



# Advanced Orienteering Pre-visit

## Classroom Activities

### Brief Synopsis

*Basic compass work and map reading skills are fundamental to navigation. In the following activities students will learn the basic parts of a compass and gain an understanding of how to read topographic maps. This knowledge will prove essential as students navigate Eagle Bluff's competitive orienteering course, reading a topographic map and following compass directions.*

Designed for 5th–8th grade

**Time Considerations:** Approx. 20-30 minutes for each activity

#### Materials:

- Activity 1: Blindfolds, outdoor space
- Activity 2: Worksheet: "Compass Parts & Purpose"
- Activity 3: Internet access to copy worksheets

**Vocabulary:** Topographic map, Contour lines, Navigation, Index line, Base plate, Compass dial, Magnetic needle, Orienteering lines, Orienteering arrow, Direction of travel arrow.

#### Outcomes:

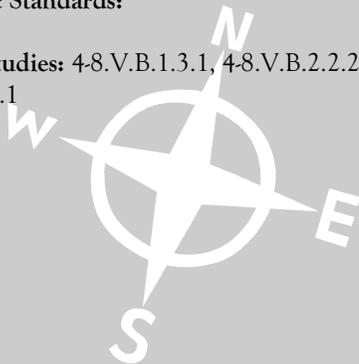
1. Students will identify the working parts of a compass and how each part aids in navigation.
2. Students will gain a basic understanding of how to read a topographic map by reading the contour lines.

#### Minnesota Academic Standards:

Science: 5.1.3.4.2

History and Social Studies: 4-8.V.B.1.3.1, 4-8.V.B.2.2.2

Language Arts: 5.1.B.1



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### Activity 1: Blindfolded Walk

**Background:** Although we may feel we have good directional instincts, it is often nearly impossible to walk in a straight line when traveling from one location to another without some type of a visual reference point. The compass in itself cannot tell you where you are or what you're looking at, but it can tell you about direction—which is a lot more than your instincts can do. A compass simply enables you to walk in a straight line using earth's magnetic field.

**Supplies:** Blindfolds

#### Procedures:

1. Divide the students into pairs, distributing a blindfold to each pair.
2. Select an open area outside and arrange the students in a line.
3. The first partner to attempt the blindfold walk will visually look for an object across the open field (at least 50 feet away) in which he/she will walk to. The student should line up with feet pointed toward the object they have chosen.
4. Blindfold the students. On your call, students will attempt to walk to their object. Non-blindfolded partners should walk behind their partner. The sighted partner is not allowed to physically touch their partner nor give them directional hints. Their responsibility is safety only.
5. Once the partner is close to their destination (or not), remove the blindfolds and note the results. Switch partners and repeat.

#### Extensions:

- Three legged walk: Secure the legs of two blindfolded students and challenge the dual to work together to walk a straight line.
- Attempt short distances and long distances. Note the difference in success.

#### Discussion Questions:

- Why was it so difficult to walk in a straight line? What would be the result if you had to walk blindfolded for a 1/2 mile, 2 miles,...?
- What are some situations in which people may have a hard time traveling straight? (snowstorm, fog, dense vegetation, darkness, sea and sky, etc.).
- Describe how a compass works? How would a compass aid in navigation?

### Activity 1: Compass Basics

**Background:** In this activity students will identify the parts of the compass and gain a basic understanding of how a compass works. This background



information will be pertinent as students combine compass work with map reading skills during Eagle Bluff's Competitive Orienteering class.

**Supplies:** "Compass: Parts & Purpose" worksheet for each student, hand compass (optional)

**Procedures:**

1. Distribute a "Compass: Parts & Purpose" worksheet to each student.
2. Read through the glossary words and the description that follows. Clear up any misunderstandings.
3. Complete the worksheet by filling in the blanks. Exchange papers and correct.

**Extensions:**

- Create your own compass using a bowl of water and a needle. Follow the directions on the website listed in the lower right hand column.
- Show examples of a working compass to identify its parts.
- Research one navigational tool that has been used by earlier mariners.

### Activity 2: Reading a topographic map

**Background:** Without ever having been to a particular location, you can know a lot about the area by just reading a map. A topographic map is a two-dimensional representation of the earth's surface. By the use of contour lines, the map gives a detailed picture of the shape of the land—hills, depressions, flat places, cliffs and other features. Contour line follow three basic rules. 1. Each line represents a specific elevation above sea level. 2. Lines never cross, split or divide. 3. The closer the lines, the steeper the slope, conversely the more spaced out the lines the gentler the slopes.

**Supplies:** Sample of a topographic map, Internet access

**Procedures:**

1. Visit the USGS website, <http://edc2.usgs.gov/pubslists/teachers-packets/mapshow/activity4.php>
2. Copy off the necessary worksheets.
3. Answers can be found in the teacher packet available online.

**Extensions:**

- Search the library, internet and home for different styles of maps to determine what information they can tell us.
- Create your own topographic map using clay: <http://spaceplace.nasa.gov/topomap-clay/redirected/>

**Discussion Questions:**

- What types of maps exists? What information does each type of map tell us?
- Why might it be important to understand contour lines on a map before embarking on an outdoor expedition?
- What three rules do contour lines follow?

### Teacher Tips

- If blindfolds are not available for the blindfold walk, you can place a large paper grocery bag over the head. Students will be able to see the ground, but will not be able to see what is in front of them.
- The blindfold walk can also be done in groups of three with one partner being the stationary object.
- The use of an overhead projector works great to illustrate the working parts of the compass.
- Use a compass (or create your own) to determine the cardinal directions in the classroom. Post and reference the directions during a class period. I.e. find a partner to the W, drop off papers on the SE table, line up at the NW door, etc...

### Additional Resources:

<http://education.usgs.gov/>

Provides the teacher resources for the USGS Activity #4 - How to read a topographic map. Website also includes additional map reading activities.

<http://edc2.usgs.gov/pubslists/teachers-packets/mapshow/index.php>

Teacher package and answer key for USGS Activity #4 - How to read a topographic map.

[http://www.ponceinlet.org/PDF/Make\\_Your\\_Own\\_Compass.pdf](http://www.ponceinlet.org/PDF/Make_Your_Own_Compass.pdf)

Lesson plan describing how to make your own compass to demonstrate magnetic north.

[http://education.nationalgeographic.com/education/activity/exploring-maps-and-models/?ar\\_a=1&ar\\_r=999](http://education.nationalgeographic.com/education/activity/exploring-maps-and-models/?ar_a=1&ar_r=999)

National Geographic website including teacher material for student map reading activities

<http://www.youtube.com/watch?v=SymUFSwEm3c>

You Tube video describing what a topographic map is and how to read contour lines.

# Compass: Parts & Purpose



NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

## Compass Glossary:

**Base Plate:** A hard, flat surface on which the compass is mounted. The base plate must lie flat in order to get an accurate reading.

**Compass Dial:** A circular dial which rotates on the base plate. The small hash marks on the dial represent degrees or direction. Each hash mark is in intervals of 2 degrees with a total of 360 degrees in all.

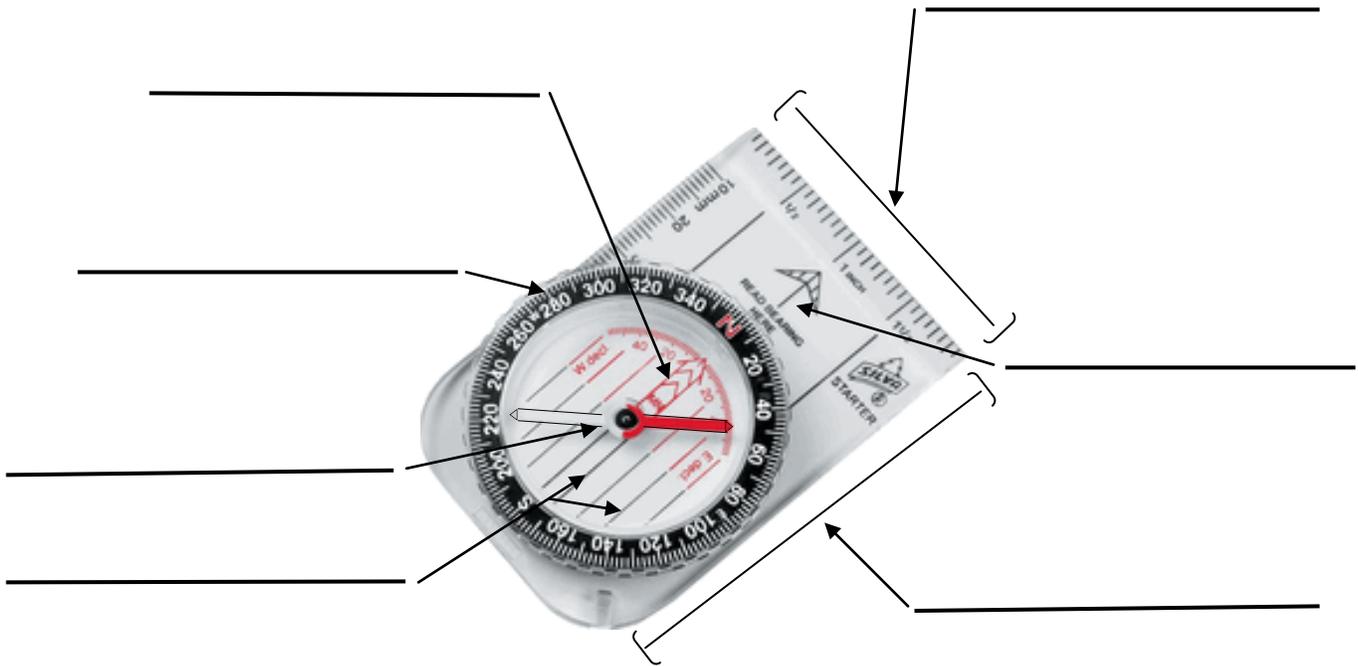
**Direction of Travel Arrow:** A stationary arrow marked on the base plate and points in the direction you should be traveling.

**Magnetic Needle:** A magnetized piece of metal which sits in a nearly frictionless substance so it can rotate freely inside the compass dial. This needle will align with the earth's magnetic force with one end pointing towards magnetic north and the other, south.

**Orienteering Arrow:** This arrow is drawn on the floor of the compass dial and rotates when the dial is turned.

**Orienteering Lines:** A series of parallel lines marked on the floor of the compass dial. The lines are used to orient a compass to a map.

**Scale:** Rulers printed on the edge of a compass to help measure distances on a map.



1. How many degrees does each hash mark represent on the dial? \_\_\_\_\_.
2. The total number of degrees in the dial is \_\_\_\_\_.
3. The red end of the magnetic needle always points to \_\_\_\_\_.
4. Which arrow points in the direction in which you should be traveling? \_\_\_\_\_.
5. What degree is directly WEST? \_\_\_\_\_.

# Compass: Parts & Purpose

## Answer Key



### Compass Glossary:

**Base Plate:** A hard, flat surface on which the compass is mounted. The base plate must lie flat in order to get an accurate reading.

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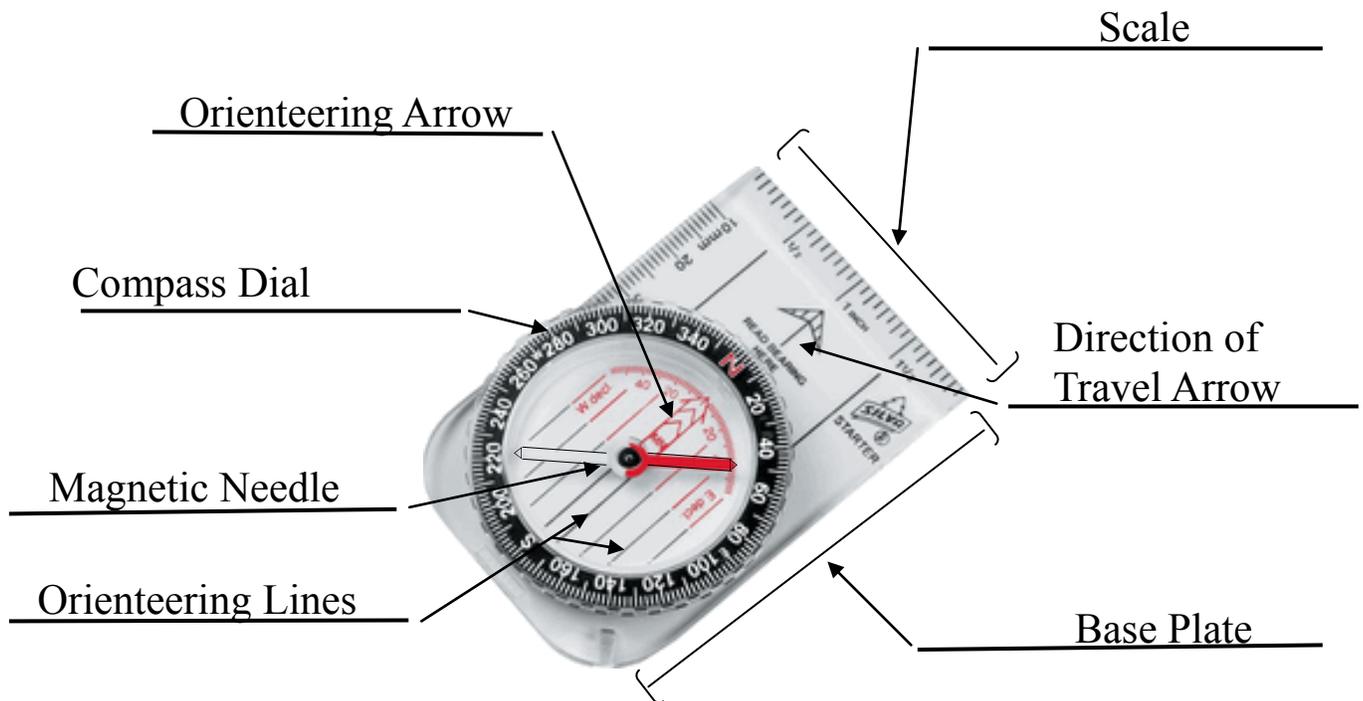
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**Scale:** Rulers printed on the edge of a compass to help measure distances on a map.



1. How many degrees does each hash mark represent on the dial? 2 Degrees.
2. The total number of degrees in the dial is 360 Degrees.
3. The red end of the magnetic needle always points to Magnetic North.
4. Which arrow points in the direction in which you should be traveling? Direction of Travel Arrow.
5. What degree is directly WEST? 270 Degrees.