The Bishop Sundial

The Bishop School has a new sundial located in the nature area in the front of the school. Here are some questions and answers about sundials.

How does a sundial work?

The sun shines on the gnomon (the triangle sticking up from the sundial base - pronounced NO-men) and casts its shadow on the appropriate hour line, thus displaying the "time."

How do I read the time?

On a sunny day, look at the right side of the shadow cast by the gnomon where it meets the numbers on the horizontal dial. The right side of this shadow will indicate the time similar to an hour hand on a clock (e.g., if the right side of the shadow is midway between the 2 and 3, the time is 2:30).

Is it accurate?

This is an extremely accurate sundial that was custom built for its location at the Bishop School. It is designed to accurately reflect the time at the school's longitude (the vertical lines on a map) and latitude (the horizontal lines). The school's longitude and latitude are printed at the bottom of the sundial.

What goes into accurate sundial design?

The angle on the gnomon has to be equal to our latitude to adjust for the changing "height" of the sun in the sky during the changing seasons.

The position of the hour lines on the sundial must be calculated and laid out based upon our longitude and latitude. The hour lines are not equally spaced to account for differences in East-West time zones.

Does the sundial always show the correct "clock" time?

No, there are two factors that can't be controlled with a fixed sundial.

#1. Daylight Saving Time

In most of the country, clocks "spring ahead" by one hour in early April and "fall back" by one hour in late October. A sundial does not have "hands" like a

clock, which can be set ahead or back and it would be confusing to label a sundial with two sets of hour numbers.

The Bishop sundial is designed for the part of the year from April to October when daylight saving time is in effect. During other months, you need to "adjust" the time on the sundial by subtracting one hour.

#2. The Equation of Time

Another factor that causes sundials to differ from "clock" time is The Equation of Time. All stationary sundials must be mentally "corrected" for this factor to achieve accurate clock time.

This variation from clock time changes each day of the year causing the sundial's time to appear to be "fast" by as much as 16 minutes or "slow" by as much as 14 minutes throughout the year. This variation has two main causes: (1) The earth moves more quickly in its elliptical orbit around our sun when closest to it and more slowly when it's farthest away, and (2) The sun "travels" across our sky on the ecliptic, as opposed to the equator.

The chart below allows you to determine how much time to add or subtract from the sundial to get an accurate reading for any day of the year.

For more information about sundials:

There is a lot of information about sundials on the web. Check out some of these sites as a starting point:

Solarnoon.com
Wsanford.com
Squidoo.com/sundial
Sundial.co.uk

The Equation of Time