

Electricity and Magnetism: Orienteering

Teacher's Guide

- Subject:** Integrated Science (Life; Earth-Space; Physical) focus on physical
- Topic:** Using Earth's magnetic field to locate items at ISSP
- Summary:** This lab requires that student's use their knowledge of magnetism to conduct a treasure hunt in the park. They will have to use a compass to locate several stations where they will be asked to answer questions that require them to use magnetism.
- Objective(s):** After completing the field lab, students will be able to:
1. Understand the relationship between Earth's magnetic field and finding directions
 2. The student will become familiar with use of a compass
 3. The student will be able to answer several questions related to magnetism.
- Ecosystem(s):** Hammocks; Pinelands; Freshwater Wetlands
- Equipment:**
- Compass
 - map of the park
 - magnetite and 3 other rocks
 - ISSP flag to mark spots
 - GPS
 - magnet, bowl, aluminum foil, needle to create a compass
 - small prize if you want

Background:

- 1 **Vocabulary:** magnet, magnetism, magnetic pole, magnetic domain, compass, orienteering, force, bearing, cardinal directions, pacing
- 2 **Reference Material:** Chapter 12, McDougal Littell Science—7th grade
- 3 **Equipment Training:** compass use

Procedure (Engage; Explore; Explain)

1. Congratulations, you have been chosen for the game show "Survivor—ISSP". You now have your first immunity challenge—your tribe must be the first to locate the ISSP flag using only a compass and map. Good luck!! Remember, the winning tribe gets immunity, the losing tribe must vote a member off (just kidding!)
2. While the group is all together:
 - a. Have students orient their compass.
 - b. Go over the procedure and break into teams. Can be by class or smaller groups.
 - c. Assign jobs within the team. One person is in charge of holding the compass while other students are assigned the pacing.
 - d. Hand each group a map or card with directions they must go to reach the first station.
3. At the first station, they students will have to perform an activity or answer a question correctly before they can be given their next set of directions.
4. The students will continue to repeat step 3 at a predetermined number of stations. At the last station, they will be given a small "prize" if the teacher decides that this is appropriate.
5. Students should answer the discussion questions at the bottom of their Data Sheet.

Sunshine State Standards:

Science: SC.A.2.3.1 GLE 7.1; SC.C.2.3.1 GLE 7.1, 7.2; SC.H.1.3.5; SC.H.2.3.1; SC.H.3.3.6

Language Arts: LA.A.1.3.2; LA.A.2.3.5; LA.A.2.3.8; LA.C.1.3.1

Mathematics: MA.B.1.3.4; MA.B.3.3.1; MA.B.4.3.2; MA.E.1.3.1 **Social Studies:** SS.B.1.3.1; SS.B.1.3.2; SS.B.1.3.5

Electricity and Magnetism: Orienteering Student Data Sheet

General Information

| | | | |
|-------------------|--|------------|--|
| Full Name: | | Date: | |
| School (teacher): | | Time: | |
| Latitude: | | Longitude: | |

Field Observations/Measurements/Data

| Station number: | Location: (North, South, South-East, etc) | Bearing: (in degrees) | Answer to question or problem at station: |
|-----------------|--|--------------------------|--|
| | | | |
| | | | |
| | | | |
| | | | |
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| | | | |
| | | | |

Lab Performance

Facilitator Signature: _____

| | EXCELLENT | GOOD | FAIR | POOR |
|--|-----------|-----------|-----------|-----------|
| Follows lab procedures carefully and fully. | 10 - 9 | 8 - 7 - 6 | 5 - 4 - 3 | 2 - 1 - 0 |
| Uses laboratory time productively and stays on task. | 10 - 9 | 8 - 7 - 6 | 5 - 4 - 3 | 2 - 1 - 0 |
| Works well with partners. | 10 - 9 | 8 - 7 - 6 | 5 - 4 - 3 | 2 - 1 - 0 |

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Assessment

1. How many degrees are on a compass? List the degrees for direct North, South, East and West.

| | |
|-----------------|---------|
| Total degrees = | |
| North = | South = |
| East = | West = |

2. Which two stations were the greatest distance apart? How did you determine this?

3. How could using a compass help you if you became lost in the Park?

4. Imagine that you have been asked to create a map of Fort White High School and the land around it. Why would you need to use a compass to complete this activity?

5. We use Earth’s magnetic force constantly in our everyday lives. Think of some forms of technology or some uses of Earth’s magnetism and describe how they either directly or indirectly influence your life.

Portfolio Journal Prompt

Scientists theorize that Earth’s magnetic field changes direction occasionally. They discovered this by using a magnetometer to study the rocks on the ocean floor along the mid-ocean ridges. Imagine that you are hiking when this reversal happens. Do you think that you would notice this and why? Would you be able to use your compass to get to the location you were trying to find?