

Pulse Rate Line Graphs

Pillar: Active Living

Division: III

Grade Level(s): 6-8

Core Curriculum Connections: Mathematics

I. Rationale:

Regular exercise is an important component of cardiovascular health and overall well-being. Students learn about the benefits of exercise by exploring the effect of exercise on pulse rate and the benefits derived from regular physical activity and living an active, healthy lifestyle. Students learn how to locate and determine their heart rate and understand the effect that activity has on heart rate. This data is then used to create, label, and interpret line graphs of their pulse rate that show the effect of exercise. Additional calculations can be done such as calculating the mean, median, mode, and range of the class' results. This lesson allows students to collect, manipulate and analyze data so they can visually see their results and better understand what they have observed.

II. Activity Objectives:

The students will:

- learn how to determine pulse rates.
- determine the effect on pulse rate after doing physical activities that vary in intensity.
- create, label, and interpret line graphs to show the effect of exercise on pulse rate.
- interpret Excel graphs using measures of central tendency (mean) to determine different heart rates. (resting, maximum, and target)

III. Curriculum Outcomes: Mathematics

- Statistics and Probability (Data Analysis)
- General Outcome: Collect, display and analyze data to solve problems.

Grade 6	Grade 7	Grade 8
<p>Specific Outcomes:</p> <p>1. Create, label and interpret line graphs to draw conclusions. [C, CN, PS, R, V]</p> <p>3. Graph collected data, and analyze the graph to solve problems. [C, CN, PS, R, T] [ICT: C6–2.5, C7–2.1, P2–2.1, P2–</p>	<p>Specific Outcomes:</p> <p>1. Demonstrate an understanding of central tendency and range by:</p> <ul style="list-style-type: none"> • determining the measures of central tendency (mean, median, mode) and range • determining the most appropriate measures of central tendency to report findings. <p>[C, PS, R, T]</p>	<p>Specific Outcomes:</p> <p>1. Critique ways in which data is presented in circle graphs, line graphs, bar graphs and pictographs. [C, R, T, V] [ICT: C7–3.1, C7–3.2, F4–3.3]</p>

2.2]	[ICT: P2–3.4] 2. Determine the effect on the mean, median and mode when an outlier is included in a data set. [C, CN, PS, R]	
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IV. Materials:

- sheet of graph paper
- colored pencil
- one ruler
- stop watch
- music

V. Teacher Background Information:

The heart is the most important muscle in the body. It is a pump and is responsible for delivering oxygen upon demand, through the blood, to the tissues. At rest, about 5 liters of blood flow through the heart per minute. When exercising, there is an apparent increase in demand for oxygen, at which time approximately 20 liters of blood per minute flow through the heart. There are two easily accessible strong pulse points. They are the carotid artery and the radial artery. To find the carotid artery, place you index and middle finger just below the angle of the jaw. The pulsation felt will be that of the carotid artery. To find the radial artery, place your finger on your thumb and slide it up, just above the wrist and gently press. The pulsation felt here is that of the radial artery.

VI. Procedure:

1. Ask students how they could obtain the most accurate number of times that the heart beats per minute. Students should understand, that by actually taking the pulse for the full sixty seconds will result in the most accurate count. However, the pulse can be taken for time intervals which are factors of sixty, such as 30, 15, 12, 10, 6 seconds, etc. Once the time interval has been selected, the number of beats counted is then multiplied by the corresponding factor to obtain the approximate number of times the heart beats in a minute.

2. Have students find their pulse at either pulse point. However, before the data is collected, allow time for students to become comfortable taking their pulses. When students are ready, use the stopwatch, instruct them when to start and stop using a stop watch students begin and end counting their heartbeats when so instructed.

Note: In an exercise program, a person's pulse should be taken before, during and immediately after the exercises have been completed. (It may prove to be interesting for students to discuss why it is important to take your pulse frequently when exercising).

3. Have students take their pulse rate while sitting at their desks to determine their resting heart rate. Then discuss various activities that are cardiovascular in nature, such as dancing, jogging, swimming, and

discuss why they are so important. Conduct different exercises one at a time for one minute each and have students record their heart rates after performing the exercises. Be sure to allow time between activities to allow the pulse to slow to a resting rate (approximately 3-5 minutes should accomplish this). Exercises should progressively increase in intensity. Start with a very low intensity one such as marching on the spot, and then gradually increasing in intensity by including dancing, jumping jacks, jogging, and finally push-ups or burpees.

4. After completing each exercise, have students record their heart rates on the line graph. Once the number of beats have been counted, have the students multiply it by the appropriate factor to determine the approximate number of beats per minute. The data from each student is plotted on their graph.

5. After each student's graph is completed. Review the data critically and share and discuss any observations. Students should notice that their bpm gradually increased as the intensity of the exercises increased.

6. Take this opportunity to discuss the benefits of regular exercise for the heart and the entire cardiovascular system. Information found on the following sites, may be beneficial:

- [Public Health Agency of Canada - Healthy Living Unit](#) - an excellent resource summarizing the benefits of regular physical activity on health.
- [Health Link Alberta](#)
- [Heart and Stroke Foundation](#)

VII. Extensions and Variations:

- Have students calculate the mean, median, mode, and range, or their results.

VIII. Assessment Ideas:

- collect and assess line graphs
- check calculations of mean, median, mode, range and any other teacher-created problems that the students were asked to solve.