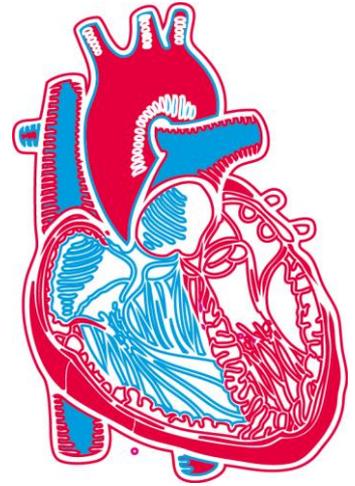


Introduction:

The human heart is an incredible muscle. Rhythmically beating, to keep us alive.

All human hearts have the same anatomical elements (two atriums and two ventricles), however every individual heart beats differently!

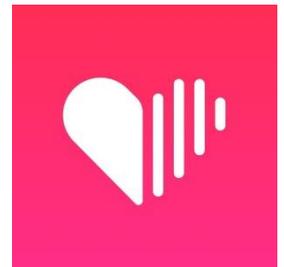
Factors such as genetics, exercise, diet, sleep and stress all result in a range of variations to heart rate.



Apps required:

To complete this challenge, we recommend using a phone app if you don't have access to a heart rate monitor.

- **Cardio: Heart Rate Monitor app** - This is a Free app from the iTunes/android store.



About the 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 for the best results when using the Cardio Heart Rate Monitor 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.

A day in the life of my heart.

Today's Challenge:

Today, you will be completing two challenges, aimed at analysing and recording changes to your heart rate throughout a normal day.

You will need to take a range of heart rate measurements at designated times throughout your day, recording all results

To complete this challenge try to ensure your day is as "normal" as possible. Whether it be breakfast, lunch or dinner times, going for a run or watching T.V, we just want you to go about your day doing the things you would normally do.

Challenge 1 - *Heart rate changes over one hour*

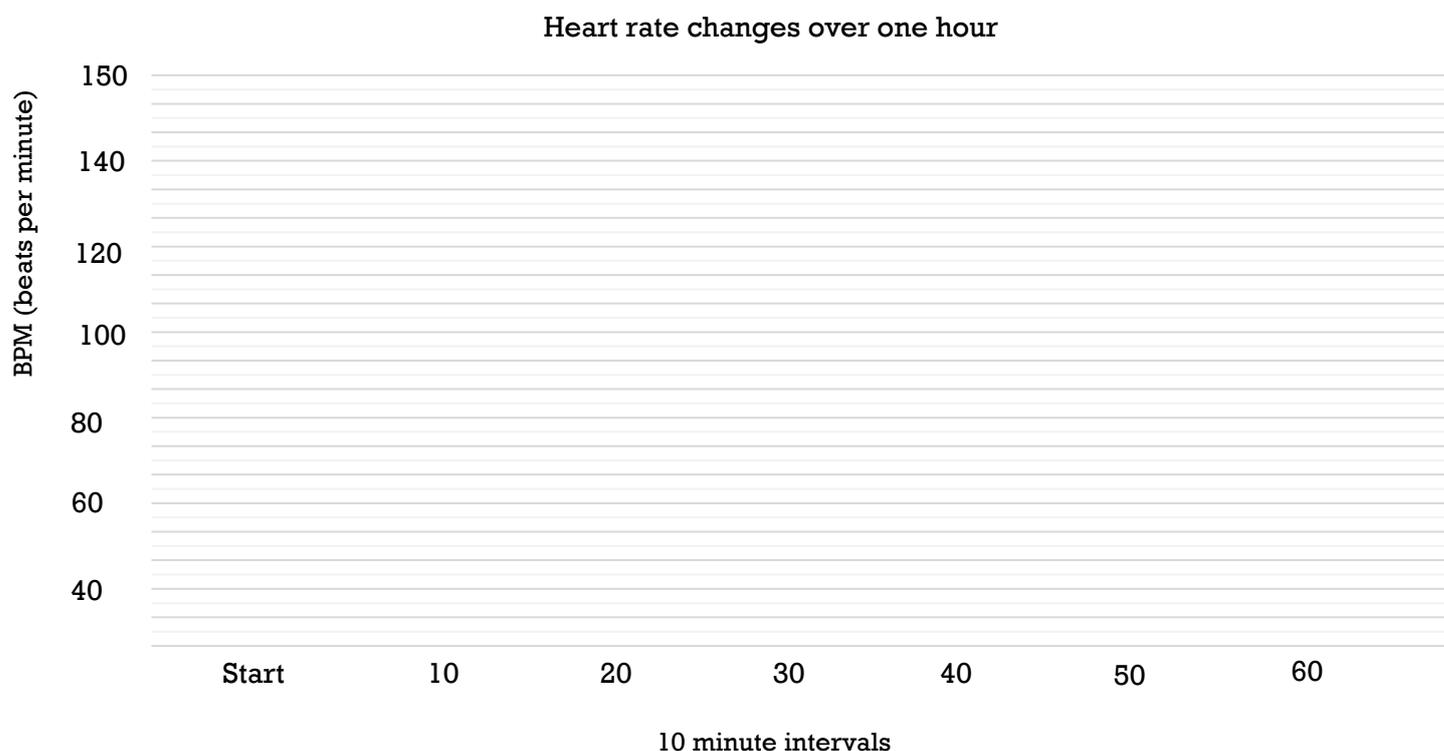
- You are required to;
 - Use the **Cardio: heart rate monitor app** to take seven heart rate measurements.
 - One heart rate measurement initially to start the challenge and then a measurement every **10 minutes** over the span of one hour.
 - Record heart rate data in the table below.
- Your heart rate will be recorded in BPM (*beats per minute*)

| Start | 10 minute mark | 20 minute mark | 30 minute mark | 40 minute mark | 50 minute mark | 60 minute mark |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | | | | |

A day in the life of my heart.

Results: Challenge 1 - *Heart rate changes over one hour*

Create a line graph comparing changes to your heart rate during challenge 1. *Ensure you use a ruler when completing your line graph*



Record 3 things you did during the hour (eg walking, read book etc):

1. _____ 2. _____ 3. _____

Record your highest and lowest heart rate for the hour

| | Interval Time | Heart rate recording |
|------------------------------|---------------|----------------------|
| Highest heart rate recording | | |
| Lowest heart rate recording | | |

A day in the life of my heart.

Challenge 2 - Heart rate changes throughout the day

You are required to;

- Use the **Cardio: Heart rate monitor app** to take seven heart rate measurements.
- One heart rate measurement every **two hours** over the span of the day.
- Record heart rate data in the table below.
- Your heart rate will be recorded in BPM (*beats per minute*)

| 8am | 10am | 12pm | 2pm | 4pm | 6pm | 8pm |
|-----|------|------|-----|-----|-----|-----|
| | | | | | | |

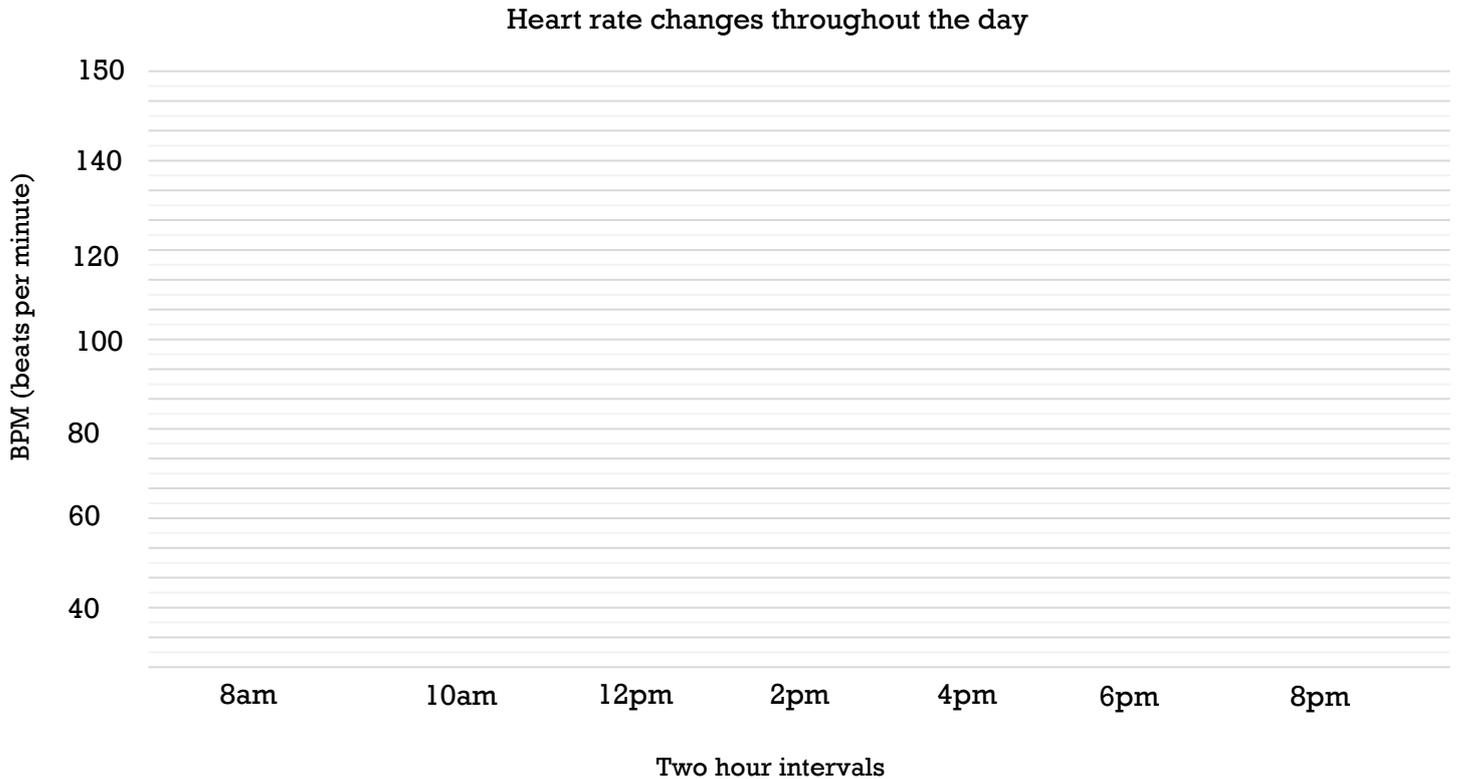
a) At what times of the day did you record your highest and lowest heart rates?

| | Time of day | Heart rate recording |
|------------------------------|-------------|----------------------|
| Highest heart rate recording | | |
| Lowest heart rate recording | | |

A day in the life of my heart.

Challenge 2 - Heart rate changes throughout the day

Create a line graph comparing changes to your heart rate during challenge 2.
Ensure you use a ruler when completing your line graph.



b) List three different activities you did throughout the day.

1. _____
2. _____
3. _____

Data analysis

- a) Using the data collected for both experiments, can you work out your average heart rate for both experiments?

| | Average heart rate |
|-------------|--------------------|
| Challenge 1 | |
| Challenge 2 | |

- b) During which experiment did you record a higher average heart rate? _____

- c) Why do you think this occurred?

- d) Why do we look at average heart rate data to analyse the results?

- e) Why did your heart rate continually change throughout the day?

- f) What time during the day it would be best to collect your resting heart rate?

A day in the life of my heart.

g) Identify and explain a limitation (problem) of using a phone app to collect heart rate data. What heart rate technologies would be best to use?

EXTENSION QUESTIONS

How can heart rate data be used to assist in improving an individual's heart health?

Design another heart rate investigation using the Cardio heart rate app.

Experimental Question (what will you be investigating?)

Hypothesis (what do I think might happen?)

Data Collection (when and how will you be recording your data?)

Results (what will you use to record results? (Graphs, tables etc)

Analysis (what calculations, graphs might help you to analyse your results?)
