

Rate Your Heart

Overview

What is your heart rate? Why is it important?

The heart is a pumping organ. Blood is forced through the arteries as heart muscles contract. As the blood flows through the arteries it creates a series of waves or pulses which can be measured. We call this measurement the heart rate and it indicates how fast our heart is beating. The heart rate is an important measure of our physical fitness, fewer beats usually means a well-conditioned heart while more beats shows your heart needs to work harder to circulate blood. In this experiment, you will monitor your Resting Heart Rate, see how it is affected by physical activity and discover how quickly it recovers afterwards.

Equipment

- Einstein™ Tablet+, MiLAB™
- Heart Rate Clip

Experiment procedure

1. Launch MiLAB program 
2. Connect the heart rate clip to the device
3. Attach the clip to your finger; make sure you feel metallic point.
4. Make sure only the Heart Rate Sensor is selected in MiLAB
5. Select sensor properties  and select \checkmark both Heart Rate 0-200 bmp and Heart Rate 0-5v
6. The rate should be 10 /sec
7. The duration should be 60 sec
8. Select Run  to begin recording data
9. Wait 60 seconds (for the first 15 seconds, the graph will show your pulse, then a second plot line will appear indicating the number of beats per second)
10. The graph displays your Resting Heart Rate
11. Select Run  to begin recording data
12. Jump or run in place for 60 seconds
13. The graph displayed shows your Heart Rate while exercising
14. Select Run to  begin recording data
15. Rest for 60 seconds
16. The graph displayed is your Recovery Heart Rate
17. How quickly did your heart return to its Resting Heart Rate?

The Science

The heart's main job is to circulate blood throughout the body. This blood is used to distribute oxygen and nutrients to the muscles while carrying away waste products. To force the blood through our bodies the heart muscle expands and contracts 60 to 100 times a minute. Each time that happens, we feel it as a heartbeat. The Heart Rate or Pulse is measured in beats per minute (bpm). Like any muscle, the heart can be conditioned and strengthened by exercise. Your Resting Heart Rate indicates your overall heart health; a strong, well-conditioned heart can pump blood through your system more effectively meaning the heart needs to expand and contract less often. Exercise, however, also significantly affects the heart rate - as we exert ourselves our muscles demand more oxygen and nutrients and the heart must beat faster to increase blood circulation. After exercising the heart begins to return to its normal pattern. A well-conditioned heart, again being more efficient, quickly returns to its resting rate.