



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> <b>Hilary S. Benedick</b>	<b>Project Number</b> <b>J0603</b>
<b>Project Title</b> <b>Avalanches</b>	
<b>Objectives/Goals</b> To determine what factors promote avalanches.	
<b>Abstract</b> <b>Methods/Materials</b> A mountain slope was simulated by constructing a flat board hinged on one end. The board could be raised and maintained at any angle. Snow crystals were simulated by flour and sugar. Conditions at which a slab avalanche were produced were recorded while seperately varying the following six factors which were postulated to increase the risk of avalanches and tested in the following fashion: 1. greater depth of snow; Depths of simulated snow crystals were varied and the angle at which the slope simulator had to be elevated in order to create a slide was recorded. 2. larger vs smaller crystal which produce less crystal to crystal interactions sugar verses flour (I confirmed crystal shape by viewing viewing both under the microscope). 3. increase of slope. 4. layers of different types of snow crystals varying layers of sugar and flour. 5. lack of objects protruding from the snow represented by absence vs presence of tree-like foam struture glued to surface of the slope simulator which protruded above the level of the snow. 6. smooth ground surfaces Represented by smooth wood surface vs sandpaper on surface of slope simulator.	
<b>Results</b> 1. Avalanche risk increased with increasing depths of snow. 2. Fewer crystal to crystal interactions (sugar) increased avalanche risk. 3. Avalanches occurred rarely on slopes less than 25 degrees or greater than 50 degrees but were seen frequently on slopes between these angles. 4. Presence of an lower unstable layer increased avalanche risk. 5. Objects protuding through the snow pack decreased avalaches. 6. Avalache occured more frequently on smooth vs rough underlying surfaces.	
<b>Conclusions/Discussion</b> 1. Greater depths of snow increased the risk of avalanches by increasing the amount of gravitational force exerted on the snow pack. 2. Larger crystals with less crystal to crystal interactions (sugar) promote avalanches by producing a less adhesive snow pack. 3. Slope's effect on avalanches was not a linear relationship as originally hypothesized. Risk of avalanche initially increased with slope, but then decreased with additional slope because of a lack of accumulation. 4. Slide risk increased with an unstable lower layer of snow. 5. Objects protruding from the snow anchored the snow pack. 6. Smooth ground surfaces provided less friction increasing the likelihood of avalanches.	
<b>Summary Statement</b> The purpose of this project is to determine what factors affect the formation of avalanches.	
<b>Help Received</b> My father discussed the project with me and he helped build the slope simulator.	