



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> <b>Alexander J. Velarde</b>	<b>Project Number</b> <b>J0625</b>
<b>Project Title</b> <b>Impact Craters: The Effects of Different Angles of Impact</b>	
<b>Abstract</b> <b>Objectives/Goals</b> An impact crater is formed when a meteoroid strikes the surface of a planet, moon, or other land mass in space. In my research and experiment, I tried to find out how the angle of a meteoroid impact changes the appearance of an impact crater. <b>Methods/Materials</b> In my experiment, I filled a pan with cornmeal and powdered tempera. I then rolled a marble (the impactor) down a ramp situated at 20, 45, and 90 degrees. I then observed and measured the craters and recorded the measurement of crater size and depth. I repeated this process fifteen (15) times for each angle. In addition, I calculated the energy available for crater formation by using the formula $F=MA$ (Force = Mass x Acceleration) where acceleration is the result of gravity (32ft/sec squared) and for the slopes, the sine of the angle. <b>Results</b> The results I came up with are the following: A higher angle of impact caused a smaller crater; a lower impact angle caused a larger crater. If the angle is lower, the crater will be shallower and if the angle is steeper, the crater will be deeper. <b>Conclusions/Discussion</b> With a steeper angle of impact, the marble will gain speed and have more velocity. This will result in a larger crater. This, however, does not apply to a vertical drop. In the event of a vertical drop, the surface material has nowhere to go, which in turn causes the initial crater to be smaller and deeper.	
<b>Summary Statement</b> In my project, I looked at the effects of different angles of impact on how craters are formed.	
<b>Help Received</b> Mother helped with typing and graphs. Father helped with typing.	