General Certificate of Secondary Education
June 2012

Human Health and Physiology 44152/TN

Unit 2 Investigations in Human Health and Physiology

Teachers' Notes Confidential

Investigative Skills Assignments (ISAs)

- **ISA 1 – Energy from Food**
- **ISA 2 – Lung Capacity**

Valid for Moderation in June 2012

For immediate release to the teacher(s) responsible for GCSE Human Health and Physiology

All controlled assessment marks to be returned to AQA by 7 May 2012

Introduction

1 The Investigative Skills Assignments (ISAs) will be available to Examinations Officers (EO) in April 2011. The EO may print out **one** copy of the ISAs for the use of the Head of Human Health and Physiology but this copy **must** be kept under secure conditions.

2 The ISA papers must **not** be downloaded on to the centre's intranet, neither should any electronic copies be made.

3 Teachers' Notes are sent out in advance of the ISA papers so that teachers can incorporate the ISAs into their schemes of work.

4 Candidates may attempt one or both of the ISAs supplied by AQA, and submit the best mark to AQA. Candidates may **not** attempt an ISA more than once. **New ISAs are issued each year and are valid for one year only.**

5 **Do not use the 'live' ISAs for practice purposes.** These ISAs may be used from September 2012 for practice.

6 Candidates should be entered in February for controlled assessment moderation in the following June.
A mark is not needed at the time of entry but should be submitted to AQA and the moderator by 7 May. The marks must be submitted on the Centre Mark Form (CMF). The centre should also circle the highest and lowest non-zero mark on the CMFs.

7 The teacher should ensure that the PSA mark has been added to the ISA mark to make a total controlled assessment mark.

8 The entry code for Unit 2 (controlled assessment) is **44152**.

9 The entry code for certification in Human Health and Physiology is **4417**.

10 ISAs require candidates to use information from their own experiment to answer some of the questions in Section 2. Consequently as far as possible, centres should use tasks **very similar** to the ones detailed in the Teachers' Notes.

11 Further information about conducting the ISA can be found in the *'Guidance Notes for Controlled Assessment'* accessed through the Teacher Resource Bank for GCSE Human Health and Physiology
http://www.aqa.org.uk/qual/newgcses/science/new/human_materials.php?id=03&prev=03

GCSE Human Health and Physiology ISA

ISA 1 – Energy from Food – Teachers' Notes

Valid for Submission in June 2012

This ISA relates to Section 3.3.2: Nutrition.

Area of Investigation
This work should be carried out during the teaching of the section relating to:

- **why a person is malnourished if their diet is not balanced**
- **the effects of reducing or increasing the various components in the diet.**

Candidates should be able to use practical and enquiry skills to:

- investigate the energy content in different foods
- interpret food labels with particular reference to quantities and energy values of the nutrients
- understand the need for controlling variables and the principle of a fair test
- distinguish between the independent and dependent variable
- present data in a suitable form
- draw conclusions
- evaluate the method used and suggest possible improvements eg choice of measuring instrument, range of values chosen, number of repeats.

It is recommended that the investigation is put into an applied context.

- Food analysts use a range of techniques to identify the contents of foods.
- Health scientists can advise people about the variations in diet to control normal growth and some health problems such as diabetes and heart disease.

Risk Assessment
It is the responsibility of the centre to ensure that a risk assessment is carried out. The teacher's attention is drawn particularly to the risk of burns during the igniting of food samples. Eye protection should be worn.

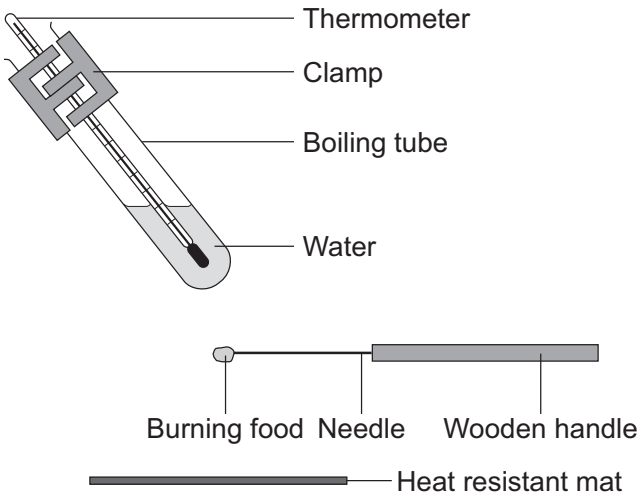
The Practical Work
Candidates should be given the opportunity to carry out an investigation concerning the energy content in a range of different food types.

For this part of the investigation candidates may work individually or in groups. All candidates must be involved in the investigation.

A suggested method is described overleaf, but centres may adapt this method to suit their own needs. For each ISA undertaken by a class, the teacher **must** complete an ISA Explanation Sheet and include this with the sample of work sent to the moderator. Instructions of a general nature may be given to the candidates, but these must not be so prescriptive as to preclude candidates from making their own decisions.

Suggested method:

- record the mass of the chosen food sample
- add a measured volume of water to a boiling tube
- set up the apparatus as shown in the diagram below
- record the temperature of the water
- ignite the food with a Bunsen burner
- hold the burning food beneath the boiling tube of water
- record the temperature of the water when the food has been completely burned.



Candidates should choose:

- a sensible range of at least three different food types (for example, three different types of biscuit would be unlikely to generate meaningful results)
- to collect sufficient results to be able to calculate a mean for each food type.

Candidates need to produce a table for the results.

They will need to have collected sufficient data to enable them to display these results in a graph or bar chart. (Refer to the Teachers' Guide for further clarification.)

The Data Processing

For this part of the investigation candidates must work individually under direct supervision.

Following the practical activity, candidates will need to calculate a mean for each food type.

Each candidate must draw a graph or bar chart to show his or her **mean** results.

The candidates' work should be collected by the teacher at the end of this session and returned to the candidates only when they undertake the subsequent ISA test.

Candidates' work must **not** be annotated with additional information, by either the teacher or the candidate, which would give them an unfair advantage during the ISA test, eg the use of the terms independent/dependent variable.

GCSE Human Health and Physiology ISA

ISA 2 – Lung Capacity – Teachers' Notes

Valid for Submission in June 2012

This ISA relates to Section 3.3.5: Gas exchange.

Area of Investigation
This work should be carried out during the teaching of the section relating to:

- **gas exchange and the measurement of lung capacity**.

Candidates should be able to use practical and enquiry skills to:

- investigate the lung capacity in different individuals
- understand the need for controlling variables and the principle of a fair test
- distinguish between the independent and dependent variable
- select a suitable range of values for the independent variable
- present data in a suitable form
- draw conclusions
- evaluate the method used and suggest possible improvements eg choice of measuring instrument, range of values chosen, number of repeats.

It is recommended that the investigation is put into an applied context.

- Doctors and nurses can monitor diseases of the respiratory system such as asthma, emphysema and cystic fibrosis.
- The patient's main lung volumes can be recorded using a spirometer.

Risk Assessment
It is the responsibility of the centre to ensure that a risk assessment is carried out.

The Practical Work
Candidates should be given the opportunity to carry out an investigation which allows them to measure and compare the lung capacities of different individuals.

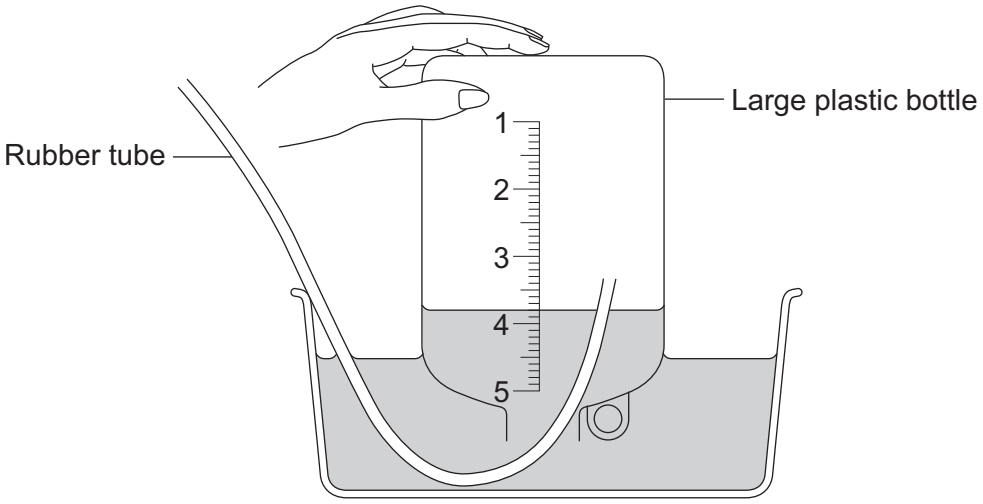
For this part of the investigation candidates may work individually, in groups or in pairs: one (or more) candidate(s) doing the trial and one observer holding the container upright. All candidates must be involved in the investigation.

A suggested method is described overleaf. Centres may adapt this method to suit their own needs but the method must involve the **displacement of water**. For each ISA undertaken by a class, the teacher **must** complete an ISA Explanation Sheet and include this with the sample of work sent to the moderator. Instructions of a general nature may be given to the candidates, but these must not be so prescriptive as to preclude candidates from making their own decisions.

Turn over ▸

Suggested method:

- set up the apparatus as shown in the diagram below
- a large plastic container used to store squash is ideal but will require calibrating
- half fill a bowl of water and hold the container filled with water upside down in the bowl
- remove the lid of the container being careful not to let any air into the container
- push a length of tubing into the mouth of the container
- mark the starting level of the water in the container
- inhale deeply and blow through the tube until you can exhale no more
- using the graduations marked on the container record the volume of water remaining in the container
- the amount of water displaced (difference between the start and end volume of water) is an approximate measure of the maximum volume of air which the lungs can breathe out.



Candidates should choose a continuous variable to investigate such as height or age. The task should be repeated a sufficient number of times or with a sufficient number of individuals in each group in order to obtain a mean.

Candidates need to produce a table for the results.

They will need to have collected sufficient data to enable them to display these results in a graph or bar chart. (Refer to the Teachers' Guide for further clarification.)

The Data Processing

For this part of the investigation candidates must work individually under direct supervision.

Following the practical activity, candidates will need to calculate, or be given, the mean result for each value of the independent variable.

Each candidate must draw a line graph or bar chart to show the **mean** results for each value of the independent variable.

The candidates' work should be collected by the teacher at the end of this session and returned to the candidates only when they undertake the subsequent ISA test.

Candidates' work must **not** be annotated with additional information, by either the teacher or the candidate, which would give them an unfair advantage during the ISA test, eg the use of the terms independent/dependent variable.

GCSE Human Health and Physiology (44152)

ISA Explanation Sheet

to accompany each ISA

(You will need to fill in more than one of these sheets if different students have carried out different methods)

Centre Number						Year of submission

ISA Title

Name of Teacher	

Independent variable	Dependent variable

Did you make any changes to the suggested method?

YES / NO

If YES give details of any changes you made to the suggested method, the equipment, chemicals etc for this investigation.

Any other information:

Teacher Signature:

Please attach any experimental worksheet or outline used by the candidates to carry out the investigation if available.