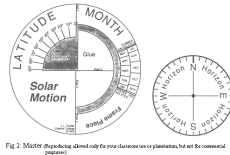


Solar Motion Demonstrator



Name	_____
Date	_____
Period	_____ Table _____

Student Activity - Solar Motion Demonstrator

The geographical directions of North, East, South, and West are marked around the horizon. Smoothly pivot the frame piece. As the head of the brass fastener rises above the plane of the Horizon Disk (green disk), it represents sunrise and the beginning of daytime. Below the plane represents sunset and the beginning of nighttime.

The perimeter of the Horizon Disk is marked in 10-degree increments (**azimuth**). The geographical direction will be N, NE, E, SE, S, SW, W, NW

1) Set the brass fastener at mid February (representing today's date)

Give geographical direction and azimuth for sunrise:

Agoura Hills, CA _____ Stonehenge _____

Which has the sun rising farther North? _____

As you swing the "Sun" around, it gets higher in the sky above the horizon. This is its "angular height" above the horizon. The Sun reaches its greatest angular height at a time halfway between the times of sunrise and sunset; this time is not noon on your clock—it depends on where you are located in your time zone, whether or not you are on daylight savings time, and on details of the Earth's motion around the Sun.

2) By using your Solar Motion model, you can get a sense of how large this maximum angular height is for various times of the year.

Give the month of the year that has the greatest angular height:

Agoura Hills, CA _____ Stonehenge _____

Give the month of the year that has the least angular height:

Agoura Hills, CA _____ Stonehenge _____

3) On any particular day, the Sun will rise just as many degrees north or south of East as it sets north or south of West.

Set the brass fastener at mid October:

Do you find this statement to be true for Agoura Hills and Stonehenge? _____

4) Pivot the piece carrying the brass "Sun" at a constant rate over its entire range and observe.

Place the "sun" at late March.

What is the geographical direction at sunrise:

Agoura Hills, CA _____ Stonehenge _____ Equator _____ North Pole _____

What do we call this day? _____ Why? _____

5) Place your latitude at Stonehenge.

Which month has the largest angular height? _____

Which month has the smallest angular height? _____

In which month does the longest day occur? _____ What do we call this day? _____

In which month does the shortest day occur? _____ What do we call this day? _____

The previous activity demonstrates the two most important factors responsible for the seasons: the period of time over which the Sun's rays strike the ground (the length of day), and the angle at which they strike the ground.

6) Place the brass fastener, "sun" at June. Give the 1) geographical direction and 2) azimuth:

Equator 1) _____ 2) _____ Tropic of Cancer 1) _____ 2) _____

Stonehenge 1) _____ 2) _____ Agoura Hills, CA 1) _____ 2) _____

Place the brass fastener, "sun" at December. Give the 1) geographical direction and 2) azimuth:

Equator 1) _____ 2) _____ Tropic of Cancer 1) _____ 2) _____

Stonehenge 1) _____ 2) _____ Agoura Hills, CA 1) _____ 2) _____

Do the same as above for the North Pole: What happens unusual in December? _____

A point in the sky directly over your head is called the **zenith**.

7) To find out when and where the Sun passes through the zenith, move the "Sun" to a position late in June and pivot it through its daily motion to see if it passes directly overhead.

Does the sun pass through zenith at these latitudes? (Yes or No)

Equator ____, Tropic of Cancer ____, Agoura Hills, CA ____, Artic Circle ____, N Pole ____

Will the sun ever (at any month) pass directly through zenith? (Yes or No)

Agoura Hills, CA ____ Stonehenge ____

Set the Horizon Disk to a latitude of 0°.

What month(s) does "sun" reach zenith? _____

Set the Horizon Disk to a latitude of 90°. Again, vary the time of year and see how the path of the "Sun" across the sky changes.

Describe the motion of the sun for an observer at the North Pole as the "sun" moves through the seasons. (How does the sun appear to the observer?)

8) Where does the sun rise and set (geographical direction and azimuth) on you birthday in Agoura Hil

Sunrise _____ Sunset _____ Number of Hours of Sunshine _____