



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.)

Kara R. McLevige

Science Fair Use Only

J1417

Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9)

How Long Does the Sun Take to Rotate?

Division

Junior (6-8) **Senior (9-12)**

Preferred Category (See page 5 for descriptions.)

14 - Physics & Astronomy

Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.)

Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.

The purpose of this experiment was to find out how long it takes the Sun to rotate. My hypothesis was that the rotation of the Sun would take 23 to 28 days at its equator, and sunspots would be visible for no longer than 14 days at its equator and 16 days at its poles.

A reflecting telescope was used to focus an image of the Sun onto a cardboard screen. A picture of the image of the Sun was then taken with a digital camera. This procedure was repeated 23 times over a period of about 6 weeks. The paths of the sunspots were traced on transparency paper, and the latitude and longitude of each sunspot on each day were measured. This information was entered into an Excel spread sheet. The change in longitude was used to calculate the rotation per day in degrees. The time it would take for the Sun to make a complete rotation was then calculated.

The average rotation rate of the sunspots per day was 13.7 degrees. From this the average rotation period of the Sun would be 26.6 days. The slowest moving sunspot averaged 11.0 degrees per day. At that rate, the Sun would take 34.7 days to rotate. The fastest moving sunspot averaged 16 degrees per day. At that rate, the Sun would take 22.5 days to rotate. No relationship was observed between rotation rate and sunspot latitude for latitudes between plus and minus 30°. This experiment suggests the Sun does not rotate at a constant rate, but it is hard to distinguish between Sun rotation rate changes and measurement error.

Summary Statement (In one sentence, state what your project is about.)

My project is on measuring how long it takes the Sun to rotate by observing sunspots.

Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4.

Father helped set up measurement technique and data analysis.