the Earth's plates. In this activity, you will examine the sea-floor age in order to determine the movement of the Earth's plates and the relationship of sea-floor age to plate boundaries.

**Key Question:**
How does the age variation of the sea-floor provide supporting evidence for plate movement?

**My World Skills:**
*New Skills*
- Create Selections using Analyze mode
- Use "Measurement Tool"

*Review Skills*
- Show & hide layers and reorder layers
- Activating a layer
- Classify Layers
- Show & hide legends
- Open and sort data tables

**Data Layers:**
- Continents
- Plate Boundary types
- Sea-floor age (m.y.)

> **Show/Hide vs. Activating Layers Tip:** Showing & hiding a layer is not the same as activating a layer.
>
> Activate a layer by checking on the layer's name. The layer will change from gray to white and a yellow box will appear around the edges. In the example below, Lines of Latitude & Longitude and Continents are showing but only the Continents layer is active.
>
> | Layer List | |
> | --- | --- |
> | ✓ **Lines of Latitude & Longitude** | + |
> | ✓ **States** | ◩ |
> | ✓ **Continents** | ◩ |
> | Fill Color: L | ▼ |
> | ▷ | |

**Setup:**
➢ Launch My World

➢ Make sure you are in Construct mode ("Construct" tab at top of screen).

➢ In the Data Library, choose "Plate Tectonics" from the menu.

➢ Drag the required datasets (above) to your layer list

➢ Enter Visualize mode by clicking the "Visualize" tab.

> **Layer Order Tip:** When creating your map, remember that the order is important. Layers on the top will cover up layers beneath. Therefore, it is a good idea to put transparent layers, like Continents, toward the top so they will never be covered.

Investigation of Sea-Floor Age

*What does this dataset contain?*

The sea-floor age layer contains information about the general age of the sea-floor in million of years (m.y.) before present.

➢ Begin by examining the contents of the Sea-floor age layer table within My World.  Sort the "AGE (m.y.)" field.

**Table Tips:** You can **open** a activated layer's table using the using the pulldown menu "Layer" and selecting "Show Layer Table..." or selecting the "Show Table of Selected Layer"  icon  .

1. What is the range of values from youngest to oldest?

**Sort** a field by clicking on the field name.  Each click will sort the field, ascending  descending , and then back to unsorted.
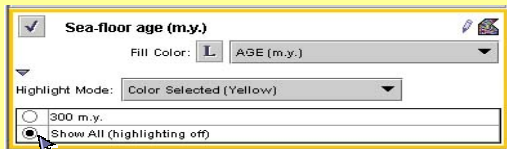
It is important to notice where the oldest values (300 m.y.) in the table are located on the map.  Once you've sorted the column, hold the control key and highlight each of the seven that have an age of 300. Once you have selected all seven, click "Make Selection From Rows" at the top of the table.  Add "**300 m.y.**" for a name.  You will be retuned to the mapview.

2. What area of the map represents an age of 300 m.y.?

### *What is the pattern in the data?*

**Switching Selections Tip:** You can switch between selections within a layer by selecting the radio button  .  As you create selections they are added to this list.  Any selection can be deleted by highlighting it and selecting the "Delete Selection"  .

➢ Switch the selection back to "Show All (highlighting off)" from "300 m.y."

| ✓ | **Sea-floor age (m.y.)** | | |
|---|---|---|---|
| | Fill Color: L | AGE (m.y.) | ▼ |

Highlight Mode:   Color Selected (Yellow)   ▼

○  300 m.y.
◉  Show All (highlighting off)

**Pointer Tool Tip:** Use the Pointer Tool   to identify the age of the ocean floor moving away from the plate boundaries.  Notice that the age will appear on the Sea-floor age (m.y.) legend located below the map.

➢ Explore the data by identifying the areas of the seafloor by age.

3. What color represents the oldest regions of the sea floor and what color represents the youngest regions of the sea floor?

4. If you were to travel in a straight line from Florida to the west coast of Africa, describe the pattern you would see in the age of the sea floor.

Create specific selections of the youngest and oldest areas of the sea-floor using the select by value in Analyze mode.
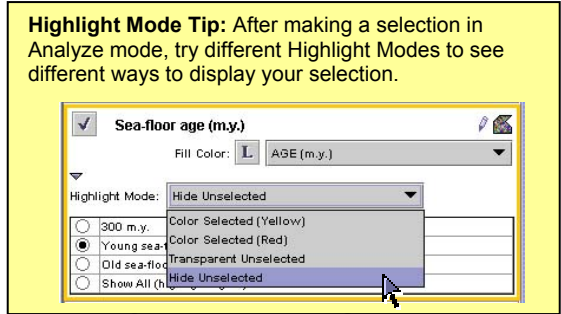
➢ Select items from "sea-floor age" whose "Age (m.y.)" is less than "10".  Type in a Result Name of **Young sea-floor 5 m.y**.

➢ Return to Analyze mode and create a second section that is less than "**300**" and greater than or equal to "**170**". Type in a Result Name of **Old sea-floor 170-180 m.y.**

➢ Switch between the different selections and make observations of where the oldest and youngest areas are located.

**Highlight Mode Tip:** After making a selection in Analyze mode, try different Highlight Modes to see different ways to display your selection.

5. Is there any symmetry to the pattern within an ocean basin?

6. What might this pattern tell you about the movement of Earth's plates?

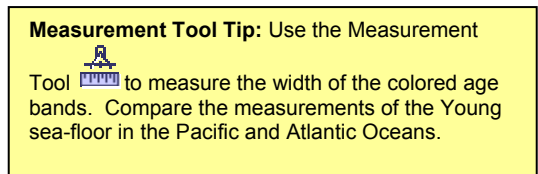7. Compare the width of the **Young sea-floor 5 m.y**. in the North Atlantic to the Pacific Ocean.

➢ Turn on the "Plate Boundary Types" layer and observe the relationship between plate boundaries and the youngest and oldest areas of the sea-floor.

➢ Change the legend of the "Plate Boundary Types" layer to "Margin Type".
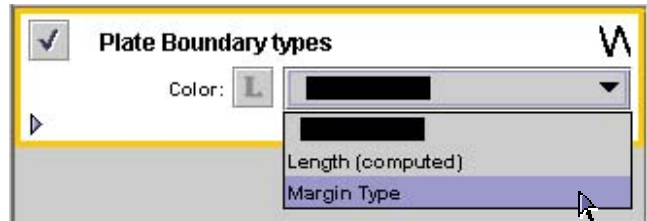
8. Is there a relationship between sea floor age and margin type?

➢ Turn on the **"Young sea-floor 5 m.y."** selection and compare the rate of spreading from the Pacific and Atlantic Oceans on either side of South America by comparing the width of the regions with sea floor of this age.

**Measurement Tool Tip:** Use the Measurement Tool to measure the width of the colored age bands. Compare the measurements of the Young sea-floor in the Pacific and Atlantic Oceans.

9. Which spreading center is opening faster?

10. What does the width of the colored bands represent?

11. Why do the widths vary from one ocean basin to the other?

Summary:
For each boundary type, list evidence you've discovered that describes plate movement.

**Background:**
Volcanoes are landforms that are formed from escaping magma from Earth's mantle and are good indicators of the either weaknesses in crust or plate movement.  In this activity, you will examine records of a variety of volcano types and their geographic distribution in order to determine their relationship to the location of plates.

**Key Question:**
How does the location and type of volcano help us understand the movement of plates?

**My World Skills:**
   *New Skills*
   • Create Selections using Analyze mode
   • Use "Histogram" button

   *Review Skills*
   • Show & hide layers and reorder layers
   • Activating a layer
   • Classify Layers
   • Show & hide legends
   • Open and sort data tables

> **Show/Hide vs. Activating Layers Tip:** Showing & hiding a layer is not the same as activating a layer.
>
> Activate a layer by checking on the layer's name.  The layer will change from gray to white and a yellow box will appear around the edges.  In the example below, Lines of Latitude & Longitude and Continents are showing but only the Continents layer is active.
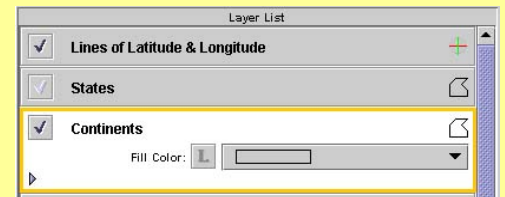>
> 

**Data Layers:**
   • Continents
   • Plate Boundary types
   • Volcanoes

**Setup:**
   ➢ Launch My World

   ➢ Make sure you are in Construct mode ("Construct" tab at top of screen).

   ➢ In the Data Library, choose "Plate Tectonics" from the menu.

   ➢ Drag the required datasets (above) to your layer list

   ➢ Enter Visualize mode by clicking the "Visualize" tab.

> **Layer Order Tip:** When creating your map, remember that the order is important. Layers on the top will cover up layers beneath. Therefore, it is a good idea to put transparent layers, like Continents, toward the top so they will never be covered.

Investigation of Volcanoes

*What does this dataset contain?*

The volcanoes layer contains information about their worldwide location, name, elevation and type.

➢ Begin by examining the contents of the Volcanoes layer.

1. How many volcanoes are represented in this table?

➢ Close the table when finished.

> **Table Tips:** You can **open** a activated layer's table using the using the pulldown menu "Layer" and selecting "Show Layer Table..." or selecting the "Show Table of Selected Layer" icon ⊞ .
>
> **Sort** a field by clicking on the field name. Each click will sort the field, ascending ≡ descending ≡ , and then back to unsorted.

Histograms are a useful tool when reviewing the contents of a layer table. They display the distribution of values for each table attribute or field.

➢ With the Volcanoes layer still active, select the "Show Histogram for the Selected Layer" button ▮▮ .

➢ Begin with "Elevation" as the attribute, using the pull-down selector. Change the minimum value to "0" and select "enter".

2. What is the maximum value for volcano elevations using the statistics at the bottom of the window?

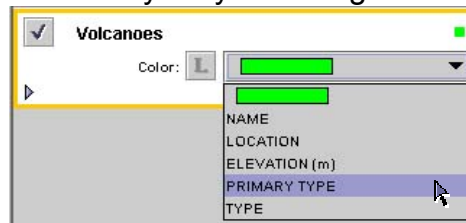3. What is the average (mean) elevation for all volcanoes worldwide?

➢ Change **View Histogram for Field** to **Primary Type**

4. Which volcano type is the most frequent worldwide?

➢ Close the histogram.

*What is the pattern in the data?*

➢ In the layer list, classify the Volcano layer by choosing "Primary Type" from the pulldown menu.



> **Legend Tip:** You can toggle a layer's legend on and off by selecting the "Hide/Show Color Legend" button L .

5. What observations can you make about volcano locations compared to the continents?

6. What visual pattern do you notice in Volcano locations?

7. Provide a possible reason why Volcanoes occur in these locations?


Create specific selections of the location of Stratovolcanoes and Shield volcanoes using the select by value in Analyze mode.

> Select items from "**volcanoes"** whose "**primary type**" matches one of the values checked below: check "**Stratovolcano"**.  Provide a result name that will describe the selection.

> Return to Analyze mode and create a second section from "**volcanoes"** whose "**primary type**" matches one of the values checked below: check "**Shield Volcano"**.  Provide a result name that will describe the selection.

**Highlight Mode Tip:** After making a selection in Analyze mode, try different Highlight Modes to see different ways to display your selection.

> Switch between the different selections and make observations of where Stratovolcano and a Shield Volcano are located.
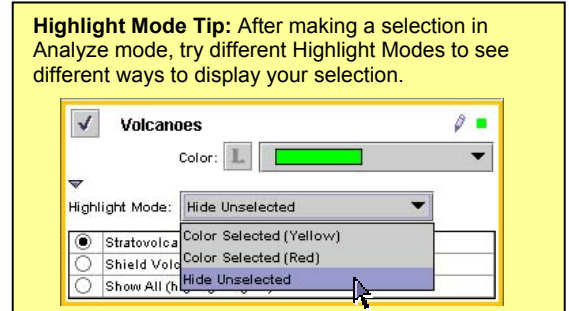

8. Is there a general difference in the location of Strato vs. Shield Volcanoes worldwide?

> Turn on the "Plate Boundary Types" layer and observe the relationship between plate boundaries and Stratovolcano and a Shield Volcanoes.

> Change the legend of the "Plate Boundary Types" layer to "Margin Type".


9. What is the pattern of volcano type at divergent vs. convergent boundaries?

10. Does one type of volcano occur more often at a plate boundary than the other?

11. Is the pattern of volcanoes similar on both sides of a plate boundary? Explain the pattern you observe.


Summary:
For each boundary type, list evidence you've discovered that describes plate movement.

## Background:

Earthquakes are caused by the movement within the Earth's crust. In this activity, you will examine records of earthquakes and their geographic distribution in order to determine their relationship to the location of plates.

## Key Question:

How does the location and depth of earthquakes help us understand the movement of plates?

## My World Skills:

*New Skills*

- Create Selections using Analyze mode

*Review Skills*

- Show & hide layers and reorder layers
- Activating a layer
- Classify Layers
- Show & hide legends
- Open and sort data tables

> **Show/Hide vs. Activating Layers Tip:** Showing & hiding a layer is not the same as activating a layer.
>
> Activate a layer by checking on the layer's name. The layer will change from gray to white and a yellow box will appear around the edges. In the example below, Lines of Latitude & Longitude and Continents are showing but only the Continents layer is active.



## Data Layers:

- Continents
- Plate Boundary types
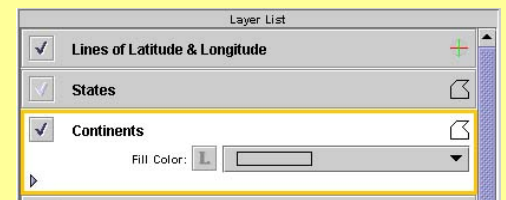- Earthquakes medium m4.0-5.9 (2001-2003)

*Optional:*

- Earthquakes big 6.0-9 (1994-2003)
- Earthquakes small m2.0-3.9 (2001-2003)

## Setup:

- ➢ Launch My World
- ➢ Make sure you are in Construct mode ("Construct" tab at top of screen).
- ➢ In the Data Library, choose "Plate Tectonics" from the menu.
- ➢ Drag the required datasets (above) to your layer list
- ➢ Enter Visualize mode by clicking the "Visualize" tab.

> **Layer Order Tip:** When creating your map, remember that the order is important. Layers on the top will cover up layers beneath. Therefore, it is a good idea to put transparent layers, like Continents, toward the top so they will never be covered.

<u>Investigation of Earthquakes</u>

*What does this dataset contain?*

The earthquakes layer contains information about their worldwide location, depth and magnitude. There are two ways to view the contents of the dataset:

➢ Open the table for this layer to investigate its contents.  Sort the "Depth" and Magnitude" fields. Note the ranges of values for both of these fields.

> **Table Tips:** You can **open** a activated layer's table using the using the pulldown menu "Layer" and selecting "Show Layer Table..." or selecting the "Show Table of Selected Layer" icon ▦ .
>
> **Sort** a field by clicking on the field name.  Each click will sort the field, ascending ≡ descending ≡ , and then back to unsorted.

➢ In the layer list, classify the Earthquake layer by choosing "Depth" from the pulldown menu.
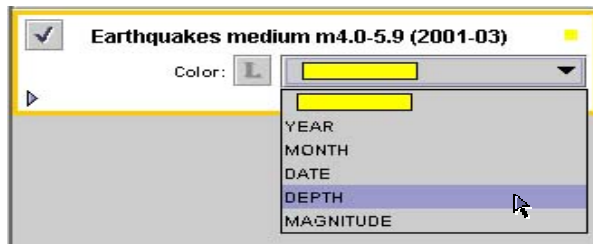


> **Legend Tip:** You can toggle a layer's legend on and off by selecting the "Hide/Show Color Legend" button **L** .

*What is the pattern in the data?*

1. What visual pattern do you notice in Earthquake locations? Provide a possible reason why Earthquakes occur in these locations?

Create a series of selections of shallow (0-199) and medium(200-399) and deep (400 and greater) earthquakes using the select by value in Analyze mode.

➢ Select items from "earthquakes medium…" whose "depth" is greater than "400".  Provide a result name that will describe the selection.

➢ Return to Analyze mode and create the additional selections from "earthquakes medium…"  Provide result names that will describe the selection.

> **Highlight Mode Tip:** After making a selection in Analyze mode, try different Highlight Modes to see different ways to display your selection.
>
> 

➢ Switch between the different selections and make observations of where earthquakes of different depths occur.

2. Where do the deepest Earthquakes occur?

3. Why do you think Earthquakes are deepest at these locations?

4. Where do the shallowest Earthquakes occur?

5. Why do you think Earthquakes are shallowest at these locations?

➢ Turn on the "Plate Boundary Types" layer and observe the relationship between plate boundaries and earthquakes of varying depths.  Change the legend of the "Plate Boundary Types" layer to "Margin Type".

6. What is the pattern of earthquake depths at a divergent boundary?

7. What is the pattern of earthquake depths at a convergent boundary?

8. What differences do you notice between these two boundary types?

9. Is the pattern of earthquakes similar on both sides of a plate boundary? Explain the pattern you observe.

Summary:
For each boundary type, list evidence you've discovered that describes plate movement.

**Background:**
The pattern of seismic shear-wave (s-wave) velocities in the upper mantle can provide important clues to the dynamic nature of the Earth's mantle.   Changes in s-wave velocities support the concept of convection currents associated with plate movements.  In this activity, you will examine the s-wave velocities at 100 km below the Earth's surface in order to determine its relationship to plate movement and plate boundaries.

**Key Question:**
How does the pattern of seismic shear-wave (s-wave) velocities in the upper mantle provide supporting evidence for plate movement?

**My World Skills:**
  *New Skills*
  • Create Selections using Analyze mode

  *Review Skills*
  • Show & hide layers and reorder layers
  • Activating a layer
  • Classify Layers
  • Show & hide legends
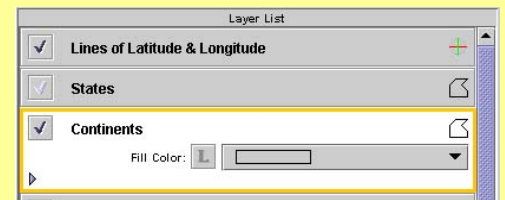  • Open and sort data tables

**Data Layers:**
  • Continents
  • Plate Boundary types
  • Seismic S-wave Velocity at 100 km

> **Show/Hide vs. Activating Layers Tip:** Showing & hiding a layer is not the same as activating a layer.
>
> Activate a layer by checking on the layer's name.  The layer will change from gray to white and a yellow box will appear around the edges.  In the example below, Lines of Latitude & Longitude and Continents are showing but only the Continents layer is active.



**Setup:**
  ➢ Launch My World

  ➢ Make sure you are in Construct mode ("Construct" tab at top of screen).

  ➢ In the Data Library, choose "Plate Tectonics" from the menu.

  ➢ Drag the required datasets (above) to your layer list

  ➢ Enter Visualize mode by clicking the "Visualize" tab.

> **Layer Order Tip:** When creating your map, remember that the order is important. Layers on the top will cover up layers beneath. For example, make sure Glacial Movement is above Glacial Deposits, or else you will not be able to see it.

Investigation of S-wave Velocity

## *What does this dataset contain?*

The Seismic S-wave Velocity layer models the velocity at which s-waves travel through Earth's mantle as a result of seismic activity (i.e., earthquake). S-waves will decrease in velocity (speed) as they travel though material that is hotter and less dense and will increase in velocity when traveling through cooler and denser material. Areas of slower s-wave velocity are found where active convection is occurring in the upper mantle. *In this dataset, the s-wave velocities are from a depth of 100 km below the Earth's surface.*

> ➢ Begin by examining the contents of the s-wave layer table. Sort the "Velocity (km/sec)" field.

1. What is the range of values from slowest to fastest? Close the table when finished.

**Table Tips:** You can **open** a activated layer's table using the using the pulldown menu "Layer" and selecting "Show Layer Table..." or selecting the "Show Table of Selected Layer" icon ▦ .

**Sort** a field by clicking on the field name. Each click will sort the field, ascending ≣ descending ≡ , and then back to unsorted.

## *What is the pattern in the data?*

> ➢ Explore the data by identifying the variation in s-wave velocities around the world.

2. In general, where are the regions of slow velocities?

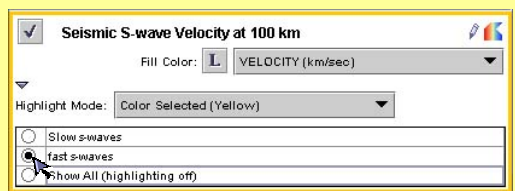3. Where are the regions of fast velocity?

4. Which correspond with land and which with the oceans?

**Pointer Tool Tip:** Use the Pointer Tool ⬉ to identify values of the active layer. Notice that the value will appear on the Seismic S-wave Velocity at 100 km legend located below the map.

Create specific selections of the fastest and slowest areas of s-wave velocity using the select by value in Analyze mode.

> ➢ Select items from "Seismic S-wave Velocity at 100 km" whose "Velocity" is less than "4.3". Provide a result name that will describe the selection.
>
> ➢ Return to Analyze mode and create a second section that is greater than or equal to "4.6". Provide a result name that will describe the selection.

**Switching Selections Tip:** You can switch between selections within a layer by selecting the radio button ⬯ . As you create selections they are added to this list. Any selection can be deleted by highlighting it and selecting the "Delete Selection" ✕ .

✓ Seismic S-wave Velocity at 100 km
Fill Color: **L** VELOCITY (km/sec) ▼
Highlight Mode: Color Selected (Yellow) ▼
○ Slow s-waves
◉ fast s-waves
○ Show All (highlighting off)

Switch between the different selections and make
observations of where the slowest and fastest regions
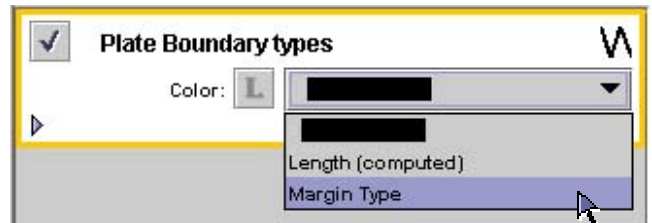are located.

5. Is there any symmetry to the pattern
within an ocean basin?

6. What might this pattern tell you about the
movement of Earth's plates?
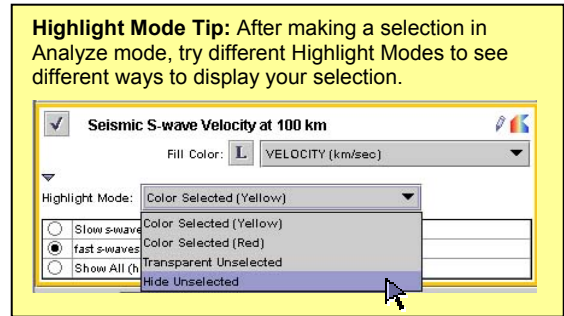
> Turn on the "Plate Boundary Types" layer and observe the relationship
> between plate boundaries and the slowest and fastest regions of s-wave
> velocities.

> Change the legend of the "Plate
> Boundary Types" layer to "Margin Type".
> What is the pattern between regions of
> the slow and fast velocities and divergent
> vs. convergent boundaries?

Summary:
For each boundary type, list evidence you've discovered that describes plate
movement.