Mapping the Earth - The Physical Setting: Earth Science
Lab Activity: Latitude & Longitude Adventure Ships

Introduction:
The system that is used to locate and describe your position on Earth’s surface is latitude and longitude. Originally used by cartographers for creating maps and captains for navigation on the open ocean, latitude and longitude has become a part of nearly everyone’s daily life. Whether using turn-by-turn directions with your GPS device or locating a friend’s location, latitude and longitude are the basis for many different applications in every day life.

Objectives:
• Apply latitude & longitude skills to play adventure ships

Adventure Ship Key:

<table>
<thead>
<tr>
<th>Ship Name</th>
<th>Number of Hits to Find</th>
<th>Ship Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Vocabulary:

Latitude –

Longitude –

Prime Meridian –

Equator –

Part A: Adventure Ship Game
Important Facts:
• Your latitude runs parallel to the equator
• Your longitude runs parallel to the prime meridian

Procedure for Part A:
1. Set up your adventure ship board using one folder. The Defensive Map (where your ships are hiding) goes on the top of the folder. The Offensive Map (where you try to locate your partner’s ships) goes on the bottom of the folder (on the desk). *The positions will be on the grid lines, so no need to use minutes.
2. Place your folder back-to-back with your partner (make sure they can’t see your ships). Use a clip to secure the two folders together. Make sure your Offensive Map is being held up.
3. When it is your turn, try to locate a position on your partner’s ship by stating a possible coordinate. First say the latitude then the longitude (don’t forget to state the direction).
   a. If it is a “hit” (meaning you located the ship) the mark an O on that coordinate.
   b. If it is a “miss” (meaning you did not locate the ship), then mark an X on that coordinate.
4. When it is your partner’s turn, listen to the coordinates they give you (remember, they are trying to find your ships).
   a. If they hit one of your ships say, “hit” and color in that circle on your ship.
   b. If they missed one of your ships then say, “miss”.
5. Take turns locating ships with your partner. One guess per turn.
6. The first person to find all of the ships wins!
**Part B: Conclusion Questions:**

- Use your knowledge of latitude & longitude, your **Defensive Map**, and your **ESRT (page 4)**, to answer the following questions.

1. At which ship would you see the highest altitude of Polaris? Explain your answer.

2. At which ship(s) would you **NOT** be able to see Polaris? Explain your answer.

3. Which ship would have a 60° altitude of Polaris?

4. You are sailing on **Ship B** and look up at the night sky to view Polaris. What is the altitude of Polaris going to be at this location? Explain your answer.

5. Which ships are found to the **East** of the **Prime Meridian**?

6. Which ships are found to the **West** of the **Prime Meridian**?

7. You are sailing on **Ship C**. According to page 4 of your **ESRT**, where are you located?

8. You are sailing on **Ship D**. According to page 4 of your **ESRT**, where are you located?

9. You are sailing on **Ship E**. According to page 4 of your **ESRT**, where are you located?

10. You have built new ships to study the Earth. Plot the following new ships on your **Defensive Map**. The coordinates are given below:
   - **Ship F** is sailing to study sea ice in the **Arctic Ocean**. The coordinates are **75° N, 165° W**. Place an **X** on your **Defensive Map** at this position and label it **Ship F**.
   - **Ship G** is sailing to study ice sheets in **Antarctica**. The coordinates are **60° S, 135° W**. Place an **X** on your **Defensive Map** at this position and label it **Ship G**.

**Conclusion:** Describe how latitude and longitude coordinates are used to locate positions on Earth. *You may either write OR draw this explanation.*
Map A: Defensive Map (where you hide your ships)
Offensive Map (where you try to locate your partner's ships)