



## Driving Question:

*How does exercise affect your breathing frequency?*



## Thinking about the question

How does running or resting affect your breathing?

In this activity you are going to monitor the breathing patterns and explore how exercise affects your breathing frequency (respiratory rate). You will use a thermocouple sensor to measure the temperature of air passing when you breathe in and out. The result is displayed as a wave, which you can use to find the respiratory rate.

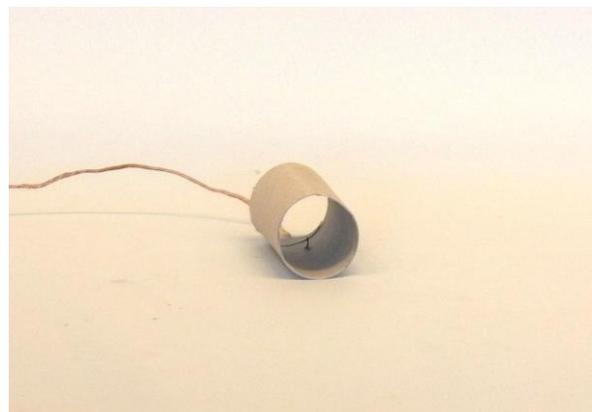
## Materials

In your investigations you will use:

- Interface or data-logger e.g. CMA Vincilab,
- Thermocouple sensor,
- Cardboard tube.

## Investigations

1. Place the tip of the thermocouple wire in a cardboard tube as shown on the photo. The test subject will breathe through this tube.
2. Connect the thermocouple to the input 1 of your data-logger.
3. Open Coach Activity 'Human breathing'.
4. Let the test subject sit quietly in a chair.
5. Let the test subject position the tube with the thermocouple in front of his mouth.



6. Let the test subject breath via the tube in an out as normal as possible and start the measurement.
7. After the measurement stopped save the data.
8. Let the test person do some vigorous exercise such as running up and down the stairs a few times.
9. Repeat step 4 to 6.
10. Do the same experiment for a longer period. You will be able to study how fast breathing frequency recovers after the exercise.
11. Describe a resting breathing pattern. How many breaths were taken each minute.
12. Compare the results before and after the exercise. Explain the differences.
13. Compare the results of the extra experiment (step 10) between different students.
14. How does condition affect the recovery of breathing frequency?
15. Determine the respiration period and rate.
16. Combine this experiment with the recording of the heart rate.
17. Are there differences between males and females?
18. Does a person's length have any influence?

### **Resources:**

Coach Activity: Human breathing.cma7