



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Mayte Gutierrez	Project Number J1912
Project Title How Many Holes Should I Put in the Lid? Investigating Oxygen Consumption Differences in Jumping and Flying Invertebrates	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My goal was to see if butterflies consume more oxygen than ladybugs or crickets. Since they all fly or jump they need energy to move, and if they need energy then they need oxygen, because in an animal oxygen and glucose produce energy. I hypothesized that butterflies would, on average, consume more oxygen than the other insects because they have very large wings to move and a small body that has to move them.</p> <p>Methods/Materials I used a metabolism kit to perform each trial with ladybugs, butterflies and crickets. I put a group of one of the types of invertebrates I was testing inside the organism holder and measured their mass. After that I put the organism holder inside the metabolism chamber with 13-15 potassium hydroxide pellets. The pellets absorbed carbon dioxide that was coming from the insects, which created a vacuum so that I could measure how much oxygen the insects were consuming. I recorded the number on the capillary tube that the index solution was passing, which I did each 30 seconds for five minutes. I repeated this process for every trial I performed.</p> <p>Results My results show that butterflies consume more oxygen than crickets and ladybugs. The mean oxygen consumption for crickets was 0.109 cc/g, the mean oxygen consumption for ladybugs was 0.004 cc/g, and for butterflies it was 0.174 cc/g (g stands for gram of insect mass).</p> <p>Conclusions/Discussion My hypothesis was supported because butterflies did consume more oxygen than the other insects that I tested. I believe based on my results that butterflies consume more oxygen because they have small bodies and big wings, so they need more energy.</p>	
Summary Statement I used a metabolism chamber to measure oxygen consumption rates and volumes for painted lady butterflies, ladybugs, and crickets.	
Help Received My science teacher helped me learn how to use the metabolism chamber. My parents helped me get the insects.	