A BEATING HEART

Lesson Plan

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<u>Goal</u>: To use cardiac physiology to increase understanding of percents and percent difference.

<u>Grade and Course</u>: 9th Grade, Algebra 1

<u>KY Standards</u>:
      MA-HS-1.3.1
      MA-HS-1.4.1

<u>Objectives</u>:
      1. Students will perform a hand on experiment working as a group
      2. Students will be able to collect and analyze data
      3. Students will be able to calculate % difference
      4. Students will be able to relate algebra concepts with basic cardiac physiology

<u>Resources/materials needed</u>: Worksheets, stopwatch, and a calculator

<u>Description of Plan</u>:
      Students will have a lecture pertaining to percent and percent difference a day before this lesson is presented. On the day of the lesson, a short and simple introduction into the efficiency and productivity of the human heart will be given. Students will then be instructed how to estimate heart rate by measuring an individuals pulse. Students will break into groups of two or three and provided with a stopwatch, calculator and worksheet. First, the students will be given the fact that the average human heart rate is 72 beats/min. The students will be asked to calculate how many times, based upon this average, the heart will beat in 24 hours, 16 years and 100 years. Then, one group member will be chosen as the "experimental subject", as their heart rate will be measured. The chosen member of the group will sit in a chair, as another takes his or her pulse, while the other monitors the clock. A resting heart rate will be measured twice, and an average will be taken. The experimental subject will then be asked to do 30 jumping jacks, then sit in the chair and have his or her heart rate measured again, as before. The members will then be asked how the heart rate has changed, and to calculate percent difference. Time permitting; each group member can obtain a resting and post-exercise heart rate. The students will then be faced will real life examples in which heart rate may change from rest. Students will be asked to calculate percent increase and decrease, as well as be given percent differences and asked to calculate heart rates.
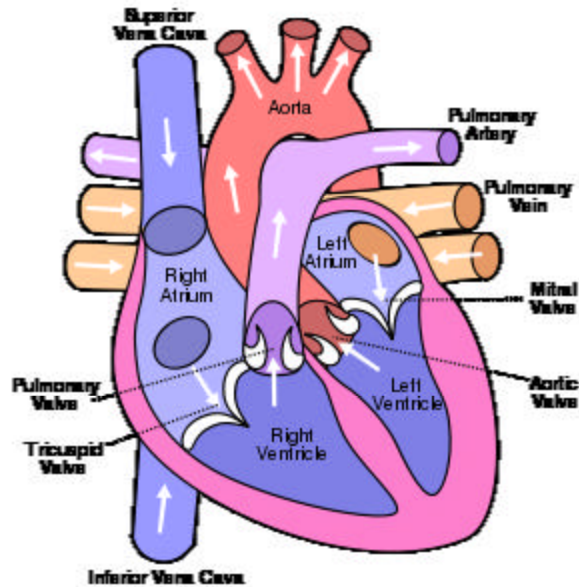
<u>Lesson Source</u>: Original

<u>Instructional Mode</u>: Interactive lecture and worksheet

<u>Date Given</u>: March 10, 2009   <u>Estimated Time</u>: 45 minute class period

<u>Date Submitted to Algebra Cubed</u>: 3/17/2009

The Beating Heart

Your heart located in the middle of your chest provides blood to the rest of your body. It is a muscular pump, (about the shape of your fist) that pumps, non-stop, for years. Normal human heart rate is approximately 72 beats per minute, or _____ beats/second. If this is the case, how many times will your heart beat in 24 hours?

How many times will your heart beat when you reach 16 years old?

How many times will your heart beat if you reach 100 years old?

Although the heart averages 72 beats per minute, your body's heart rate fluctuates multiple times throughout the day. Several factors can affect heart rate, such as diet and exercise. Lets explore some of these factors that affect YOUR hear rate.

1. Choose one member of your group and measure their heart rate by taking their pulse for 60 seconds. This will be their "resting" heart rate. Take their resting heart rate two times and calculate the average. Fill the data in below.

Resting heart rate 1:_____
Resting heart rate 2:_____
Resting heart rate average:_____

2. Now have your group member do 30 jumping jacks. After the jumping jacks, have your group member sit back in the chair as before and measure their heart rate. How has the heart rate changed? Calculate % increase.

Your resting heart rate average (question 1):_____

Heart rate after 30 jumping jacks:_____

% increase:_____

3. In the summer, you often go swimming in a lake or swimming pool. When you jump in for the first time, the water is very cold. Before you jump in the pool or lake, your resting heart rate is 72 beats/min. Immediately after jumping into the pool, your heart rate becomes 52 beats/min. How has your heart rate changed? Calculate % decrease.

Resting heart rate: 72 beats/min

Heart rate after jumping into cold water: 52 beats/min

% decrease:_____

4. After school today, you go home and chug a Coca Cola. Ten minutes after you drink the cola, your heart rate increases by 8%. Your resting heart rate before you drank the cola was 78 beats/min. What was your heart rate AFTER you drink the cola?

Resting heart rate: _____

Heart rate after you drank the cola: _____

% increase: _____

5. In the middle of a deep sleep, your heart rate is 60 beats/min. However, as you brushed your teeth before you went to bed, your heart rate was 20% higher. What was your heart rate while you were brushing your teeth?

Heart rate while brushing teeth: _____

Heart rate while sleeping: _____

% increase (from sleeping to brushing teeth): _____