Assignment
Instructions for candidates

These instructions apply to the assignment for National 5 Physics.

This assignment is worth 20 marks. The marks contribute **20%** of the overall marks for the course assessment. That is the difference between a pass (50% and an A grade 70%!)

It assesses the following skills, knowledge and understanding:

- applying knowledge of physics to new situations, interpreting information and solving problems
- planning, designing and safely carrying out experiments/practical investigations to test given hypotheses or to illustrate particular effects
- selecting information from a variety of sources
- presenting information appropriately in a variety of forms
- processing the information (using calculations and units, where appropriate)
- making predictions based on evidence/information
- drawing valid conclusions and giving explanations supported by evidence/justification
- suggesting improvements to experiments/practical investigations
- communicating findings/information

Your teacher or lecturer will tell you how the assignment will be carried out and any required conditions for doing it.

In this assignment you have to investigate a topic in physics by doing research. Your research involves gathering data/information <u>from an experiment</u> and from internet/literature sources.

You then produce a report on your investigation.

Your report is not marked at any point by your teacher or lecturer. It is sent to SQA for marking.

Your assignment has two stages:

- research
- report

Research stage

Choosing your topic

- You need to choose a relevant topic in physics to investigate.
- Your topic must be agreed with your teacher or lecturer.

Deciding your aim

- Once you have chosen your topic you need to decide what the aim of your investigation is. Remember that you need to do an experiment **and** try to find data/information to compare with your experimental results.
- Your teacher or lecturer will provide advice on the suitability of your aim.

Experimental research

- When choosing your experiment, remember it must allow measurements to be taken.
- When carrying out your experiment, you must either work on your own or as part of a small group. If you are working as part of a small group, you must take an active part.
- Make sure you take measurements over a wide enough range to meet the aim of your investigation.
- You should repeat measurements, if possible.
- You will use your raw experimental data during the report stage.

Internet/literature research

- You need to find data/information from the internet, books and/or journals that you can compare to your experimental data. This could be a table or a graph, or information from diagrams or text.
- It is important that you record where you get your data/information from in enough detail that another person could find it. This is known as a reference.
- In your report you need to explain, in your own words, the physics relevant to your aim. You can gather information using the internet, books and/or journals.

Report stage

Producing the report

- **The report must be all your own work**.
- When producing your report, you are supervised by your teacher or lecturer at all times.
- You have **1 hour and 30 minutes** to complete your report.

Resources

In the report stage, the only materials you are allowed to have are:	**In the report stage, you cannot have a previously prepared:**
• these instructions for candidates • information you have gathered from the internet, books and/or journals to help you explain the physics relevant to your aim • the experimental method • your raw experimental data • your internet or literature data/information, including the reference to the source of the data/information	• draft of your report • draft of your explanation of physics relevant to your aim • specimen calculation or set of calculations for mean or derived values • graph • comparison of data • conclusion • evaluation of your experimental procedure

Guidance on producing your report

Your report must be easy to follow.

You may find that using headings will help to make your report clear.

Title

- Your title must tell the reader what your report is about.

Aim

- Your aim must describe clearly the purpose of your investigation.

Underlying physics

- You must explain the physics relevant to your aim.
- You must use your own words as much as possible.
- You may choose to include:

  — relationships or equations

  — definitions of symbols used

  — explanations or justifications of relationships or equations

  — explanations of physical properties

  — copies of diagrams which you would find difficult to draw

- You can quote from sources as long as you give a description or explanation showing that you understand the physics.
- Do not include a passage copied directly from a source. This would not show that you understand the physics.

Description of experiment

- You must give only a **brief** description of the experiment you carried out.
- You must show that you can summarise your experimental method and must not give a full description.

Experimental data

- You must include a table showing **all** of the measurements you recorded in your experiment.
- Make sure you include column headings and units.
- You must use the data from your table to carry out calculations.
- If you have repeated measurements, you should calculate average values. These can be included in your table of results.
- If you've used the results from your experiment to determine further values, you should show at least one sample calculation.

Graphical presentation

- You must produce a graph of your experimental results.
- The graph must:
  - be a scatter graph, line graph or a bar graph, whichever is appropriate for your data (usually a line graph!)
  - be large enough to allow points to be read accurately
  - have suitable scales, labels and units on the axes.
- You must use graph paper or a computer graphing package.
- If you are using a computer graphing package, include **both major and minor gridlines, and use plotting symbols which are clear but not too large**.
- If you are plotting a scatter graph, a line or curve of best fit should usually be drawn. However, if there is no obvious pattern to your plotted data points, you should not try to draw a line or curve of best fit.

Data/information from an internet/literature source

- You must include data/information obtained from an internet/literature source that you can compare with the data from your experiment.
- You must include a reference to this source of data/information, which would allow another person to find it. For example:

Source	Reference
website	full URL for the page or pages
journal	title, author, journal title, volume and page number
book	title, author, page number and either edition or ISBN

Analysis

- You must compare your experimental data with the data/information from your internet/literature source.

Conclusion

- You must state a conclusion which relates to your aim. The conclusion must be based on the data in your report.

Evaluation

- You must identify a factor in your experiment which had a significant effect on the reliability, accuracy or precision of your experiment.
- You must then explain either:

  — what you did or could have done to minimise the effect of this factor

  or

  — how you know this factor had a significant effect.

Summary

Heading	Information	Marks
Title	An informative heading.	*1*
Aim	A description of the purpose of the investigation.	*1*
Underlying Physics	A description of the physics relevant to the aim which shows understanding.	*3*
Experimental Data	A brief description of an experiment.	*1*
	Raw data from the experiment.	*1*
	Raw data presented in a table with headings and units.	*1*
	Values correctly calculated from raw data.	*1*
Internet / Literature Data	Data from an internet / literature source.	*1*
	A reference for the internet / literature source	*1*
Graph	The correct type of graph used to present the experimental data.	*1*
	Suitable scales.	*1*
	Suitable labels and units on axes.	*1*
	All points plotted accurately, with line of best fit if appropriate.	*1*
Analysis	Experimental data compared to data from internet / literature source.	*1*
Conclusion	A conclusion related to the aim that is supported by data in the report.	*1*
Evaluation	A discussion of a factor affecting the reliability, accuracy or precision of the results.	*2*
Structure	A report that can be easily followed.	*1*
	Total Marks	***20***