Pulse Oximeter Lab
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Everest Pulse Oximeter Test Results

In the spring of 1997, climbers David Breashears, David Carter, and Ed Viesturs agreed to undergo physiological and psychometric testing from Base Camp to the summit. Below is the data on the physiological testing. SaO2 refers to oxygen saturation - the percentage of oxygen in arterial blood. At sea level this is generally between 97 and 99%. SaO2 levels and pulse were measured with a small device called a pulse oximeter that is attached to the fingertip and takes measurements by shining red and infrared light through the finger tissue.

Fill in the missing information:
(from website, about 1/3 of the way down the page)

Oxygen Saturation tells you the percentage of ________________

The pulse oximeter uses two lights to analyze hemoglobin. One is a ________ light, with a wavelength of __________ nm.
The other is an _________ light, with a wavelength of ____________ nm.
Oxygenated hemoglobin absorbs more __________________ light.
and deoxyhemoglobin absorbs more __________________ light.
Question: When is there more oxygen in your bloodstream—when your pulse is high or low?

Hypothesis: Write a hypothesis statement that answers the Question above.

Procedure: You are going to use the class pulse oximeter to measure your SaO2 level with a low pulse and a high pulse and compare the two readings.

What are some things you can do in the classroom to make sure your pulse is low?

What are some things you can do in the classroom to ensure you have a high pulse rate (gets your heart beating faster)?

When it is your turn to use the pulse oximeter, take a reading when you have been quiet and inactive for a few minutes, then take again when you have done something physical to get your heart rate up.

Data:

<table>
<thead>
<tr>
<th>Activity level</th>
<th>Pulse (bpm)</th>
<th>SaO2 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiet, inactive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very active</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Analysis:

Which of your O2 levels was highest: (complete sentence please, with numbers).
Conclusion: What do you think the answer to the question is now? (sentence) Was your hypothesis accepted or rejected?

Everest Data: Get a sheet of data from one of the 3 climbers who climbed Everest in 1997. Glue your data here: Graph the percentage of oxygen (SaO2) vs elevation for your climber on the next page. What does your graph show?

climber data available at http://www.pbs.org/wgbh/nova/everest/expeditions/97/testresults.html