# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Conor J. Walsh

**Project Number**
**J2430**

**Project Title**
# How Does Temperature Affect the Transformation of Caterpillar to Butterfly?

**Abstract**

**Objectives/Goals**
This project attempted to determine how temperature affects the metamorphosis of cold-blooded Painted Lady (Vanessa cardui) larva (caterpillar) and pupae (chrysalis) to butterfly.

**Methods/Materials**
My experiment exposed identical groups of cold-blooded Painted Lady caterpillars and chrysalis to different temperatures to determine whether this difference in temperature causes them to develop at different rates. One sample of caterpillars was exposed to cooler temperatures (about 66 F) and a second identical sample was exposed to warmer temperatures (about 75 F). The transformation from caterpillar to chrysalis to butterfly was observed and recorded. The experiment was conducted twice to verify results.

**Results**
My hypothesis that cold-blooded caterpillar larva and pupae exposed to warmer temperatures would grow and develop into butterflies at a faster rate than those exposed to cooler temperatures was supported by the data collected in the experiments conducted. In both trials of the experiment the larva and pupae exposed to warmer temperatures developed into butterflies about twice as fast as those exposed to cooler temperatures.

**Conclusions/Discussion**
All insects, including caterpillars and butterflies, are cold-blooded and take on the temperature of their surroundings. Cold-blooded creatures are much more active in warm environments and are very sluggish in cold environments because their muscle activity depends on chemical reactions which run quickly when it is hot and more slowly when it is cold. The climate of the earth is changing with average temperatures increasing. My experiment shows that increasing temperatures will have an affect on how cold-blooded butterflies will develop. The experiment also raises questions: Will a change in temperature change caterpillar population? Migration? Impact their food source? How will these changes affect the rest of the ecosystem? The results and conclusions from this experiment raise a number of other questions and opportunities for other scientists to look deeper at these issues.

**Summary Statement**
My project exposed two identical groups of cold-blooded Painted Lady caterpillars to different temperatures to determine if this difference in temperature causes them to develop into butterflies at different rates.

**Help Received**
My dad ordered the caterpillars online and helped me with typing the report and building the display boards.