



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> Karen H. Cho	<b>Project Number</b>  34957
<b>Project Title</b> Fingers on the String	
<b>Objectives/Goals</b> My project was to determine if string players do have longer left hand fingers. Wolff's law states that human bones will adapt to the pressure it receives. Supported by that theory, I predicted that string players will have longer left hand fingers compared to their right because they are constantly receiving pressure on their left fingers from pressing down on the strings. I surveyed students who have played 0-2 yrs, 2-4 yrs, 4-6 yrs, and 6-8 yrs. I predicted that students who have played 6-8 yrs would probably have the biggest difference between their left and right hand finger lengths, and those who have played 0-2 yrs would have the least difference between their fingers. <b>Abstract</b> <b>Methods/Materials</b> I surveyed 20 string instrument students (age group 6th-9th grade) who have played 0-2 years, 2-4 years, 4-6 years, and 6-8 years. Each student correctly positioned his/her hands on the Hand Diagrams and measured the difference between his/her right and left hand finger lengths. <b>Results</b> String players do have longer left hand fingers. Especially, the students who have played for 6-8 years had the biggest difference in finger length, and those who played for 0-2 had very minimal difference. Some of the biggest differences occurred in the fourth finger, so I will give an example set of data with the fourth finger. 6-8 yrs: 0.36 cm difference, 4-6 yrs: 0.22 cm, 2-4 yrs: 0.26 cm, 0-2 yrs, 0.12 cm. The negative results that appeared on my data table was when the students had longer right hand fingers than their left <b>Conclusions/Discussion</b> My hypothesis was correct: string players did have longer left hand fingers. Also, those who have played 6-8 yrs had the greatest difference between their left and right finger lengths, and those who played 0-2 years had almost no difference. My project shows that bones will react to the stress or mechanical load that it is put under. It cautions us against putting unnecessary pressure on our bones, such as cracking our knuckles or sitting at a crooked position for a long time. It also helps us develop methods to intentionally make our bones react to stress, such as jumping or doing sports to grow taller.	
<b>Summary Statement</b> String players have longer left hand fingers because they are constantly receiving pressure when pressing down on the string.	
<b>Help Received</b> Surveyed students at my orchestra-Santiago Strings (6th-9th grade).	