



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

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Project Title Get Your Head in the Game	
Objectives/Goals To determine if protective padding, known as headgear, could absorb the level of g force impacts in soccer which commonly result in concussions.	
Abstract Methods/Materials 90 tests were conducted. 30 separate tests were performed on a mannequin head with out any headgear, 30 tests were performed on mannequin B wearing Full90# headgear and 30 additional tests were performed on mannequin C wearing Headblast headgear. To stimulate a force of 78 gs, a baseball pitching machine was used to propel a ball directly at the mannequin head. A single baseball was used for all tests. Both the front forehead and the right side of the head were tested. The level of g force was measured by an accelerometer. The parameters of the accelermeter were set at 75 gs as 78 gs are considered strong enough to cause a concussion by the American Academy of Neurology. Both side and front impacts were measured at three separate speeds.	
Results One brand of headgear failed to reduce impact by the expected 30% but the other brand exceeded the expectation of 30%. The tests showed that the level of impact to the front forehead was reduced by Headblast headgear at 1% at the highest speed of impact and 13% on the lowest speed for front impact. Full90 reduced the level of impact 43% at the highest speed and 62% at the lowest speed. For side impact, Headblast reduced the level of impact 13% on the lowest speed and 36% on the highest speed. Full90 reduced the level of impact 23% on the lowest speed and 44% on the highest speed.	
Conclusions/Discussion The hypothesis that headgear would reduce impact on the head by at least 30% when a 78g force impacted the head, was partially correct. One brand of headgear failed to reduce impact by 30% but the other brand exceeded the expectation of 30%. The tests showed that impact to the front forehead was reduced by Headblast headgear at 1% at the highest speed of impact and 13% on the lowest speed for front impact. Full90 reduced the impact 43% at the highest speed and 62% at the lowest speed. For side impact, Headblast reduced the impact 13% on the lowest speed and 36% on the highest speed. Full90 reduced the impact 23% on the lowest speed and 44% on the highest speed. Headblast was more efficient in reducing impact on the side of the head than it was the front, but Full90 was more efficient the Headblast in both side and front impact tests. Full90 exceeded the expected 30% reduction of g force for front impacts.	
Summary Statement Does soccer headgear absorb force on a head enough to prevent a player from sustaining a concussion.	
Help Received Mother helped type and locate test accelormeter.	