ISOCHRONS are imaginary lines on a map that show the parts of Earth's surface that are the same age. When geologists first analyzed isochron maps of the ocean floor, they discovered that Earth's crust is formed along ocean ridges and recycled at the edge of oceanic crust. This discovery led to the theory known as plate tectonics. Geologists continue to use maps to study the motion of tectonic plates.

**Question:**
Can you determine the age of the crust and type paper of plate boundaries?

**Safety Precautions**

**Materials**
- paper
- colored pencils
- scissors
- metric ruler
- calculator

**PROCEDURE**

1. Read and complete the lab safety form.
2. **Figure 23** shows Plate B relative to Plate A. Draw or trace the plates onto a separate sheet of paper and cut them out. **WARNING:** Scissors can cut or puncture skin.
3. The arrow shows the movement of the plates relative to each other. Move Plate A as shown in each part of **Figure 23**.
4. Use the symbols shown in the legend to indicate the type of plate boundary and the relative motion across the boundary for each part of **Figure 23**.
5. **Figure 24** shows two plates, A and B, separated by two ocean ridges and a transform boundary. Plates A and B are moving apart at 2 cm/y. Convert the speed 2 cm/y to km/y.
6. Trace **Figure 24** onto a separate sheet of paper. Assume the geometry of the boundaries in **Figure 24** has not changed over time. Draw isochrons on 10, 20, 30, and 40 million years.
7. Color the crust based on its age: 0-10 million years old—red, 10-20 million years old—yellow, 20-30 million years old—green, and 30-40 million years old—blue.
Key

Use the following symbols to indicate the type of plate boundary:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Divergent boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Convergent boundary (triangles point to the plate that stays on the surface)</td>
</tr>
<tr>
<td></td>
<td>Transform; arrows indicate the relative direction of motion across the boundary</td>
</tr>
</tbody>
</table>

Figure 23

Figure 24

Figure 25

Name ____________________________
GeoLAB

Chapter 17 • Plate Tectonics

ANALYZE AND CONCLUDE

1. **Determine** the motion of a plate that would have each of the A sites that moved relative to the B plate.

   ______________________________________

   ______________________________________

   ______________________________________

2. **Apply** From your map of isochrons, what is the easiest way to identify the location of transform boundaries?

   ______________________________________

   ______________________________________

   ______________________________________

3. **Interpret** Look at Figure 25. From the pattern of the isochrons on the ocean floor, identify the divergent plate boundaries along the Atlantic Ocean and along the Pacific Ocean.

   ______________________________________

   ______________________________________

   ______________________________________

   ______________________________________

4. **Differentiate** Which ocean is marked by wider isochrons? Based on the amount of oceanic crust produced in a given period of time, along which plate boundary is divergence happening more rapidly?

   ______________________________________

   ______________________________________

   ______________________________________

   ______________________________________

   ______________________________________

5. **Infer** The spreading center in the Pacific Ocean is not centered in the same manner as the Atlantic Ocean. Explain how this indicates the presence of convergent plate boundaries.

   ______________________________________

   ______________________________________

   ______________________________________

   ______________________________________

   ______________________________________