CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Emily Nardoni; Hayley Perkins

Project Number
S1114

Project Title
The Carbon Dioxide Effect

Abstract

Objectives/Goals
The goal of our project was to observe the effect of varied levels of carbon dioxide on the respiration rate of two case studies.

Methods/Materials
Our materials were a turntable (an old record player), and airtight bag with a tube attached to breathe in and out of, a cup, a cylinder, a marker, and paper to record our data. We positioned the cylinder with connected sheets of paper wrapped around it on our turntable. The airtight bag was placed next to it, with the cup holding the marker in place at a 90 degree angle to the cylinder. Therefore, when one breathes in and out of the tube, the marker will record the respiration rate on the revolving paper, allowing us to visually see our results and creating a home-made kymograph. We tested 2 people in 2 different conditions: first under normal conditions and second after 4 minutes of jumprope.

Results
With the cylinder revolving at 10 revolutions per minute, Case Study 1 was able to complete only 9 pages of data under normal conditions. Our results graph shows struggle in her breathing by the 6th page of data, due to the increased levels of carbon dioxide she was breathing in. In her second test, after 4 minutes of jumprope, she was only able to complete 3 pages of data, all of them strained with a noticeable struggle by the 2nd page. Case Study 2 was able to complete only 6 pages of data under normal conditions, with great difficulty by the 5th page, and 3 pages after the jump rope. Specific wavelengths and the graphs themselves are displayed on our board.

Conclusions/Discussion
As the case studies breathed in and out of the bag, the percentage of carbon dioxide in the bag increased as the person breathed in oxygen and breathed out carbon dioxide. The changes in these percentages are clearly displayed on our results graphs by the variations in the wavelengths recorded. After exercise, very little carbon dioxide intake was able to be sustained by both case studies due to the increased demand for oxygen. This demonstrates the practical and environmental importance of the fixed gas percentages in the air, and the dangers of different levels of carbon dioxide intake under different conditions.

Summary Statement
Our project was created to demonstrate and test the effects of varied levels of carbon dioxide on respiration rate.

Help Received
Our teacher, Mr. Rufus, gave us the first, general idea for the project, and we figured it out from there. Materials were provided by Mr. Nardoni, while everything else was found as a household object.