

Teacher Packs in Experimental Science

BIO Pack 10

Investigating the effect of physical exercise on pulse rate

Pack contents

- A. Teachers' Guide
- B. Students' Guide
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Curriculum areas covered

Year 1 Semester 2 Unit 4.0 of Diploma in Basic Education Biology Curriculum for designated Science and Mathematics Colleges of Education in Ghana.

Title: Investigating the effect of physical exercise on pulse rate

Target group: Diploma in Basic Education

Also Suitable for: Senior High School Students

Learning Outcomes:

These are the learning outcomes expected after students have gone through this Pack

1. Knowledge and Understanding

KN1 understand the effect of physical exercise on the heart

KN2 describe the rate of heart beat

KN3 understand systolic and diastolic pressure of the heart

2. Cognitive Skills

CS1 state the effect of exercise on pulse-rate

CS2 describe what happens to pulse–rate during the recovery period following exercise

CS3 account for the alteration in pulse-rate during and after exercise

3. Key Skills

KS1 recording data

KS2 manipulating data

KS3 predicting from data

KS4 inferring from data

KS5 displaying data graphically

4. Practical Skills

PS1 locate the position of the radial pulse in the wrist

PS2 take pulse rate correctly

A. Teacher's Guide

This pack is to introduce students to investigate the effect of exercise on pulse-rate of the circulatory system.

- Ensure there is a stop- clock/watch with seconds hand
- Provide Graph sheets / paper
- Ensure students have pencils, rule and erasers
- Guide students to work in pairs – one member acting as the subject and the other assisting by keeping a record of the results
- Let the subject locate, using the first and second fingers, the position of the radial pulse in their wrist.
- Let the students take the pulse-rate of their colleagues in a relaxed sitting position for a period of 3 minutes, keeping a separate record for each minute.
- Students should then determine the average pulse-rate at rest
- Let the subject carry out one-minute vigorous exercise by running on the spot
- Instruct the one who took the exercise to sit down immediately for their colleague to measure their pulse
- Taking of the pulse should continue over a period of 15 minutes and the pulse – rate at the end of each minute recorded.
- Instruct the students to plot a graph of: 'Pulse – rate' against 'Time in minutes', to show the relationship between exercise and pulse-rate, following experimental procedure strictly.

Sample Assessment Questions

- What is the effect of exercise on pulse – rate?
- What happened to the pulse- rate during the recovery period following exercise?

B. STUDENTS' GUIDE

Background Information

In this activity, you will learn about blood and the circulatory system, thus extending your knowledge of human anatomy and physiology. The circulatory system covers the structure and functions of the heart, blood and blood vessels as well as disorders associated with them, including the importance of exercise and regular checking of heart beat and blood pressure of a person. This activity is designed to investigate the effect of exercise on pulse- rate.

Equipment / Materials

Stop – clock / Watch with seconds hand

Other requirements

Graph paper, Pencil / pens, Erasers, Ruler / rule

Experimental Procedure

- Work in pairs – one member acts as the subject while the other takes measurements and keeps record of the measurements.
- The one who is not the subject uses their first and second fingers to locate the position of the radial pulse in the wrist of the subject.
- Take the pulse – rate of the subject in a relaxed sitting position for a continuous period of 3 minutes and record the pulse – rate for each minute separately.
- Calculate the average pulse – rate of the subject (your colleague) at rest
- Let the subject have one minute vigorous exercise by running on the spot
- Let the subject sit down immediately and begin to count his pulse rate
- Continue to take the pulse of the subject repeatedly over a period of 15 minutes and record the pulse – rate at the end of each minute
- Plot a graph of: 'Pulse – rate' against 'Time in minutes' to show the relationship between exercise and pulse- rate. Adhere strictly to the experimental procedure.
- Change over the roles you played: The subject now takes the measurements and the one who took measurements at first becomes the subject.

Reflection on the experiment

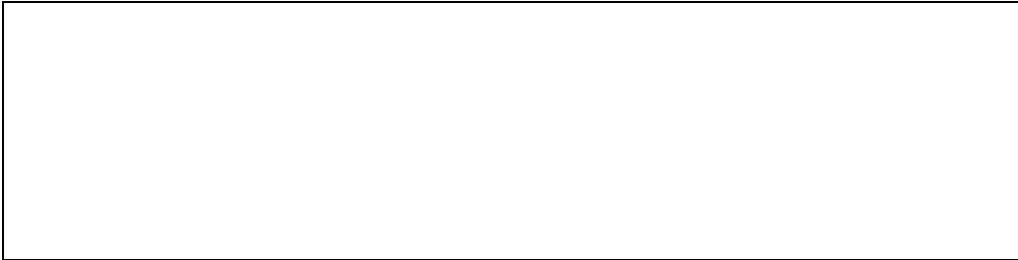
Take some time to reflect on the activity carried out. Ensure that you have understood the procedure followed. If clarification is needed, discuss it with your teacher or colleagues.

- Do you think this activity could be done in a different way? Give reasons for your answer.
- What other things can you do to enhance your knowledge of the breathing mechanism in humans? Discuss with your group.

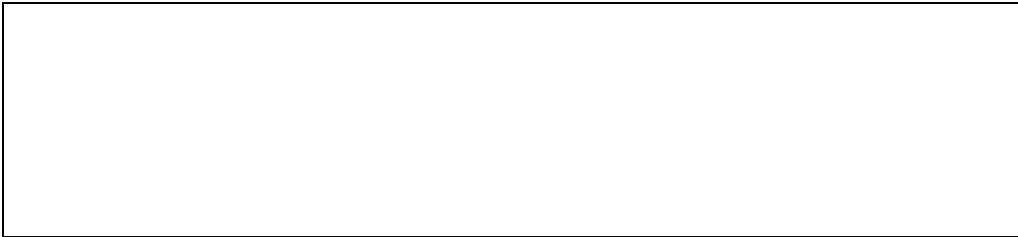
C. Assessment – Students Sheet

On completion of the experiment, you should answer the following questions:

1. What is the effect of exercise on pulse- rate? (CS1)



2. What happened to the pulse – rate during the recovery period following exercise? (CS2)



3. Account for the alteration in your pulse- rate during and after exercise. (CS3)



4. Plot a Graph to show the relationship between exercise and pulse-rate (KS5)

5. What conclusions can you draw from your Graph? (KS4)



D. Extensions to the experiment

Investigate the relations between exercise, pulse-rate and the rate of breathing.

E. Useful links

Mensah, S. K. E. (1992) *Source Book for Science Teachers (Biology)*. Cape Coast: Institute of Education

F. Health & Safety

- You are responsible for your immediate working area
- At the end of the activity, ensure that your working area is clean.
- Be careful when taking readings with the clock/ watch.
- Wash hands well with soap after the experiment

G. Evaluation

Answer the following questions

- How did you like the pack?
- What would you like to have included to make the pack more beneficial?