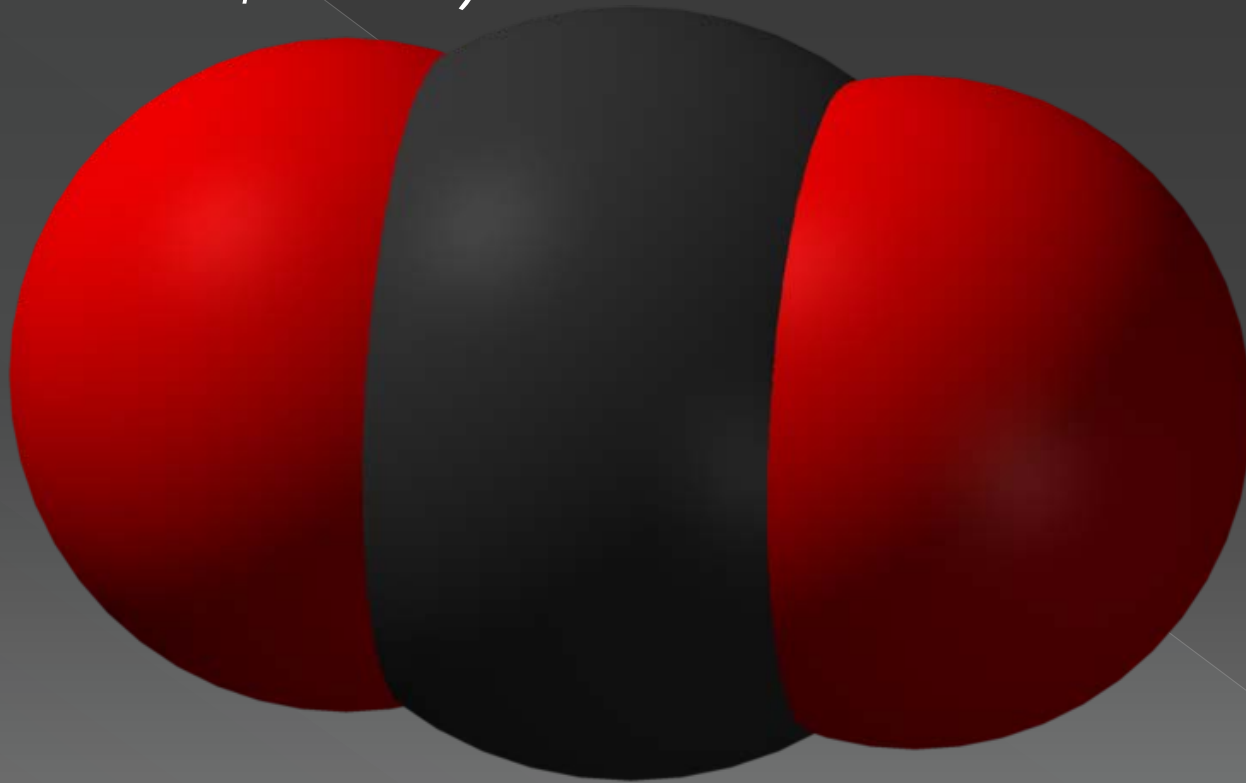


Monitoring concentrations of Carbon Dioxide in a New York City Classroom

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Marine Biology Research
Program, 2011

A model of Carbon Dioxide!

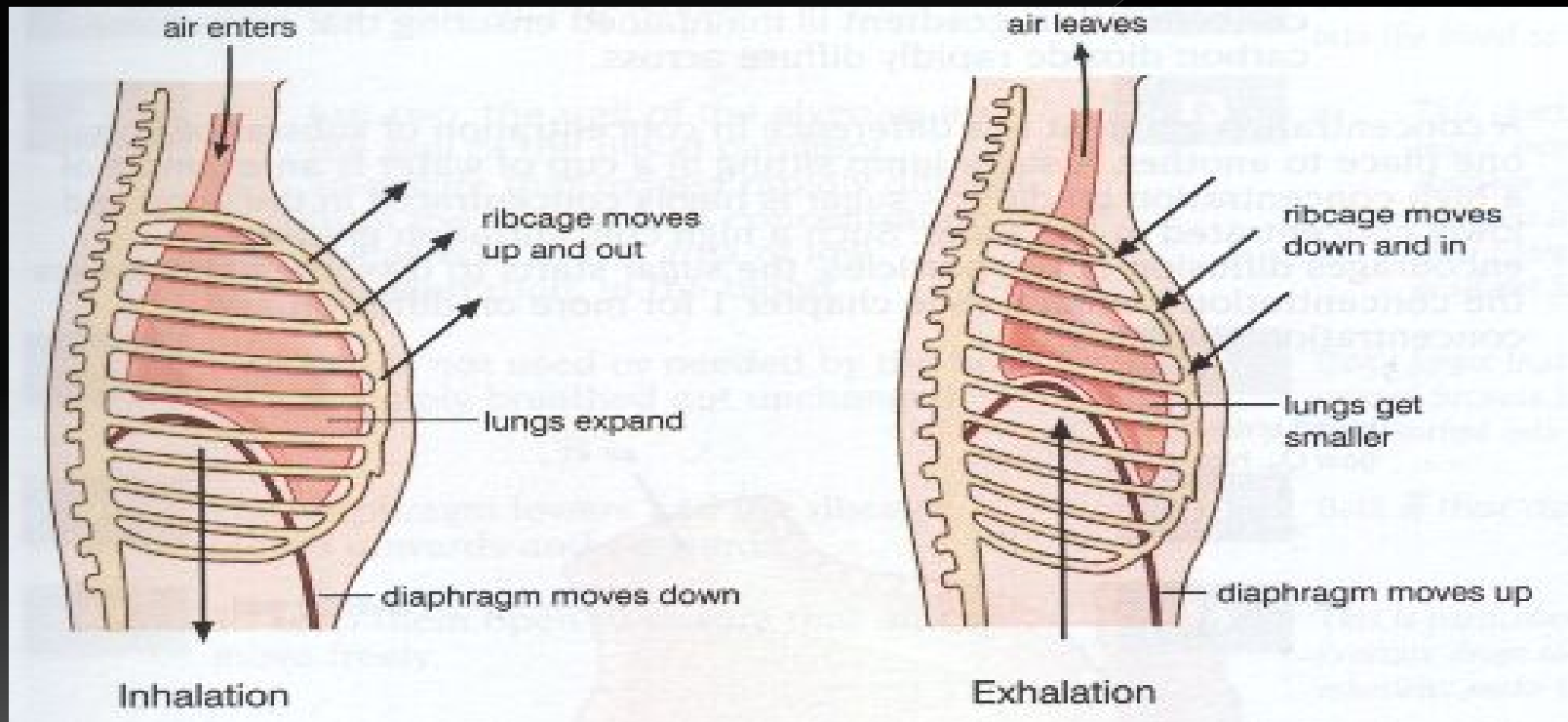
⦿ (Ben Mills, 2011)



Introduction

Carbon Dioxide also known as CO₂ is produced during cellular respiration (Olsen,2011). Human that are exposed to high levels of CO₂ can experience health problems/ risks (W.D.H.S, 2011).

Explanation of how CO₂ gets in and out of your body



(BIO301, 2011)

Continuation

This project will determine how much CO₂ a student is taking in everyday they come to the school, and also how much is surrounding them. The CO₂ sensor will detect high and low the levels of CO₂ is in the classroom.

Background Information

The levels of carbon dioxide for the outdoor air level is 250-350 ppm, 350- 1,000 ppm is found in occupied spaces with good air exchange.

Continuation

1,000- 2,000 ppm can be a risk of drowsiness and poor air, 2,000-5,000 ppm shows signs of headaches, sleepiness, bad concentration, increase in heart rate and slight nausea (W.D.H.S)

Continuation

> 5,000 ppm can lead to loss of oxygen which can damage the brain permanently, you can slip into a coma and it can even cause death (W.D.H.S).

Li-820 CO₂ Gas Analyzer

This sensor is going to be used to analyze/detect the CO₂ that is in the room. So the parts of the sensor are the water proof enclosure, it has a one micron filter, it has a pump the analyzer is connected to a power cord.

Hypothesis

If the doors and windows are closed then the CO₂ levels will increase to levels above 1000 ppm with no open spaces to let external air in.

Experimental set up/Procedure

- Students will be in the classroom with closed windows and doors, the CO₂ sensor will be detecting the carbon dioxide surrounding the air.
- Students will be in the classroom with open window and doors and the CO₂ sensor will detect it.

Materials

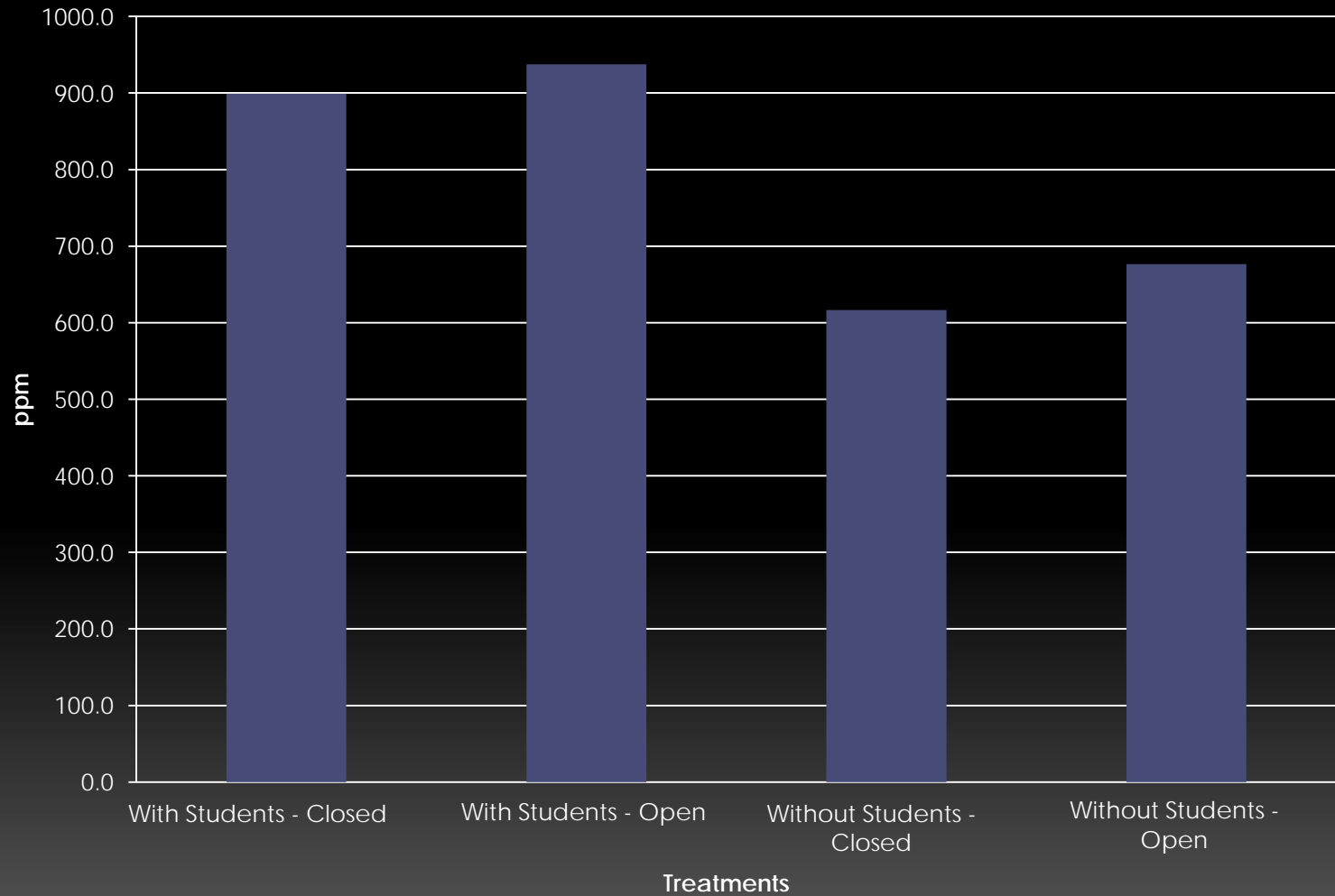
Item	Quantity	Function
Spip4h	1	Stores the data.
Li-820	1	Detects the CO2.
Microsoft Excel	1	To Make graphs.
Blue tooth	1	Send information to the sensor to help it detect data.
Air Cable	1	Connects to the computer and send signals to store data.
Google Earth	1	To get a map of the school building.
Schedule	1	Helps to know when to open or close windows and doors.

Project Design

Scientific problem	Proposed Controls	Proposed Constants
What are the concentrations of carbon dioxide in a New York City Classroom?	Classroom without students	Classroom

Assumptions	Limitations
CO2 will rise with students in the classroom with open doors and windows.	Having only one sensor, prevents from having replicates.
With closed doors and closed windows the CO2 will be less because the school ventilator system will filter the air in the school.	

Average CO2 levels in a New York City Classroom (2012)



BAR GRAPH DATA

Ventilation system

Depending on the temperature of the room like if the room is cold the ventilation system blows out warm air. In every room there is a ventilation shaft, but not all rooms have a sensor that detects air.

Conclusion

Concentration of carbon dioxide in the classroom with student – closed shows the greatest amount of CO₂ 10ppm away from 1000ppm which is found in occupied places with good air exchange, so the ventilation system in the room when the windows and doors are closed worked well in regulating the air in the classroom. The data wasn't as good as hoped because of the change within the CO₂ sensor, when the room temperature is cool the sensor reads a bit more and when it's warm the CO₂ sensor reads less.

bibliography

References

In *Human Physiology-respiration*.

Retrieved from

<http://people.eku.edu/ritchisong/301note6.Htm>

Olson, A. In *Effects of Exercise: Changes in Carbon Dioxide Output*.

Retrieved from <http://www.sciencebuddies.org/science-fair-projects/pr...>

(2005, Oct.). Retrieved Apr. 14, 2011, from

<http://www.dhs.wisconsin.gov/eh/chemfs/fs/carbondioxide.htm>

biosciences, Retrieved Nov. 10, 2011, from

http://www.licor.com/env/pdf/gas_analyzers/820/820_brochure.pdf

Retrieved from

<http://chemistry.about.com/od/factsstructures/ig/Chemical-Structures---C/Carbon-Dioxide.-12A.htm>

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