



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2018 PROJECT SUMMARY**

<b>Name(s)</b> <p align="center"><b>Vivian La T. La</b></p>	<b>Project Number</b>          <p align="right">38653</p>
<b>Project Title</b> <p align="center"><b>How Does the Temperature of Seawater Affect the Development Process of Sea Urchins?</b></p>	
<p align="center"><b>Abstract</b></p> <p><b>Objectives/Goals</b>          If the temperature of the sea water where the development process takes place is warmer, then there is higher possibility of sea urchin embryos going through each stage of growth up to the blastula stage.</p> <p><b>Methods/Materials</b>          I used live Strongylocentrotus Purpuratus sea urchin, found off the Western Coasts of North America, sea water, heating plate, refrigerator, petri dishes, potassium chloride, and pipettes to perform this experiment. I extracted the sea urchin gametes (eggs and sperm) by using potassium chloride, which stimulates the gonads, the reproductive organs, to start producing the eggs or sperm. I gathered the pure form of the gametes and put 160 eggs per petri dish, which contained sea water. Each petri dish is put into a different temperature condition.(37 &amp;#8451;, 23&amp;#8451;, and 4 &amp;#8451;)The eggs are fertilized and immediately put in their assigned temperature condition. Observations are recorded about every three hours for about a week.</p> <p><b>Results</b>          Many of the eggs in 37 &amp;#8451; and 23 &amp;#8451; groups not seem to continue with cell division and stop at the 1st cleavage of the fertilization process, no further progress was recorded after the 2-celled stage. The group at 4 &amp;#8451; forms the early pluteus one week after fertilization, meaning it has passed through the 1st cleavage/cell division, 4-celled stage, 8-celled stage, and the blastula stage (256-celled stage).</p> <p><b>Conclusions/Discussion</b>          Based on my data and observations, I can conclude that my hypothesis was incorrect. The group of sea urchin zygotes that went through the process of fertilization at 4&amp;#8451; successfully reached the blastula stage. The groups at 23&amp;#8451; and 37&amp;#8451; did not seem to continue with the fertilization process and stopped at the 1st cell division. Warming temperatures affect the process of the Strongylocentrotus Purpuratus. California, a main area where these sea urchin are found, is also having a depletion of their kelp forest due to dead zones and pollution, limiting the supply of food for the adult and developing sea urchin. With the increase of ocean acidification, many developing sea urchins cannot form their skeletal systems due to the lack of calcium carbonate available. This data can provide more points that can help the sea urchin populations that live in the kelps forests and are affected by other condition caused by temperature or directly by temperature.</p>	
<b>Summary Statement</b> <p>My project is about the effects of warming temperature conditions of the development of the Strongylocentrotus Purpuratus, a type of Pacific sea urchin species.</p>	
<b>Help Received</b> <p>I designed this experiment by myself and did my own research. I received assistance from CCRM OC labs to help with my data collecting and to carry out my method for the experiment.</p>	