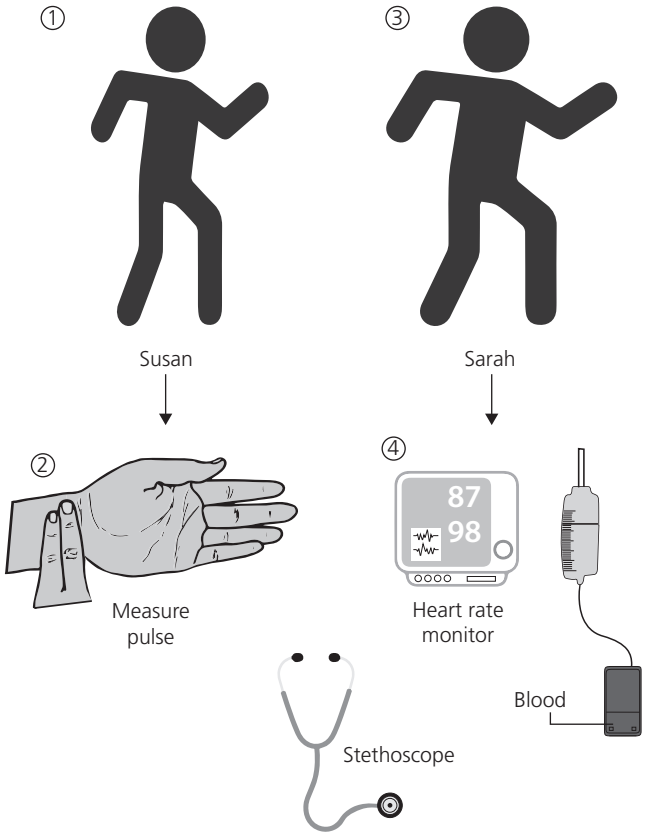
B4 Gas exchange systems

B4.3 Exercise, asthma and smoking

Guided explanation

How has technology improved how we monitor health?

Draw the diagram below and explain as follows:



1. This is Susan. She is exercising but has recently been feeling tired soon after exercising.
2. She checks her pulse to determine her recovery rate. The recovery rate is the length of time it takes for the heart rate to return to normal after a period of exercise. Susan measures her recovery rate by checking her pulse before she exercises and monitoring it after she finishes her exercise. While this is a useful way to check her recovery, Susan cannot really monitor anything else by taking her pulse.
3. This is Sarah. Sarah is also feeling tired after exercise. She decides to go to the doctor's.
4. The doctor checks her heart rate using a heart rate monitor, collects a sample of her blood for tests and uses a stethoscope to listen to her heart. All these checks mean that the doctor can identify any issues that Sarah has and help improve her health. Technology has improved how we can monitor health, as we now have accurate blood tests that can tell us whether we have a higher chance of developing diseases like cancer or whether we are recovering well from treatment. We can check whether there are issues with our brains and other internal organs by using improved scanning techniques. We can use better blood pressure monitors to tell us if our heart is working well or if there is a problem. We can diagnose cancer earlier because we have better technology that means we can catch it sooner and treat it early. Because of all these advances in technology, we have a better quality of life and can live longer and healthier lives.

Core practical

Measuring recovery time

A method is provided on the *Practical worksheet* and *Teacher and technician notes* in Boost – including equipment list and safety notes – if you wish to allow your students to proceed independently. However, for most students it will ordinarily be better to take a *Slow Practical* approach following the guidance below.

You will need a pulse meter or heart rate monitor and a stopwatch. Students should work in pairs or groups of three.

1. Assign the equipment by getting students to collect apparatus as needed and return to their workstations. They should remain seated for 2 minutes before the start of the practical.
2. Demonstrate how to use the pulse meter or heart rate monitor to measure resting heart rate in beats per minute (bpm). If these monitors are not available, then demonstrate using two fingers on the side of the wrist to find a pulse. Ask students to count the number of pulses in 30 seconds and multiply this number by 2 to work out their beats per minute.
3. Ask students to do some exercise (star jumps or running on the spot) for 1 minute. Ensure the exercise is sufficient to raise the heart rate well above resting heart rate.
4. Ask students to measure their heart rate immediately after the exercise and note this down for the 0 minute mark.
5. Ask students to repeatedly measure their heart rate every minute for up to 8 minutes to determine their recovery time. Their recovery time is the number of minutes it takes for the heart rate to return to its resting value.