**Fitness testing using pulse rates**

**Levels:** 3-4  
**NoS achievement aims:** Understanding about science, Investigating in science   
**Contextual strands:** Living world   
**Topic:** Sports Studies

**Rationale**

A low pulse rate and fast recovery time after exercise can be indicators of good physical fitness.

This investigation encourages students to develop their investigative skills by thinking carefully about the quality of the data they collect.

**What you need**

* A stopwatch, watch, or clock that can measure seconds (one per student).

**Focus**

* How can pulse rate be measured? Is there more than one site on the body where a pulse can be taken? Over what time period should the pulse be recorded? Ten seconds? Two minutes?
* Which aspect of the work that the body does is measured by pulse rate?
* Is there a link between pulse rate and fitness? If so, what is it?  
  Note: The resting pulse rate is not, on its own, an indicator of fitness. Even amongst fit people, there is variation in resting pulse rates. Generally speaking, the pulse rate gets slightly lower as fitness increases because, when the muscles are fit, the heart can work more efficiently.
* How many times do you think you will need to repeat an investigation in order to get reliable data? Why?
* How could you make sure the pulse rate reported is correct and reported honestly?

**Exploration**

1. Discuss in the class how, in different synchronised situations, you might make a fair comparison of pulse rates, for example:
   * everyone sits down at the same time, for the same period of time
   * everyone does identical actions at the same time
   * everyone takes his/her pulse rate at the same time using the same recording methods.
2. Get students to find their pulse by using their fingers on the inside of their wrist. (Don’t use a thumb because it has a pulse of its own.)
3. Have them use the stopwatch, and count their pulse for 15 seconds.
4. Multiply the number of pulse beats by four to get the number of heartbeats per minute, and record the result.
5. Get them to repeat the process several times.
   * Do you get the same number each time? If not, why not?
6. Repeat the class pulse-taking in different synchronised situations, for example, sitting down and standing up; before, during and after exercise (this will provide data for indicating recovery rates – the time it takes the pulse to slow down after exercise).
7. Get the class to survey their results to find out the range of pulse rates.
8. Discuss with the class how they felt about recording this personal data:
   * What did you expect your pulse rate to be? Was it what you expected?
   * Were you influenced by knowing others’ pulse rates, or by knowing anything about the connection between pulse rate and fitness? If so, in what way were you influenced?

**Reflection**

* Why is pulse rate a useful science idea? In what way(s) is it helpful when asking questions about the health of the body? (It is easily measured, and meaningfully connected to bodily processes.)
* Think about how honest you were when recording your data in this investigation. (It is not necessary for students to respond publicly about their levels of honesty.) Do you think scientists are ever tempted to slightly shift data towards what they’d like it to be?
* Was it always easy to be accurate?
* What difficulties did you encounter when trying to compare each other’s measurements?
* What general statement can you make about relationship patterns between exercise and pulse rate?