**Investigation into the effect of exercise on pulse rate STUDENT**

**Introduction**

The normal heart rate (pulse rate) of a young adult human is around 60-80 bpm. When individuals undertake exercise this can affect their heart rate. You will investigate whether short duration low and moderate intensity exercise activities produce a significant change in heart rate in a group of young adult volunteer subjects.

**Aim**

* To investigate the effect of exercise on pulse rate in young adult humans*.*

**Intended class time**

* 1 - 2 hours

**Chemicals**

Not applicable for this activity.

**Equipment (per group)**

* Stopwatch/ timer
* Calculator
* Exercise equipment if required and available

**Health and Safety**

Subjects should be fit and willing and should stop exercising if they feel unwell. Please make your teacher aware of any underlying medical conditions that could affect your participation in this activity.

**Procedure**

*Note: You will investigate the effect of low and moderate intensity exercise on heart rate. You will use statistical tests to evaluate two null hypotheses using data gathered from a group of test subjects.*

***Null hypothesis A****: Low intensity exercise produces no change in heart rate in young adult healthy humans.*

***Null hypothesis B****: Moderate intensity exercise produces no change in heart rate in young adult healthy humans.*

*A formula sheet is available to support this practical activity.*

1. Working individually, design two exercise regimes according to the following criteria:

Low intensity:

* 3 minutes duration
* Feasible given the equipment and venue available to you
* Low intensity (should not produce any sensation of exertion in healthy subjects)
* Standardised (such that two subjects can carry out identical exercise)

Moderate intensity:

* 3 minutes duration
* Feasible given the equipment and venue available to you
* Moderate intensity (healthy subjects will notice mild exertion but should feel they could maintain this level of exercise over a long period of time)
* Standardised (such that two subjects can carry out identical exercise)
1. Discuss your ideas with the rest of the class and reach an agreement on which two regimes (one low intensity, one moderate) will be adopted by the whole group. These need not be two regimes from the same individual and it might be that the final agreed regimes are modified in the light of class discussion.
2. Agree on the details of the standardised way in which each subject will carry out each regime and measure the resulting pulse rate.
3. Once all subjects have completed both regimes and recorded their pulse rates, collect all the data, record it in an appropriate format and complete your write up. Include your conclusions concerning the two hypotheses above.

**Extension questions**

1. Why does exercise affect pulse rate in humans?
2. What further human responses could you go on to investigate?
3. Ethical and health and safety issues are important when deciding whether an individual can be a test subject. How will you determine who can participate as a test subject?
4. Evaluate the validity of the chosen method (the regimes used, the method provided and the group of test subjects) in this investigation.

**To submit**

For this piece of work to count towards Practical Activity Group 11 of the GCE Biology Practical Endorsement, you need to have a record of the two regimes you designed independently as well as evidence of the data collected from the group. You should have analysed the data collected and drawn a conclusion about the effect of low and moderate intensity exercise on pulse rate. Answering the extension questions will aid you in preparation for your written examinations.