

Details

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How come my compass doesn't work?

Overview

As a teacher on the NB Palmer Totten Cruise in the winter of 2014, I successfully traversed the Magnetic South Pole. This is a wandering point on the Earth's surface where geomagnetic field lines are directed vertically upwards. As an Outdoor Educator I utilize compasses regularly to navigate. The traverse of the Magnetic South Pole inspired this lesson.

Objectives

Upon completion of this activity, students will understand how a simple compass works and what factors impact their accuracy.

Lesson Preparation

Using various online resources, maps and videos (see resources). Explain that a simple compass utilizes geomagnetic lines to point either to the magnetic North or South Poles. In order to accurately navigate with that compass you would need to factor in the difference between a magnetic and geographic pole. This difference is called declination. Other factors that can divert the magnetic needle of the compass include ferrous metals, motors and other compasses. If these other factors are not close to the compass it will work properly.

Procedure

1. Prior to distributing compasses, explain and diagram the geomagnetic lines of the Earth and the photo of the position of Geographic and magnetic South Pole.
2. Explain how to hold and operate the compass using the worksheet.

Materials

- Map
- Compasses
- Various objects with a magnetic field. (Metal, motors etc.).
- A Diagram of the Geographic and Magnetic South Pole.
- How to use a map compass worksheet (attached).
- Photo of a GPS unit and a gyroscope.

3. Have students practice several times how to orient the compass and themselves to a given direction. This could be any degree that is stamped on the compass.
4. Have students walk around and find various objects that cause the magnetic needle to deviate.

Extension

Breakdown the earth into 360 degrees. Explain that each degree is then divided into 60 seconds. You can then tell them that 1 second of distance on the earth's surface is equal to a nautical mile. This explains the difference between a regular mile and a nautical mile.

Resources

There are various excellent videos that show simple steps explaining how to orient and use a compass. How to use a compass worksheet (attached). In addition I suggest accessing the PolarTREC website and review some of my journal entries.

Assessment

Once the lessons are completed, students should be able to demonstrate how to use a compass and what factors such as the Magnetic poles influencing its accuracy. In addition they should be able to list 2 other devices used to accurately.

Author / Credits

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File Attachments

Photo of the South Poles, Compass worksheet

Standards

Standard D

Questions

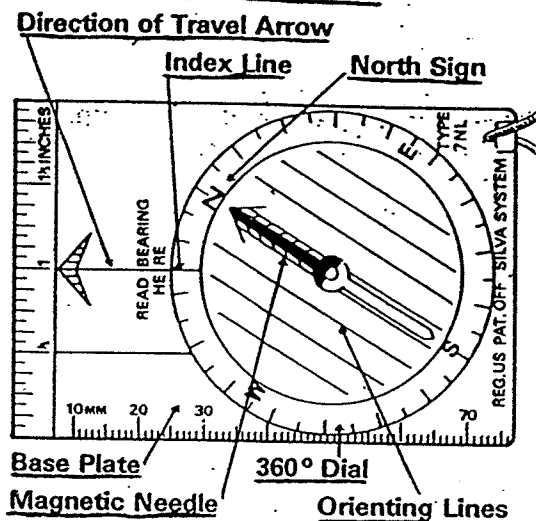
1. What's the difference between magnetic and geographic poles of the earth?
2. What are geomagnetic lines?
3. What are 3 things that cause the magnetic needle to point in the wrong direction?
4. How does a compass work?
5. What are other devices used to navigate and how do they work?

Adventures with Map and Compass

How to Begin

Can you find your way in the woods? To explore the world of nature you must get close to it. Whether you choose to hike in the woods or search out new areas for fish and game, you must be able to use a compass. And in order to learn how to use a compass properly, you must become familiar with its basic features.

The Parts of the Compass



Once you have completed Steps 1 and 2 above proceed as follows:

3. a.) Place the compass flat in your hand (see sketch). The direction-of-travel arrow should point in the same direction you are facing.
- b.) Turn your whole body until the red end (north end) of the magnetic needle points to the "North Sign" on the compass dial.
- c.) Look up to see where your direction-of-travel arrow is taking you, then pin point an object far away as the terrain will allow, i.e. a particular tree, a large stone, etc. (see sketch).
- d.) Walk (run) towards your chosen object; then repeat the same procedure.

The Map...is the very basis for Orienteering. Therefore it is of the utmost importance that you learn to understand it from the very beginning.

The Compass...is your help in staying on course, orienting the map north-south, and in measuring distances.

Finding Your Way

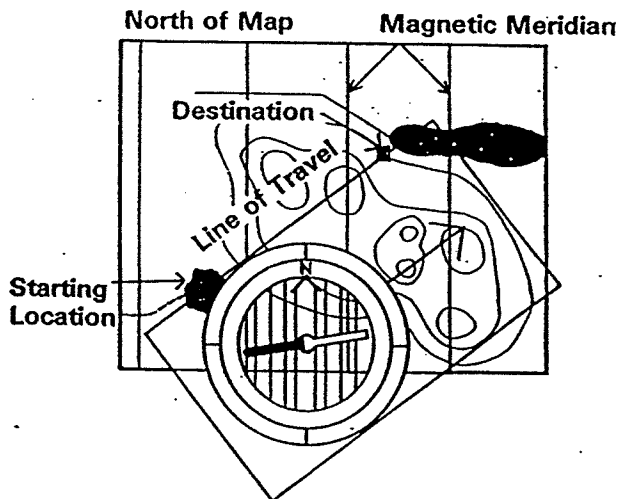
A compass should be considered a trusted friend. It is a necessary tool to use to check your direction of travel and to help you orient your map to north-south.

A map and compass are used together as a team to get you through unfamiliar terrain. This activity is commonly known as "Orienteering". Orienteering skills provide the means to navigate your way with map and compass along an unknown stretch of ground to your preselected destination.

Following is a basic outline of the steps involved in learning to use the compass. Treated as an exercise, it is a good introduction to map and compass techniques. Since learning map and compass skills is a basic requirement for Orienteering, as you become skillful your enthusiasm for Orienteering will grow.

To travel from the starting location at the building to the destination at the lake:

1. Connect the building and the lake with the base plate of your compass as shown in the sketch. The direction-of-travel arrow must point to your goal, i.e. the lake!
2. Turn the compass dial, so that the orienting lines run parallel to the magnetic meridians on the map. The "North Sign" on the compass dial must be to the north of the map.



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