WPMS Science Name:

Learning about Latitude and Longitude

Introduction

Globes and **maps** are **models** of our planet Earth. In this activity, you'll learn more about why and how we use these **systems of reference coordinates**. This means that they act together (which is what parts of any system do) to locate positions by using identifying **degrees** and **directions**. You're probably already a little bit familiar with latitude and longitude, but here you can learn a lot more.

Demonstration

Take a ball and decide how you would explain where something is located on it. Explain what you did. How efficient was your system?

Activity 1 – Making a Model of the Earth's Reference Lines and Hemispheres

Obtain a **drawing compass** and **metric ruler**. In the space below, draw a circle with a diameter of 6 cm. Then follow all the directions on the next page.

1a> Draw a horizontal line through the center of the circle. Label this **Equator.**

1b> Label the **Northern** and **Southern Hemispheres**.

1c> Draw a line perpendicular to the equator through the top and bottom, and label this **Prime Meridian**.

1d> Label the **Western** and **Eastern Hemispheres.**

Activity 2—Marking Off Latitude and Longitude

Obtain a **protractor** (preferably six-inches wide, but you can use other sizes.)

On a separate piece of paper, use the protractor to make a circle.

Caution: Do not include the bottom section below the degrees or you will have an oval, which will be useless for this activity.

2a> Draw the **equator** and **prime meridian**.

2b> Use the protractor to mark off each **10 degrees of latitude** starting at the equator. That is, mark off 10^o N, 20^o N, 30^o N, etc. up to 90^o N (North Pole), and label these on both sides of the northern hemisphere.

2c> Do the same in the southern hemisphere. That is, mark off 10^o S, 20^o S, 30^o S, etc. up to 90^o S (South Pole), and label these on both sides of the northern hemisphere.

2d> Divide the equator into six equal sections in both the western and eastern hemispheres. (This means you will have twelve marks.)

2e> Since you are starting at the prime meridian, the two sides of the circle would represent 90^o W and 90^o E. So each mark would represent 90/6 = **15^o of longitude**. That is, starting at the prime meridian, the first marks would be 15^o E and 15^o W, the second marks 30^o E and 30^o W, etc. Labels these.

2f> Now follow the directions given in class to draw lines from the North Pole to the South Pole through these longitude marks.

Extra Credit:

2g> ***On another piece of paper,*** make a similar circle, but label the vertical line through the poles **180^o**.

2h> Mark off each 15^o of longitude on the equator as before, but label them counting down from 180^o. That is, they should be labeled 165^o E and W, 150^o E and W, 135^o E and W, 120^o E and W, 105^o E and W.

Be careful about which way these directions on the other side of the Earth run.

Activity 3—Latitude and Longitude Lines on a Globe

3a> Obtain one of the plastic globes from your teacher. Examine it and your drawings from Activities 1 and 2 so you can identify the marked lines.

3b> You probably noticed two dashed lines between the equator and the 30 ^{o} N and 30 ^{o} S lines. These are called the **Tropic of Cancer (23-1/2 ^{o} N)** and **Tropic of Capricorn (23-1/2 ^{o} S)**. They are important in understanding where the Sun appears to be directly overhead at different seasons.

3c> In the space below, make a drawing showing this globe, centered around the Prime Meridian and equator.

Activity 4—More about Reference Lines on a Globe

4a> Now obtain one of the globes that includes oceans, continents, countries, etc. Examine it and your drawings from Activities 1 – 3.

4b-1> Name the continents which are entirely in the Northern Hemisphere:

4b-2> Name the continents which are entirely in the Southern Hemisphere:

4b-3> Which continents are in both the Northern and Southern Hemispheres?

4b-4> Name the continents which are entirely in the Western Hemisphere:

4b-5> Name the continents which are entirely in the Eastern Hemisphere:

4b-6> Which continents are in both the Western and Eastern Hemispheres?

4c-1> Study the globe and check off when you can always identify the following features on any globe:

_____ North America	_____ South America	_____ Europe
_____ Africa	_____ Asia	_____ Australia
_____ Antarctica	_____ Arctic Ocean	_____ Atlantic
_____ Pacific Ocean	_____ Indian Ocean	_____ Caribbean
_____ Mediterranean	_____ Gulf of Mexico	_____ Japan
_____ China	_____ Afghanistan	_____ Iraq
_____ Israel	_____ Russia	_____ France
_____ United Kingdom	_____ Spain	_____ Portugal
_____ Brazil	_____ Congo	_____ India
_____ Sumatra	_____ New Zealand	_____ Pakistan

4c-2> Now obtain a blank world map and label all of the places named above.

Extra credit:

On the globe, you can see a “figure 8” shape in the Pacific Ocean. This is called an **analemma**. It represents where the Sun is directly overhead during each day of the year.

4d-1> At approximately what latitude is the Sun directly overhead today? (Identify locations by the degree of latitude and tell which hemisphere.)

4d-2> At what latitude is the Sun directly overhead on June 20? What is the name for this latitude? What is the name for this date?

4d-3> At what latitude is the Sun directly overhead on December 20? What is the name for this latitude? What is the name for this date?

4d-4> At what latitude is the Sun directly overhead on March 20 and September 22? What is the name for this latitude? What are the names for these dates?

Filename: lat and long
Directory: D:\My Documents\WPCSD
Template: C:\Documents and Settings\Administrator\Application Data\Microsoft\Templates\Normal.dot
Title: WPMS Science
Subject:
Author: Michael Passow
Keywords:
Comments:
Creation Date: 9/25/2005 8:07:00 PM
Change Number: 6
Last Saved On: 9/25/2005 9:12:00 PM
Last Saved By: Michael Passow
Total Editing Time: 66 Minutes
Last Printed On: 9/25/2005 9:12:00 PM
As of Last Complete Printing
Number of Pages: 5
Number of Words: 1,049 (approx.)
Number of Characters: 4,912 (approx.)