



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> <b>Filippo Velli</b>	<b>Project Number</b> <b>J1631</b>
<b>Project Title</b> <b>Our Spotty Sun: Sunspots and the Sun's Rotation</b>	
<b>Objectives/Goals</b> The scientific problem is "Can sunspots be used to track and measure the sun's rotation rate and how accurately can they do so?" In this experimental project sunspots were expected to provide a reference of the sun's angular position in the sky, and that the measurement of their recorded position as function of time would provide an estimate of the sun's rotation rate, multiple sunspot measurements allowing the accuracy to be increased.	
<b>Abstract</b> <b>Methods/Materials</b> The experiment consisted in creating a pinhole camera and regularly tracking the position and size of the sunspots. To create a pinhole camera a cereal box was taken and a circle was carved in the middle of it. Then a piece of aluminum foil with a pinhole was taped on the circle in the cereal box. After reflecting the sun's rays with a mirror through the pinhole and onto a wall, an image of the sun appeared in projection. Experimentation with the size of the pinhole was necessary to obtain a bright enough image of the sun which was sufficiently sharp and contrasted to show the sunspots clearly. Then sunspot position was taken by drawing and graphing the sun first on millimetric paper and then on the logbook. Estimates of the sun's rotation rate obtained were in the range 24 - 28 days.	
<b>Results</b> After experimentation, the sun's rotation calculated from two of the sunspots, approximately 24 days and 5 hours, turned out to be fairly close to the real rotation of the sun, 24 days and 12 hours.	
<b>Conclusions/Discussion</b> Sunspots can be used as trackers of the sun's rotational period, however their own dynamical evolution and latitudinal drift make a precise calculation of the rotation of the sun's surface difficult. They also provide evidence that the surface of the sun cannot be considered as a solid body.	
<b>Summary Statement</b> In this project a pinhole camera was built to observe the sun and track sunspots to measure the sun's rotation rate.	
<b>Help Received</b> My dad helped me find a flat mirror and looked over my research paper.	