

LAB # _____ The Paths of the Sun

Problem

How can we determine:

- the location of sunrise and sunset on the equinoxes and solstices and
- the altitude of the noon sun on the equinoxes and solstices?

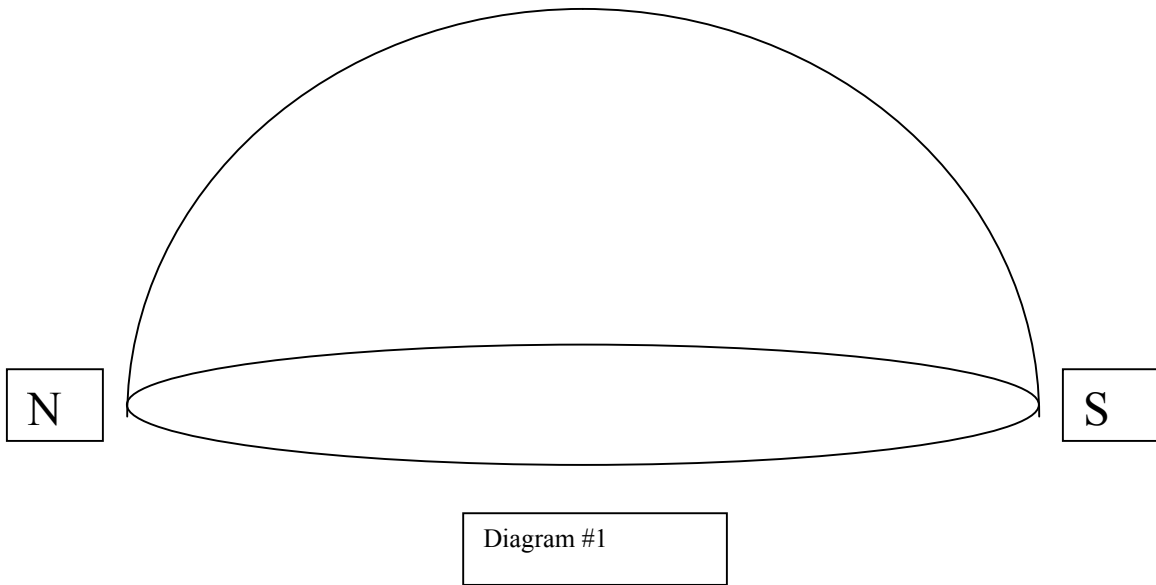
Materials

- Clear plastic dome
- External Protractor & Large round protractor
- Marking Pens

Procedure

1. Using the large, round protractor **mark North, South, East and West** on the rim of the globe.
2. **Draw** in the **observer's meridian** (a line from N → S through the zenith).
3. Put a **dot** on the meridian **48.5°** above the horizon (use the external protractor) to show the noontime position of the sun on the **equinox**.
4. Put **dots** on the rim of the dome at azimuths 90° and 270° showing the location of **sunrise and sunset** on the **equinox**.
5. **Draw a smooth blue line** on the dome to show the **path of the sun** and **label** the line **Sept 23 and March 21** (the two dates of the equinox).
6. Put a **dot** on the meridian **25°** above the horizon to show the noontime position of the sun on the **winter solstice**.
7. Put **dots** on the rim of the dome at azimuths 125° and 235° showing the location of **sunrise and sunset** on the **winter solstice**.
8. **Draw a smooth green line** on the dome to show the **path of the sun** and **label** the line **Dec 21** (the date of the solstice).
9. Put a **dot** on the meridian **72°** above the horizon to show the noontime position of the sun on the **summer solstice**.
10. Put **dots** on the rim of the dome at azimuths 55° and 305° showing the location of **sunrise and sunset** on the **summer solstice**.
11. **Draw a smooth red line** on the dome to show the **path of the sun** and **label** the line **June 21** (the date of the solstice).

12. On diagram #1 **draw and label** the path of the sun on June 21, Sept 23, Dec 21 and Mar 21. Do the equinox path in **blue**, the summer solstice path in **red** and the winter solstice path in **green**.



Summary Questions

1. In which direction does the sun **rise** on: May 15? _____ Oct 1? _____
 June 30? _____ Your birthday? Date _____ Direction _____
2. In which direction does the sun **set** on: May 15? _____ Oct 1? _____
 June 30? _____ Your birthday? Date _____ Direction _____
3. What is the highest noontime altitude that the sun attains all year in Newburgh? _____
4. The noontime sun is always found in what direction? _____
5. On the equinox, sunrise occurs at _____ AM and sunset occurs at _____ PM.
6. On the equinox path on the globe, **mark the location** of **10:00 AM**. Draw this on diagram #1.

Name _____ Class Period _____ Date _____ Lab Partner _____

7. On the equinox path on the globe, **mark the location** of **3:00 PM**. Draw this on diagram #1.

8. Why are Mar 21 and Sept 23 called the equinoxes? _____

9. Why are the first days of summer and winter called the solstices? _____
