The Analemma

Note: Question values shown in brackets.

1. [**7**] Connect the dots in Fig. 1 to form the pattern created by the Sun's apparent path across the sky throughout the year. Your figure will be similar to the photo on page 1.
2. [**2**] Consult Table I on page 3 of this activity to assist in identifying and labeling the dots appearing on the analemma with the following dates: 6/15, 9/21, 3/21, 12/27, 4/15, 6/22, 9/3 and 12/22. These particular dates have been **highlighted** on Table I.
3. [**2**] On the line you have drawn, place arrowheads at six widely separated intervals [your choice] to indicate the direction of the Sun's apparent motion across the sky.
4. [**2**] With your finger, trace the figure you have drawn. How often during the course of each year are the Sun and the clocks and watches we use in sync? ___ **4 times** ___
5. [**10**] On the line preceding the description, enter the **month and day** [m/d] on which each of the special events occurs. Dates may be used more than once.

   *** 6/15; 4/15; 9/3; 12/27** Days when the Sun and time keeping devices <u>are in sync</u>

   6/22 Summer solstice

   9/21 Fall equinox

   6/22 Day with the **most** hours of sunlight in the Northern Hemisphere

   12/22 Winter solstice

   3/21 Spring equinox

   12/22 Day with the **least** hours of sunlight in Northern Hemisphere

   <u>*Dates may be in any order. Participants must determine that there are a total of four dates.</u>

6. [**4**] Identify the points labeled A, B and C on the analemma matching the positions of their corresponding lines on globes of the world. Also identify the point labeled "D" whose position is referenced to the point located directly above the observer's head.

   A **Tropic of Cancer** C **Tropic of Capricorn**

   B **Equator** D **Meridian**

<u>Tie-Breakers</u>:

1. The higher score achieved on Part II will serve as the primary tie-breaker.
2. The following questions, in the order stated, will serve as subsequent tie-breakers: #3 – placing arrowheads in proper direction, #6 – highest total achieved.

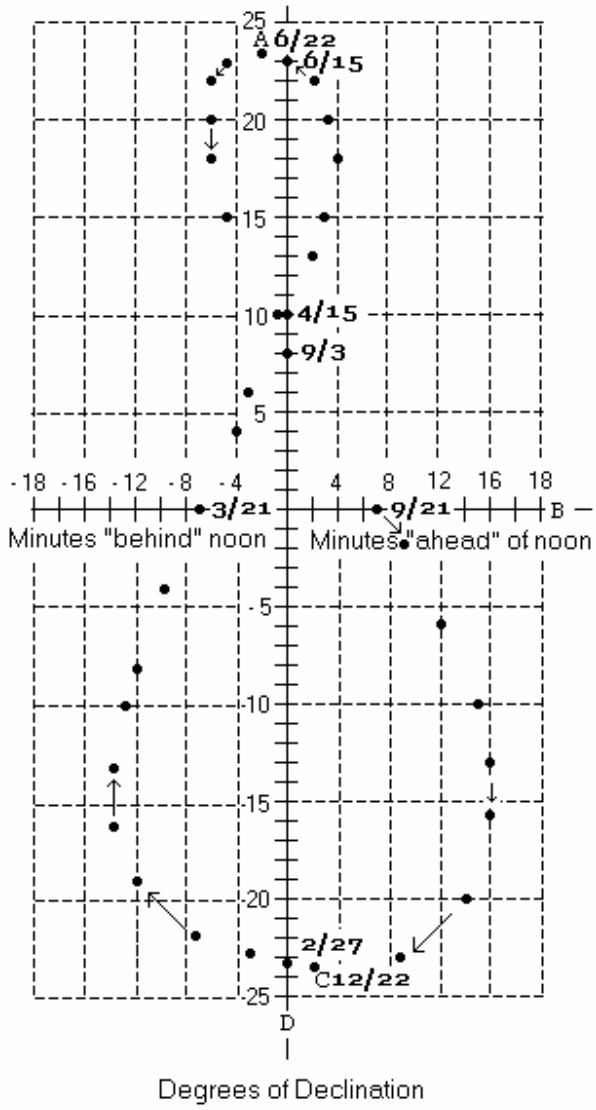

Figure 1: The Sun's Declination vs. Time

Answer Key:

Special instructions:

The "connect-the-dot" path required of the participants has not been included on this answer key to avoid clutter.

The dates on this grid refer to the analemma as it appears in the sky, not as it would appear using a stick and shadow observation.

Arrowheads may be drawn anywhere on the analemma, but must indicate correct direction.