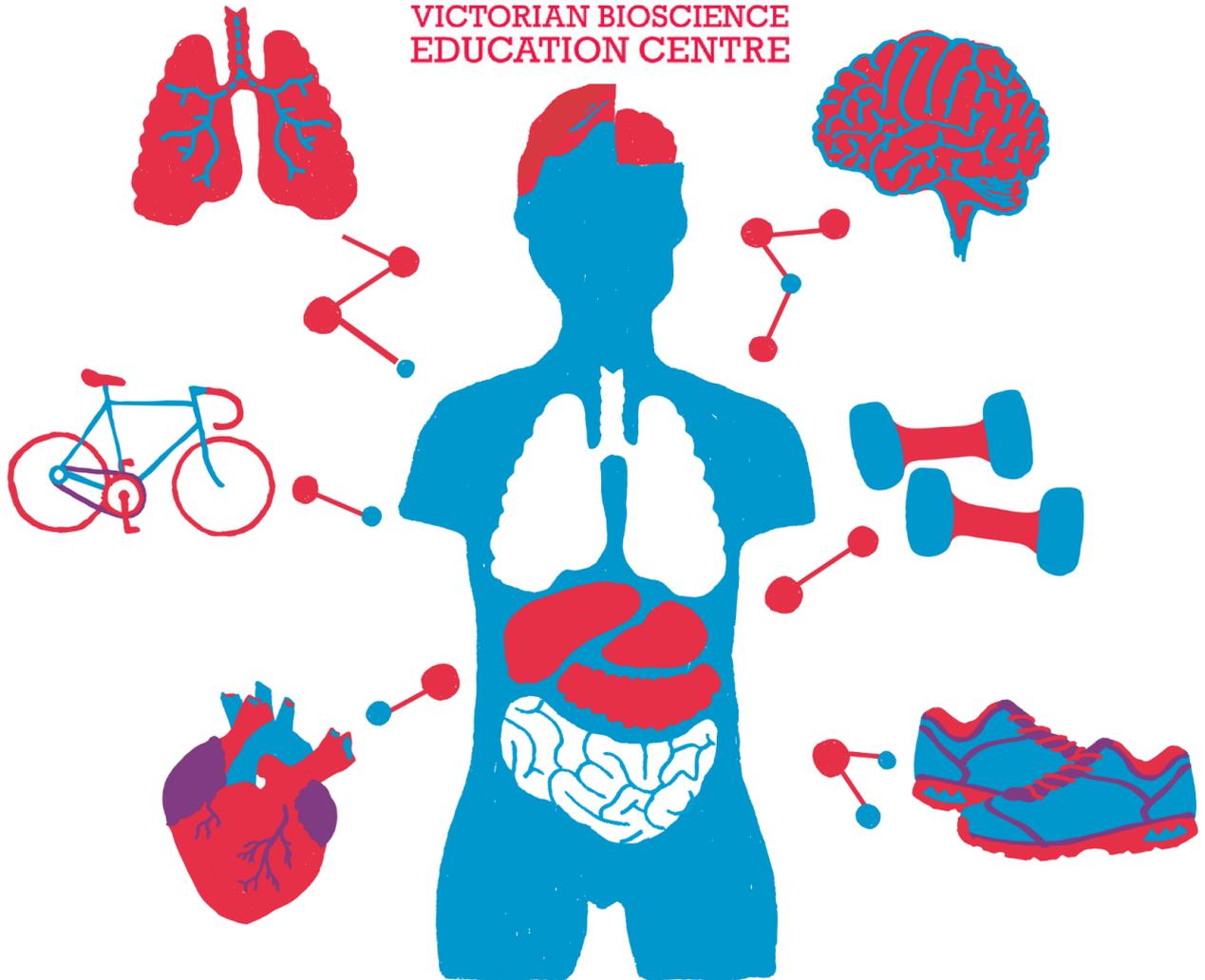


BioLAB

VICTORIAN BIOSCIENCE
EDUCATION CENTRE



Exercise and your heart: An investigation using digital technology.



Learning Intention

We are using digital technology tools to measure changes in heart rate during exercise and rest.

Success Criteria

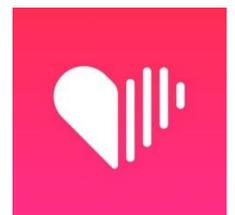
- Record and analyse individual heart rate data.
- Use affordable and accessible scientific equipment to collect heart rate data.
- Complete a range of moderate-vigorous exercises.
- Critically analyse accuracy of equipment and experimental method.

Equipment required:

	✓ / ☒
iPad or iPhone	
YouTube <u>Mindfulness and Meditation Video</u> - Press Ctrl and Click on link above	
Cardio: Heart Rate Monitor app *This is a free app to download	

How it works! - Cardio Heart Rate Monitor App:

Blood absorbs light. Every time your heart beats, the blood flow to your finger increases, causing more light to be absorbed. In between beats, less light is absorbed. By using your smartphone camera to capture tiny changes in reflected light from your finger, Cardio can calculate your heart rate.



Important tips when using the app:

- ALWAYS hold your phone steady, keep still, and don't talk during a measurement.
- Make sure your fingers are not cold.
- Cover the entire back camera lightly with your finger; don't press too hard to avoid restricting blood flow to your finger.



Experiment Method

Stage 1 - Rest:

- 1) Rest for 3 minutes - Lay down and relax. Listen to some relaxing music or try practicing mindfulness.
- 2) **Mindfulness & Meditation Link** - [Mindfulness and Meditation YouTube](#)
- 3) At the end of the 3 minutes, use the Cardiio app, to collect and record your resting heart rate.

Stage 2 – Easy Exercise:

- 1) Easy exercise for 3 minutes – We suggest jogging on the spot (light). Listen to some music to get you feeling ready to start exercise
- 2) At the end of the three minutes, use the Cardiio app, to collect and record your heart rate.

Stage 3 – Moderate Exercise:

- 1) Moderate exercise for 3 minutes – We suggest a combination of push ups, sit ups and squats in your bedroom or back yard. Listen to some more **upbeat** music to get you in the zone.
- 2) At the end of the 3 minutes, use the Cardiio app, to collect and record your heart rate.

Stage 4 – Hard Exercise:

- 1) Hard exercise for 3 minutes – We suggest running on the spot (hard) or running around your backyard as fast as you can. Listen to some pumped up music to get you going!
- 2) At the end of the 3 minutes, use the Cardiio app, to collect and record your heart rate.

Stage 5 - Rest:

- 1) Rest for 3 minutes - Lay down and relax. Listen to some relaxing music or practice mindfulness.
- 2) **Mindfulness & Meditation Link** - [Mindfulness and Meditation YouTube](#)
- 3) At the end of the 3 minutes, use the Cardiio app, to collect and record your resting heart rate.



Data Collection and Analysis

In the table below, record your heart rate at the **end** of each of the five stages of the experiment.

	Heart Rate	What type of activity did you do?
Stage 1 - Rest	_____ bpm	
Stage 2 - Easy	_____ bpm	
Stage 3 - Moderate	_____ bpm	
Stage 4 - Hard	_____ bpm	
Stage 5 - Rest	_____ bpm	

Extension: Using excel complete a **column graph** comparing your data at each of the five stages.

a) Describe what happened to your heart rate during the five stages of the experiment. Refer to data in the table in your answer.

b) Why do you think your heart rate changed throughout the experiment?



c) How accurate do you think the Cardio App technology is?
Suggest some things that may affect its accuracy during our experiment.

Can you think of anything in your daily life that might influence your heart rate?

Influence	How does this affect your heart rate?
Sleep	<i>Lack of sleep puts stress on the body, including the heart. Most school students should get between 10 and 11 hours of sleep a night.</i>

Further investigation: The human heart is very unique and everybody's heart beats differently. To observe this difference, use the same method to collect the heart rate of at least two other members of your household and record their results in the table below.

Name	Age	Rest	Easy	Moderate	Hard	Rest

Extension: Why don't you try and make your own experiment using this app.
Good luck!