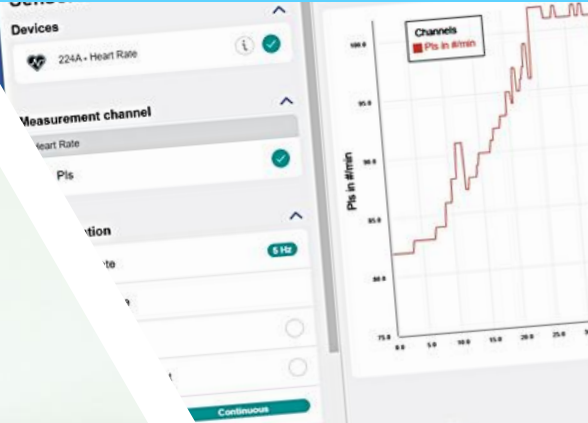


## Measuring Heart Rate using the Phywe Heart Rate Sensor

**PHYWE**  
excellence in science



**Difficulty Level**



Easy

**Group Size**



2

**Preparation Time**



5 minutes

**Completion Time**



10 minutes

Inspire young scientists and get them excited about their next discovery.

## What is Datalogging?

Datalogging is the process of collecting and storing data over time, looking at data sets, data points and logging intervals. This seamless collaboration between science, technology and data analysis is becoming a vital tool in education, for teachers and students alike.

## What are the educational benefits of datalogging?

- Develops higher-order thinking skills
- Encourages scientific reasoning skills
- Supports inquiry-based learning
- Improves and develops numeracy skills
- Works very well with EAL students
- Links the computing and science curriculum

## National Curriculum

- ✓ Key stage 4 Biology, Animal respiration AQA 4.4.2 and gas exchange in animals OCR B2.2 for GCSE science.

## Experiment:

**Measuring heart rate before, during and after exercise using the Phywe heart rate sensor.**



The normal range of a resting heart rate is between 50 and 100 beats per minute, while it can be significantly higher during or immediately after exercise.

The Phywe heart rate sensor can measure the resting heart rate and the changes in this during and after exercise. These readings can then be used to calculate recovery rate.

## What you need to get started:

- 1 x Phywe heart rate sensor (DA220120)
- 1 x chair
- Space to move

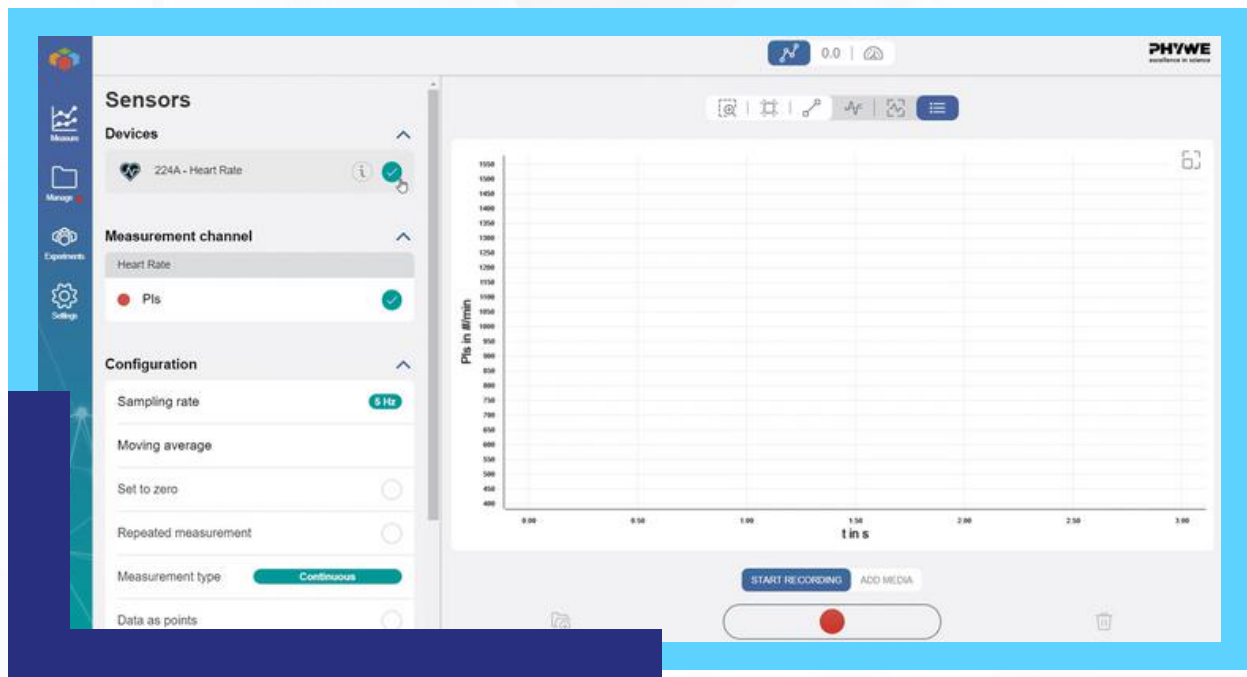
## NOTE:

If you have health issues that prevent you exercising, proceed with caution, or do not be the exerciser in this activity.



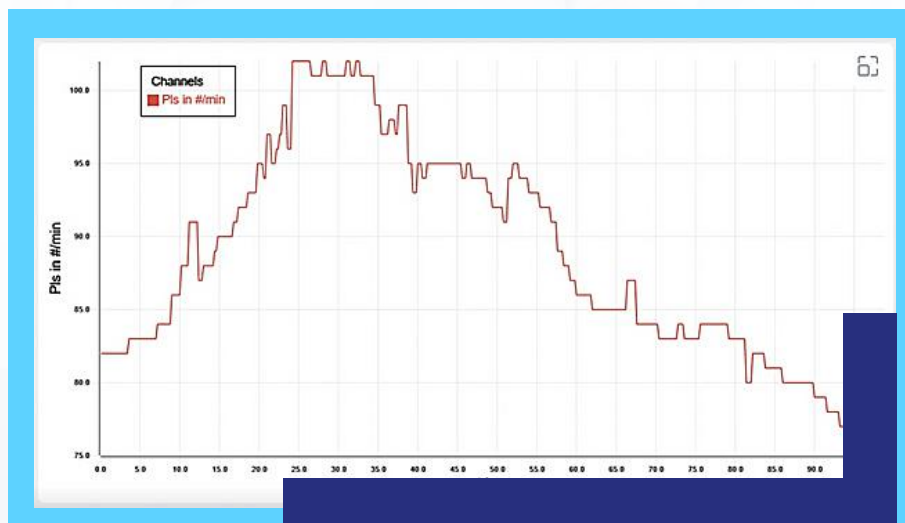
Set up the heart rate sensor with the MeasureApp:

1. Open the MeasureApp on your chosen device.
2. Connect the sensor to the MeasureApp: simply press the centre button for 3 seconds and the Bluetooth light will flash red, once connected to the MeasureApp, the light will turn green.
3. On the software the sensor will appear in devices, click on this, and it's ready to go.



## What you need to do:

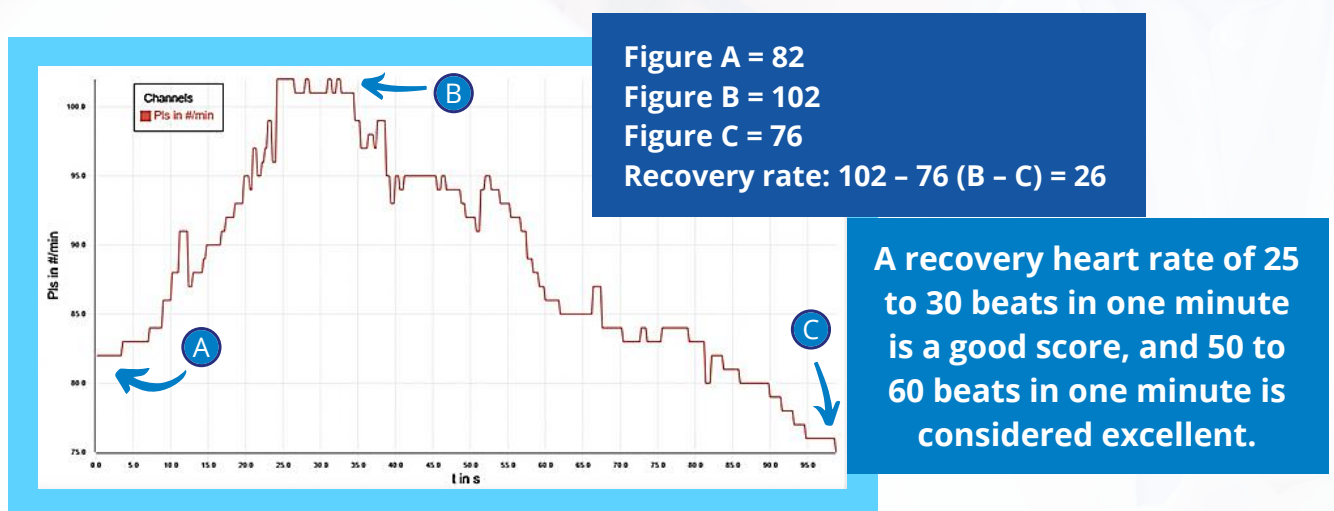
1. The person performing the exercise should sit on a chair and attach the heart rate sensor to their finger or their earlobe.
2. Check their heart rate reading on the MeasureApp for about 1 minute or until a 'base' reading is obtained.
3. Press 'Start recording'.
4. Start to exercise for between 30 seconds and 1 minute (this could be squats/star jumps or simply walking/jogging up and down in the available space).
5. Continue to monitor the heart rate on the MeasureApp.
6. Ask subject to sit back down and continue to monitor pulse rate for an additional 1 minute.
7. Press 'Stop recording'.



## Other information:

Recovery rate can be used as an indicator of overall fitness. To calculate the recovery heart rate:

- Take the resting heart rate figure - A
- Take the heart rate figure immediately after exercising - B
- Take the heart rate figure 1 minute after exercise - C
- Calculate  $B - C$ . This is the recovery heart rate number, the higher the number the fitter the person.



## How this sensor works:

The heart rate sensor takes measurements optically with an infrared light source and a photosensitive detector. During transmission, the detector and emitter are opposite each other. When the heart contracts, the finger bed fills with arterial blood, then, during diastole the blood volume drops to its lowest level.

As the heart rate sensor sends an infrared beam through the finger the hemoglobin in the blood absorbs this infrared light, therefore the higher the blood volume in the finger, the higher the light absorption by the hemoglobin. As the light absorption changes so does the signal picked up by the detector.

***To get more information on datalogging, our range of Phywe Bluetooth sensors, and for more useful resources, visit our website.***

***Free software is provided with our range of sensors. Compatible with the majority of devices, datalogging is simple to understand and cost-effective.***

Explore the range...

