

# Compass Basics

## Activity Overview

Students will become familiar with the use of a compass in preparation for mapping and site analysis activities in this book. Students will learn how to determine direction and locate objects.

## Objectives

Students will:

- Identify parts of a compass
- Set and measure direction
- Determine direction of a given object along an established compass bearing
- Practice using a compass to develop the skills necessary for mapping

## Subjects Covered

Science and Math

## Grades

3 through 12

## Activity Time

1 hour

## Season

Any

## Materials

Compasses, Coins/pennies or Golf tees

## State Standards

### Math:

Recognize & describe measurable attributes & units (D.4.1)

Demonstrate understanding of measurement (D.4.2)

Determine measurements by using standard tools (D.4.4)

Identify & describe attributes in situations not directly or easily measurable (D.8.1)

Demonstrate understanding of measurement facts, principles, techniques (D.8.2)

Determine measurement indirectly (D.8.4, D.12.3)

### Science:

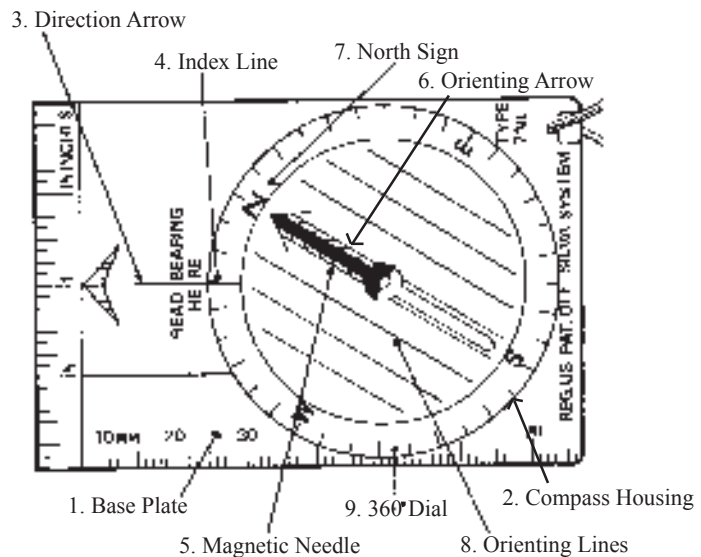
Use scientific equipment (C.4.4)

Understand energy forces (D.12.8)

## Background

A compass is a tool for determining directions by means of a magnetic needle pointing north. Determining direction is possible by measuring the angle between the object sighted or the desired direction and the magnetized needle. A compass needle always points to magnetic north, which is different than true north. Magnetic variation is the angle between true north and magnetic north. Maps typically use true north. Magnetic north is located in the upper Hudson Bay area and moves slightly from year to year.

Note: When using a compass, keep clear of metallic objects such as belt buckles. They could affect the accuracy of the compass.



## Parts of a compass:

1. Base plate
2. Compass housing
3. Direction arrow (printed on the base plate)
4. Index line (or indicator line)
5. Magnetic needle (or magnetic arrow)
6. Orienting arrow (printed on compass housing)
7. North Sign
8. Orienting Lines
9. 360° Dial

## Compass parts definitions:

1. Base plate is the rectangular bottom of the compass. It is held flat at chest level and parallel to your body.
2. Compass housing is the turning dial on the compass. The numbers

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## Compass Basics (cont.)

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around the outside of the dial are degrees. There are 360 degrees or azimuths. They represent 360 directions that you can travel from any point. The four cardinal directions are north, south, east and west and are stated as N, E, S, and W respectively.

3. Direction arrow is on the base plate and is used two ways. It points you in a direction to walk and locates an object.
4. Index line or indicator line is located on the housing below the turning dial and lines up with the direction arrow. The index line is used to set the compass for an azimuth or bearing.
5. Magnetic needle floats inside the compass housing. The arrow is magnetized so that the red end always orients itself toward the magnetic north pole.
6. The red orienting arrow lies under the needle inside the housing.
7. The north sign helps determine which way is magnetic north, as well as the other cardinal directions in relation to it.
8. Orienting lines help give a visual representation of north-south direction.
9. The dial helps determine how many degrees from the north you are facing.

### Activity Description

#### 1. How to use the compass

##### A. Dialing direction:

1. Hold your compass chest high with the base plate parallel to your body and the direction arrow pointing away from your body.
2. To find north, rotate the compass housing until the letter N or 0° is aligned with the direction arrow on the base plate.
3. Turn your entire body until the red magnetic arrow matches the N on the dial. Some people will say, “Put Fred (the red magnetic arrow) into the red shed.” You are now facing north.
4. To find east, rotate the compass housing until the letter E is aligned with the direction arrow.
5. Turn your entire body until the red magnetic arrow matches the N on the dial. You are now facing east.
6. Follow the same procedures for finding south and west.
7. Next, try setting your compass for degree bearings such as a 130°. Set the compass to 130° then match the red magnetic arrow to 0° or N. That bearing is now facing directly in front of you. Practice finding 40°, 220°, and 300° bearings.

##### B. Determining a compass bearing of an object:

1. Hold your compass chest high with the base plate parallel to your body.
2. Locate a distant object. Turn your entire body so that the direction arrow is pointing to the object being sighted.
3. Now turn the compass housing dial until the magnetic arrow matches the N on

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## Compass Basics (cont.)

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the dial (“put Fred into the red shed”). Read your compass bearing (stated in degrees) where the travel arrow is intersecting with the compass housing.

4. Continue locating two or three more objects.

### 2. Getting to know your compass games:

#### A. Dialing directions:

1. Hold your compass chest high with the base plate parallel to your body.
2. Place a coin at your feet.
3. Set your compass to north. Walk 10 paces to the north.
4. Set your compass to east. Walk 10 paces to the east.
5. Set your compass to south. Walk 10 paces to the south.
6. Set your compass to west. Walk 10 paces to the west.
7. Now, pick up your coin. What shape did you make? How many in the class found their coins?

#### B. Using compass bearings:

1. Hold your compass chest high with the base plate parallel to your body.
2. Place a coin at your feet.
3. Set your compass to a bearing of  $40^\circ$ . Walk 10 paces at a bearing of  $40^\circ$ .
4. Set your compass to a bearing of  $160^\circ$  ( $40^\circ + 120^\circ$ ). Walk 10 paces at a bearing of  $160^\circ$ .
5. Set your compass to a bearing of  $280^\circ$  ( $160^\circ + 120^\circ$ ). Walk 10 paces at a bearing of  $280^\circ$ .
6. Now, pick up your coin. What shape did you make? How many in the class found their coins?

### Extensions

- Create a baseline map using compasses and measuring tapes. See Earth Partnership for Schools activity, “Mapping Your Schoolyard”.
- Design an orienteering map using compass bearings and pacing.

### Additional Resources

- Jacobsen, C. and C. Moen. (1999). *Basic essentials of map and compass*. Globe Pequot Press.

#### Website

- Understanding and Using a Compass by the Search and Rescue Society of the British Columbia (SARBC). <http://www.islandnet.com/sarbc/compass.html>

### Assessments

- Identify the parts of a compass and explain how to find north using a compass.
- Create a course for your peers to follow using at least four different compass bearings.