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# *Orienteering – The Fundamentals*

**Core Curriculum Content Standards: 2.2. A & E; 2.5.A; 2.6.A; 3.3 A & B; 3.4 A & B, 4.1.A, 4.2.A & D, 4.5.A & C, (5.8.D and 6.6.A if topographical maps are used), 9.1.B, 9.2.A & C.**

**ORIENTEERING RATIONALE:**

The School of Conservation teaches basic orienteering skills to students because we believe this is an essential outdoor skill. According to Bjorn Kjellstrom, author and founder of Silva Compass Co., once these skills are acquired, students will be more "self-reliant and confident." At SOC we also believe this confidence leads to an increased comfort level while in natural areas. If students are more comfortable in natural areas, then they are more likely to visit them, and while there, they will more thoroughly enjoy these places. Increasing any one's enjoyment and interaction with the natural world will in turn hopefully foster an improved environmental ethic.

**BACKGROUND INFORMATION:**

We use and depend on map and compass skills nearly every day. When we travel (whether by automobile, bike, foot, etc.) from one place to another we choose which route we would like to use based on our priorities of aesthetics, time constraints, traffic conditions and many other factors. When providing directions to others, our brain automatically begins making mental maps which we rely on to describe the proposed route. Landmarks are often given to provide visual feedback for those following our directions. We also frequently rely on the four cardinal directions of North, South, East and West when giving directions.

Compasses work because there is a natural magnetic field surrounding the Earth that is caused by the liquid metal near the center of our planet. One end is near the North Pole and the other end is near the South Pole. The Chinese are credited with this discovery nearly 4500 years ago. Historians believe this magnetic field was first detected when someone placed a sliver of lodestone (type of magnetized rock) on a raft made of bark or wood and then set it in a pond. Under these circumstances the raft was able to turn until the lodestone was aligned with the magnetic field. Once aligned, the raft would cease to spin. The discoverer then tested the theory by traveling to different areas, at various times of day to determine if this phenomenon was constant. Since the magnetic field is a constant phenomenon, then angles from this constant, measured in degrees, can be determined. In short, the compass is a fancy protractor with a sensitized needle that provides all users with a common starting position or

reference point. It wasn't until approximately 1100 AD that a written description of a magnetic compass the first documented in China. The literature from Europe documents the use of a compass at about 1200 AD.

The pioneer scout, trapper, and wilderness explorer relied heavily on the skill of path finding. A highly developed sense of observation and memory were required to place the natural signs of mountains and rivers, stars and vegetation into a familiar pattern that provided the landmarks needed to travel when both maps and compasses were very primitive.

Orienteering has evolved into a very popular sport around the world, but particularly in the Scandinavian countries (Denmark, Norway, Finland, and Sweden). Using the combination of a compass and a map the athletes are sent off in timed intervals, then choose which route between controls or stations would be quickest. A straight line between two objects, although the shortest distance, may not be the most time efficient. Factors affecting the route chosen include distance, vegetation, waterways, cliffs or many other types of obstructions. Because people who orienteer are continually evaluating their position and making decisions while on the run, the sport of Orienteering is sometimes called the ' thinking man's or women's ' sport.

## PREPARATORY REMARKS / ACTIVITIES

Before the session, the instructor should check to make certain all equipment items are available and in working condition. All compasses should have strings long enough to be worn around the neck. Compasses should not have large (bigger than 1/4") air bubbles in the housing.

1. Review different uses of compasses: piloting ships and planes, military, sports including hiking, bird watching, fishing, etc.

2. Using the large demonstration compass to review the parts of the compass **(see graphic) :**
   a) **Base Plate** - rectangular bottom.
   b) **Housing** - circular raised portion of the compass.
   c) **Magnetic Needle** - one half red, one half white inside of housing; **red end always points north** when the compass is held still and level. However, iron, steel or electrical devices (cameras) can affect the needle.
   d) **Direction of Travel Arrow** - etched on base where it says "read bearing here". Should always be pointing in the **same** direction as your '**nose and your toes'**.
   e) **Orienting Arrow** - has "sergeant " stripes and is the arrow you align with the magnetic needle after setting a bearing. (Put **RED to BED**)

3. Have all students practice setting a bearing and then walking a triangle or square using their compasses. First have students mark their "home base" (starting point) with something from their pocket: a stick, rock, etc. To walk squares start with any bearing at all, find a landmark, walk "X" number of steps toward that landmark, stop. Add 90° and repeat, using equal distances for each side. After 4 sides students should have returned to their "home base". For triangles use 120° and three sides. To keep sides equal in length, have students walk heel to toe.

**The following advanced skills should be cautiously presented to students only after they have practiced the skills listed above.**

4. A **back bearing** is a method of reviewing your choice of a landmark. From a control locate and advance to your first landmark. Now turn and aim the Direction of Travel Arrow at the original control. The landmark you are now near will be accurate if the white end of the magnetic arrow falls directly above the orienting arrow.

5. **Pacing** is a simple method of keeping track of or estimating distance traveled. To determine your pace walk several times along a 100 ft. tape. A pace is simply two steps. If you begin walking with the right foot leading, begin counting every time your left foot hits the ground. After averaging the number of paces it is a simple mater of dividing 100 ft. by the number of paces needed to cover that distance. The resulting number is the length of your pace. Now if you measure on your map that your destination is 1/4 mile away, with a pace equaling five feet, you now know that in approximately 264 paces you should be very near your goal. Factors that influence the length of your pace over uneven terrain are hills, thick brush, and other impediments to forward progress.

6. **SETTING A COMPASS FROM A MAP**

To determine an unknown bearing use the following instructions:

A. Refer to the laminated map supplied by SOC. Unlike many maps, the diagonal lines on this map align with **magnetic north** (not true north); this makes setting a compass bearing from this map very easy.

B. On the map, identify or draw a line that connects your starting point with your destination point. Place your compass edge along this line of travel on the map, making sure that the **Direction-of-Travel Arrow** on the compass is pointing **from your starting point toward your destination point.**

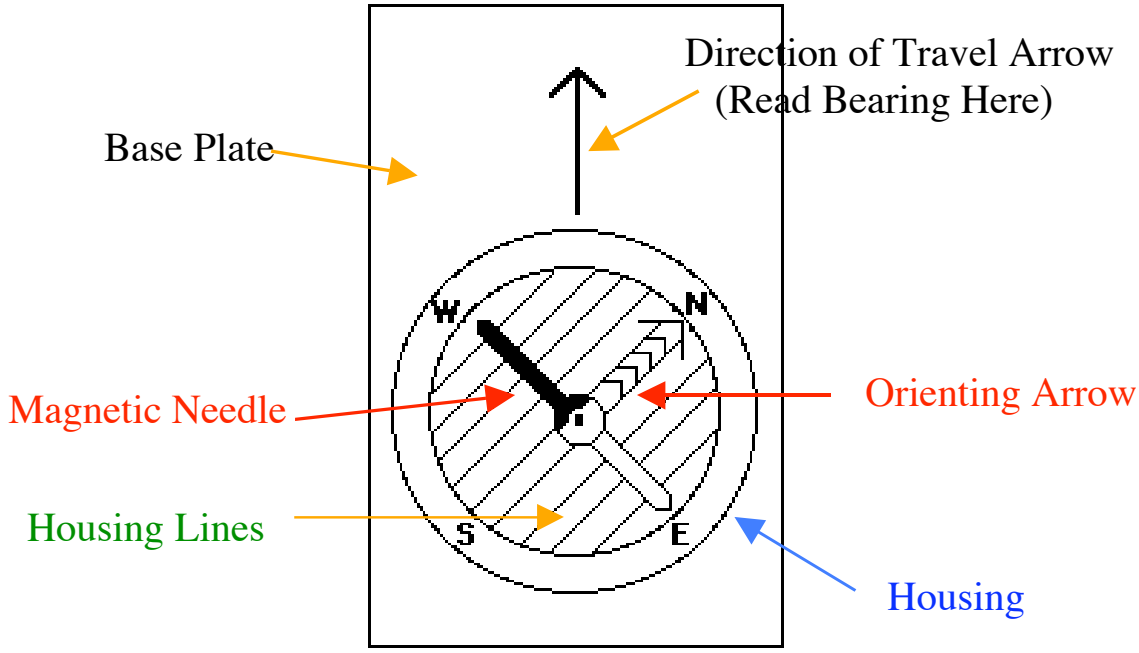
C. While holding the compass so that its position does not shift, turn the circular **housing** until the **orienting arrow** and **housing lines** are **parallel** to the magnetic north lines on the map. The number at the **"read-bearing-here"** mark on the compass is the bearing to follow.

When doing this step it is important to remember that the **Orienting Arrow** on the compass should be pointing toward the magnetic north on the map.

D. The compass bearing is now read at the **Direction of Travel Arrow**. Teaching this technique to the students may be too difficult, however they should realize that bearings are determined from using the compass in conjunction with the map, and are not always provided as they are in the SOC orienteering lessons. It can also be helpful to estimate the bearing by looking at the line you want to travel on the map and then make use of the cardinal directions and their number equivalents.
For example, if you wish to go to a place that is 60 degrees away from a starting point you would first draw a pencil line on the map from start to finish. Then using the **magnetic north lines** on the map as a guide, write the number equivalent of North (0 or 360 degrees) on the map, and then repeat with the number equivalent of East (90 degrees). Your compass bearing should fall in between these two extremes, with your destination (60 degrees) line being closer to East (90 degrees) than North (0 degrees).

**Special Note for Orienteering Instructors meeting at the Infirmary or Big Timbers**

**If and only if you are conducting your class from the Big Timbers/ Infirmary Area, you will proceed to Cabin #2 after the initial lesson and reviews. At Cabin #2 set the compass to 214 degrees. Following this bearing for ~ 900 feet should lead you across the stream (use stones as a bridge) and eventually to the trail intersection of Tinsley Trail (yellow blazes) and the Spring Brook Cabin Trail. Once you arrive there with the group turn left onto the Spring Brook Cabin Trail and follow it to the cabin. The cabin's picnic table provides a good location to review the process for determining a bearing from a map as described in #6 above. Follow this process to determine the correct bearing for a hike back to camp from the cabin to the Trading Post circle. The bearing should be 338 degrees for a distance of ~.50 miles. Leaving from the outhouse keeps the hikers away from most of the wettest areas. Please take care moving through the rocky terrain.**

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1. Drury, Jack and Bonney, Bruce, (1992). *The Backcountry Classroom*: *Lesson Plans for Teaching in the Wilderness*. ICS Books, Merrillville, IN.

2. Kjellstrom, Bjorn. (1976). *Be Expert with Map and Compass*: *The Orienteering Handbook*. Scribner's Sons, NY.

3. Ludwig, Gail. (1983). *Map and Compass*: *Instructor's Manual*. Missouri Dept. of Conservation, Jefferson City, MO.

4. Jacobson, Cliff, (1999). Basic Essentials: Map and Compass. The Globe Pequot Press, Guilford, CT.

5. For information about Orienteering events in North Jersey /Southern Tier of New York region visit the Hudson Valley Orienteering Club at: www.geocities.com/Yosemite/8761/

6. For information about Orienteering events in southern New Jersey and Pennsylvania contact the Delaware Valley Orienteering Club at: www.dvoa.us.orienteering.org/