

## Sun Time: Tracking the Earth's Rotation

Geology

Mr. Traeger

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

**Purpose**

The purpose of this activity is to learn about the rotation of the Earth and how it affects the measurement of time.

**Materials**

- World Map or Globe
- Sun Clock cutout Pattern
- scissors
- String
- glue
- tape
- Ruler
- pencil

**Part 1: Basics of Rotation**

1. What did Jean Foucault do in 1851 to prove that the Earth was rotating?
  
2. What is the Coriolis Effect and how does it affect the rotation of storms and ocean currents in the three different places noted below?

What is Coriolis Effect?	Northern Hemisphere Effects	Southern Hemisphere Effects	Effects on the Equator

3. How long does it take for the earth to rotate once? What do we call this time?
4. How many degrees are in one complete rotation?
5. In which direction does Earth rotate? From east to west or west to east?

6. What kind of geometric shape is the Earth? How would this affect the hours of daylight here in La Cañada during the winter and during the summer?

Shape?	Affect on hours of daylight in summer?	Affect on hours of daylight in winter?

7. What geometric shape do you see when you look down upon the Earth from the North Pole?

8. The circumference of a circle is  $2\pi r$ . If the radius of the Earth is 6378 Km, then what is the circumference of the Earth at:

The North Pole?	The Equator?

9. How fast is the Earth moving (in Km/hr) at: (Speed =  $2\pi r/\text{time}$ )

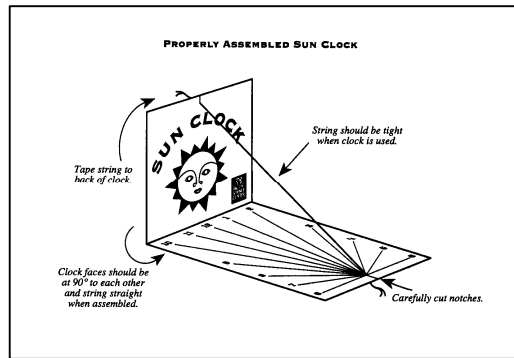
The North Pole?	The Equator?



- This question involves the crossing of the International Date Line. Remember that you add a day when flying west and subtract a day when flying east. If a plane departed at 4:00 p.m. on March 20<sup>th</sup> from Tokyo, Japan (approximately 135 degrees E), and the flight takes 9 hours and 30 minutes, what time and date would the plane arrive in Los Angeles (approximately 120 degrees west)? Show your work.

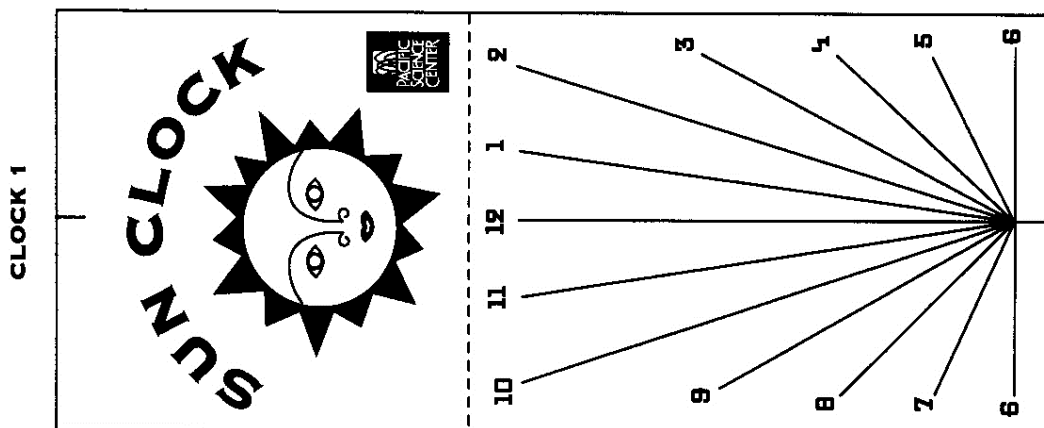
**Part 3: Making a Sundial Sun clock**

Obtain half a manila folder, scissors, glue, 20 cm of string, and the Pocket Sun Clock pattern. Construct a sun clock as seen in the illustration below.



- Take your sun clock outside and position it correctly by using a compass. Make sure that the string is tight and that the clock is at a 90° angle. Describe what you did in order to correctly read the time.
- How did peoples of ancient times read the time?
- What kind of technology do we use nowadays to keep time?
- What causes your sun clock to read different times? What are we doing?

Cut out the sun clock template as seen below. Use this to make your Sun Clock.



Use this Sun Clock if you live in: Southern California, Southern Nevada, Arizona, New Mexico, Oklahoma, Texas, Arkansas, Louisiana, Tennessee, Mississippi, Alabama, Georgia, Florida, North Carolina, South Carolina