

## Teacher Information

8. Once the needle comes to rest, read the angle from the scale to which the needle on top is pointing. Since the top of the angle is defined as the angle measured in a vertical plane between the direction of the Earth's magnetic field and the horizontal, subtract the angle measured from  $90^\circ$  to obtain the dip angle, or the downward direction of the Earth's magnetic field.

2. Have the students compare and contrast magnetic declinations of various declinations on your continent. Imagine that a plane is flying from northern Maine to southern California; discuss the compass adjustment(s) required for the aircraft to stay on course.

3. Discuss why students think the magnetic poles are constantly shifting.

### Lab Preparation






These are the materials and equipment to set up prior to the lab:

1. The two templates [Map of Earth Template and Degree Wheel Template] that students will use in this activity are located on pages XXX and XXX.
2. Set up the data collection system and provide students with magnetic field sensors.

### Sequencing Challenge

The steps below are part of the Procedure for this lab activity. They are not in the right order. Determine the proper order and write numbers in the circles that put the steps in the correct sequence.

**Note to authors:** The number of tasks is not fixed and will vary per activity. The task blocks can be copied and moved as needed.

 Float the cork with the magnetized needle in it in the beaker label N, S, E, W.	 Rub the needle from the eye to the point across the south end of the bar magnet 30 to 40 times.	 Collect data at several locations around the degree wheel.	 Sprinkle iron filings lightly and evenly across the map area of the template.	 Align the tip of the magnetic field sensor with the 0 degree marking on the template.
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### Procedure with Guided Inquiry

After you complete a step (or answer a question), place a check mark in the box (☐) next to that step.

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