

Geospatial Education

Using a Compass

Grade Level: 3-6

Classroom Time: 30 minutes

Materials:

Maps

The Compass

Find Your Way with a Map - The Silva System

Silva compass

Objectives:

1. Given instruction and materials, students will learn the parts of a compass.
2. Given instruction and materials, students will learn to use a compass correctly.

Teacher's introduction to the material:

With the advent of GPS, fewer students have learned to use a compass. This lesson demonstrates its use and familiarizes students with compass readings. The cardinal directions are North, South, East and West. The Earth's magnetic field is also known as the geomagnetic field. It is the magnetic field that extends from the Earth's interior to where it meets the solar wind, a stream of charged particles emanating from the Sun. There is a difference between magnetic North and true North. Magnetic North is the direction indicated by a compass when pointed towards the magnetic North Pole. True North, also called "geodetic North," is the path a meridian follows to the geographic North Pole. Magnetic declination is the angle of difference between the two. Declination for locations may be obtained from the NOAA Magnetic Field Calculator.

Instruction:

1. Show the students a compass rose on a map. Have students find a certain location on the map. Name other locations and ask students which cardinal direction they would follow to the new location.
2. Read *The Compass*. Give students compasses. Explain to the students the parts of the compass.
3. Use a Compass:
 - a. Hold the compass baseplate at waist height. Point the direction of travel arrow away from the body.
 - b. Turn the degree dial until the orienting arrow lines up with the magnetic needle. Look at the direction of travel arrow to determine the general direction you are facing.
 - c. To practice using the compass have students stand facing different landmarks and re-adjusting the compass to take a new cardinal directional readings.
4. Take a compass bearing:
 - a) Hold the compass baseplate at waist height.
 - b) Point the direction of travel arrow at a landmark.
 - c) Turn the degree dial until the *orienting arrow* lines up with the *magnetic needle*. Look at the *direction of travel arrow* to determine the general direction you are facing.
 - d) Read the degrees on the compass housing. That is the bearing of the landmark.
5. Read *Find Your Way with a Map - The Silva System*. Use a compass with a map.

Skills: Geography, Physical Science, Reading comprehension

Vocabulary: Cardinal Directions, Compass Bearing, Declination, Geomagnetic North, Landmark, Magnetic declination, Magnetic North, True North

The Compass

The Earth's magnetic field is also known as the **geomagnetic field**. It is the magnetic field that extends from the Earth's interior to where it meets the solar wind, a stream of charged particles emanating from the Sun. The Chinese knew about magnetism as early as 2637 BC, but the first written description of a compass for navigation didn't appear in Europe until 1190.

There is a difference between **magnetic North** and **true North**. Magnetic North is the direction indicated by a compass when pointed towards the magnetic North Pole. True North, also called "geodetic North," is the path a meridian follows to the geographic North Pole. **Magnetic declination** is the angle of difference between the two. For example, in a location where the **declination** is 10 degrees West, true North would actually be 10 degrees East of the direction indicated by the compass.

Parts of a Compass

1. The baseplate is the clear, plastic plate on which the compass is embedded.
2. The direction of travel arrow is the arrow in the baseplate that extends beyond the compass; pointing away from the compass.
3. The compass housing is the clear, plastic circle that houses the magnetized compass needle.
4. The degree dial is the twistable dial surrounding the compass housing that displays all 360 degrees of the circle.
5. The magnetic needle is the needle spinning within the compass housing.
6. The orienting arrow is the non-magnetic arrow within the compass housing.
7. The orienting lines are the lines within the compass housing that run parallel to the orienting arrow.

The end of the compass *magnetic needle* that is painted red is drawn toward magnetic north. Look at the *compass housing degree dial*; it is a full circle marked off in 360 equal parts called degrees. Zero and 360 degrees (the beginning and end of the circle) are marked with an "N" for North. There is an "E" at 90 degrees for East, an "S" at 180 degrees for South, and a "W" at 270 degrees for West. A bearing is the number of degrees between an object in the field and North on the compass. For instance, the bearing straight East is 90 degrees. A building directly South would have a bearing of 180 degrees.

To determine which direction you are facing, hold the compass *baseplate* in the palm of the hand at waist height (hand should be level). Turn the degree dial until the *orienting arrow* lines up with the *magnetic needle*. Look at the *direction of travel arrow* to determine the general direction you are facing. For example, if the *direction of travel arrow* is pointing between the N and the E, you are facing Northeast. To find a bearing read the *degree dial*. For example, if the *degree dial* is at 23 degrees, the bearing would be 23 degrees Northeast.

Magnetic Field Calculators. NOAA. Retrieved from: <http://www.ngdc.noaa.gov/geomag-web/#declination>
Tkaczyk, Filip. How to Read a Compass. Alderleaf Wilderness College. Retrieved from:
<http://www.wildernesscollege.com/how-to-read-a-compass.html>

Find Your Way With a Map. The Silva System:



Place your compass on the area map with the Base Plate edge connecting where you are with where you want to go.



Set the compass heading by turning the compass Dial until the "N" aligns with Magnetic North (MN) on the map.



Remove the compass from the map and hold it level in front of you with the Direction of Travel Arrow pointing straight ahead. Turn your body until the red end of the Needle is directly over the Orienting Arrow, pointing to the "N" on the dial. The Direction of Travel Arrow now points precisely to your destination. Look up, sight on a landmark and walk to it. Repeat this procedure until you reach your destination.

