Temperature and exercise

Aim
You are going to investigate the effect of exercise on the human body.

Materials required
• digital thermometer
• stepper set to lowest level

Safety
! If you are excused from PE, tell your teacher.
! If you are asthmatic, you may need your inhaler.
! Do steady exercise; do not race against other people.
! Clean the thermometer with antiseptic wipes before and after use.

What to do
1 Use the digital thermometer to measure your resting temperature by placing the thermometer under your tongue for two minutes.
2 Measure and record your resting temperature and breathing rate by counting the number of chest movements made in one minute.
3 Step up and down once every three seconds for two minutes.
4 Measure and record your temperature and breathing rate again immediately after exercise and state whether you are sweating.

Analysis of your results
1 Calculate the percentage change in temperature during the activity.
2 Calculate the percentage change in breathing rate during the activity.
3 Why do people sweat during exercise?
4 Describe what happens when you sweat.
5 What do body cells need to work properly?
6 You have been provided with the following: computer and datalogging software, temperature sensor and interface unit, an exercise bicycle and stopwatch, design an experiment to investigate the effect of exercise on temperature.

7 Read the passage below and then answer the questions:

James and Samir are taking part in the Great North Run. The day is unusually warm and James and Samir are feeling very hot and are soaked in sweat. At the end of the run, James drank 1 litre of water and Samir drank 1 litre of a glucose-containing sports drink. Later in the day James started complaining of thirst. He also felt sick and light-headed. After a while James started to act strangely. He seemed disorientated, argumentative, hot, tired and thirsty. Samir realised something was wrong and took James to the nearest hospital.

i Why were James and Samir feeling hot?
ii Why were James and Samir soaked in sweat?
iii Why was James complaining of thirst?
iv At the hospital, James was found to be dehydrated and suffering from hyperthermia (high body temperature). He was told his condition was caused by water and salt loss. He was given a solution consisting of salts and sugars dissolved in water, which he was told to sip slowly over a period of one hour. Suggest why this solution was needed.

v What could James have done to prevent hyperthermia?