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GCSE Additional Applied Science (4863)

Student Guide to Assessment

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The marks for your GSCE Applied Science coursework are worth 60% of the total number of marks, so you really need to understand what is required and how to get the best marks. During your course you will complete three pieces of work (assignments) that will make up your coursework for the qualification.

The course is divided into three units. Your work for units 1 and 3 make up the 60% coursework. Unit 2 is tested by an examination, and makes up the other 40% of the marks.

Unit 1 – Science in the Workplace

The total number of marks available for Unit 1 is 25.

You must complete **two** assignments for this unit – if you don't, you will miss out on marks.

The first assignment involves investigating workplaces that use scientific skills, describing the work of scientists or people who use scientific skills and showing how science is important in a wide variety of jobs.

In the second assignment you need to investigate working safely in a scientific workplace and compare the health and safety precautions in that workplace with the precautions in your school or college.

The Workplace Investigation

There are 11 marks available for this investigation. Your work will be assessed using the three-stage grid below. As you progress through each stage you will be able to gain more marks.

Stage 1	Stage 2	Stage 3
You should be able to: • produce a simple study on a range of organisations that use science • state the products made or services provided • identify the jobs of those employed.	You should be able to: • identify the range of organisations as local, national or international • describe their location • describe the products made or services provided • describe the jobs and qualifications of the employees and how they use science • describe the types of skills scientists need in addition to their qualifications, and a range of careers that are available in science.	You should be able to: • produce an in-depth study of **one** particular organisation: • explain its location • describe the products made or services provided and explain their importance to society • give a detailed account of the skills and qualifications needed by scientists who work there • describe the effect on the local environment of the organisation.

To complete **Stage 1** you should produce a report that:

- clearly states the purpose of **at least three** organisations that use science of scientific skills, and
- identifies the jobs of the people employed.

To complete **Stage 2**, and so get higher marks, for **each** of the organisations you have studied you need to:

- describe the organisation as local, national or international (make sure that you include one of each)
- give the location of the organisation
- clearly describe the products that the organisation makes or the services it provides
- clearly describe the jobs of the people working with science or using scientific skills in the organisation, and the qualifications they need to do their jobs, and
- outline the types of careers that are available in science and the types of skills that scientists may need in addition to their qualifications. (This need not necessarily be linked to your chosen organisations but could be, for instance, in a hospital.)

To complete **Stage 3**, and get the highest marks, you must write a more detailed account of **one** of the organisations you have studied. You need to:

- include the reasons why it is located where it is
- describe the products the organisation makes or the services it provides
- explain why these products or services are important to society
- describe the particular skills and qualifications that the people working in the organisation have, and
- describe the effect the organisation has on the local environment.

Checklist for the Workplace Investigation

Use the checklist to track your progress for your Workplace Investigation. Put a tick in the appropriate box when you complete each task.

The shaded items are part of the detailed study you need to do at Stage 3 for **one** organisation only.

	Organisation		
	1	**2**	**3**
For each organisation I have:			
Named it			
Described whether it is local, national or international			
Described where it is located			
Made a list of the products it makes or the services it provides			
Described the products or services			
Made a list of the jobs of the people employed			
Described the jobs that people at the organisation do			
Described how these people use science in their jobs			
Described what qualifications these people need			
Described the skills scientists need, as well as their qualifications, to work in science			
I have given a range of careers that are available in science			
For one organisation I have:			
Explained why it is located there			
Explained why the products or services are important to society			
Described the particular skills and qualifications that the people who work at the organisation need to do their jobs			
Described the effect the organisation has on the environment			

The Health and Safety Investigation

There are 11 marks available for this investigation. Your work will be assessed using the three-stage grid below. As you progress through each stage you will be able to gain more marks.

Stage 1	Stage 2	Stage 3
You should be able to carry out research into working safely in the school or college laboratory, including: • hazards and risks and their assessment • first aid • fire prevention.	You should be able to carry out research into the issues of working safely in a workplace that uses science or scientific skills, including: • hazards and risks and their assessment • first aid • fire prevention.	You should be able to carry out research into the issues of working safely in a scientific workplace and compare these with the school or college laboratory, including: • hazards and risks and their assessment • first aid • fire prevention.

Stage 1

In your work on safety in the school or college laboratory you should include sections on:

- hazards and risks
- first aid, and
- fire.

You may find it easier to complete your work by using the three main headings from the assessment grid (hazards and risks, first aid and fire). You should clearly explain why risk assessments are important when working in the laboratory. You may want to give an example of a risk assessment of your laboratory area.

Stage 2

To complete Stage 2 you need to investigate the health and safety issues in a workplace (**not** your school or college laboratory) that uses science or scientific skills. Your investigation should ideally be presented under the same headings as you used for the school or college investigation. You may want to include a risk assessment form and perhaps an accident report form obtained from a workplace.

Stage 3

To complete Stage 3, and get the highest marks, you should compare your two investigations and comment on the similarities and differences between school or college and the workplace. Remember to give examples and to compare all three sections – hazards and risks, first aid and fire. For example:

- the ways that risk assessments are prepared and presented and how accidents are reported could be different
- the types of signs and symbols that you observe in each place will be similar, although they may not necessarily be for the same hazards.

Checklist for the Health and Safety Investigation

Use the checklist below to track your progress through the work you do for your Health and Safety Investigation for Unit 1.

The shaded item is what you need to do in addition to reach Stage 3.

Put a tick against each marking point as you complete it.

	In School/ College	**In a Workplace**
I have researched safe working practices		
I have described laboratory hazards and risks and how they are assessed		
I have described the first-aid procedures that are in place		
I have described the procedures and equipment used for fire safety		
I have compared what happens in school or college with what is done in the workplace		

Communication Skills

There are 3 marks available in Unit 1 for your communication skills, which will be assessed throughout the unit using the three-stage assessment grid below. Marks are awarded for selecting appropriate information and for presenting your reports logically and clearly.

Stage 1	**Stage 2**	**Stage 3**
You should be able to use a limited range of sources and information to present findings in your portfolio.	You should be able to use a range of sources and information to present findings clearly in your portfolio.	You should be able to identify and use a wide range of sources and information to present findings clearly and logically throughout your portfolio

- A ‘limited range’ means less than three.
- A ‘range’ is three.
- A ‘wide range’ is more than three. At **Stage 3** you must remember to carefully list the sources of information used.

Unit 3 – Using Scientific Skills

You need to complete **one** investigation for Unit 3 – if you don't, you will not be able to get high marks. Your teacher might decide that you need to do more than one assignment to make sure that you gain experience of the type of work that is needed to produce a good report on your investigation.

The total number of marks available for Unit 3 is 40.

In this unit the investigation that you submit will be concerned with the work of **food** scientists, **forensic scientists** or **sports** scientists.

You will learn about some of the practical techniques that these scientists use and you will be given the chance to use some of these skills in your own investigation. You will need to produce evidence to show that you have skillfully used laboratory techniques to carry out your investigation.

You will be expected to:

- clearly **describe the purpose** of your investigation
- **produce a plan** for your investigation
- complete a **risk assessment** (or risk assessments) for your investigation
- **carry out** the plan
- **collect and process some results** from your investigation
- **make scientific conclusions** using the results of your investigation
- **evaluate** your work and
- **explain** how a food, forensic or sports scientist might use the results of your investigation.

Unit 3 will be assessed using the three-stage grid on the next page. Each stage you complete will allow you to gain higher marks.

Stage 1	Stage 2	Stage 3
You should be able to: • give a simple vocational application of your practical investigation.	You should be able to: • describe a vocational application of your practical investigation.	You should be able to: • research and explain the vocational significance of your practical investigation.
You should be able to: • produce a simple plan for your investigation with guidance • carry out a risk assessment for your investigation, given clear guidelines.	You should be able to: • produce a plan which, with little guidance, would enable your investigation to be carried out by another person • carry out a risk assessment for your investigation, given some guidelines.	You should be able to: • independently produce a plan, described in a series of well ordered steps, which would clearly enable your investigation to be carried out by another person • independently carry out a risk assessment for your investigation.
You should be able to: • select, with guidance, appropriate equipment for your investigation and use it safely to carry out the plan to collect and record some data/information.	You should be able to: • select, with little guidance, appropriate equipment for your investigation and use it correctly and safely to carry out the plan to collect and record data/information accurately in a suitable format.	You should be able to: • independently select appropriate equipment for your investigation and use it correctly and safely it to carry out the plan to collect and record data /information accurately and precisely in a suitable format repeating measurements if necessary.
You should be able to: • use the data/information collected from your investigation to make some simple conclusions.	You should be able to: • Use and process the data/information collected from your investigation to make conclusions.	You should be able to: • Use and accurately process the data/information obtained, and data/information obtained from other sources, to make and present well-structured and accurate conclusions.
You should be able to: • give a simple evaluation of your practical activity.	You should be able to: • give an evaluation of your practical investigation and suggest an improvement to your method • suggest how your findings could be used in the vocational setting.	You should be able to: • review your work, and present a logical evaluation of its strengths and weaknesses • suggest improvements to your method that would allow the collection of more accurate, precise and reliable evidence • suggest and explain how your findings could be used in the vocational setting.

Stage 1

Before starting your investigation you must make sure that you can **give a use** for the investigation. The use must be linked to food, forensic or sports science.

To complete Stage 1 you should produce a plan and risk assessment for your investigation before starting the practical work. You should select the correct equipment to use. Your teacher may give you some help in planning, producing your risk assessment and selecting your equipment.

You should be able to collect and record some results and use them to make some conclusions.

You should be able to make a simple judgement and evaluate your work in terms of what went well, and why, as well as the problems that you had in completing the investigation.

Stage 2

Before starting your investigation you must make sure that you **describe a use** for the investigation. The use must be linked to food, forensic or sports science.

To complete Stage 2 you should prepare a plan for the investigation that someone else could follow, and carry out a risk assessment, before starting the practical work. You should also be able to select the correct equipment to use. You may be able to check your ideas for the plan, risk assessment and selection of equipment with your teacher.

You should be able to collect results and/or measurements and record them accurately – for example, in tables. You should be able to construct your own tables with the appropriate headings and units. Where appropriate, you should be able to use your results to carry out calculations and make relevant scientific conclusions.

As part of the overall evaluation of your investigation you should be able to identify the limitations of your investigation and suggest an improvement to it that would allow you to collect more reliable data. You should be able to describe the application of the investigation and suggest how your findings might be used by a food, forensic or sports scientist.

Stage 3

Before starting your investigation you must use your scientific knowledge and understanding to **explain a use** for the investigation. The must be linked to food, forensic or sports science.

To complete Stage 3 you must have carefully and independently planned your investigation and have anticipated any problems that may occur. Your plan must be written so that another person is able to follow it easily. At this level you should be able to work independently to select the appropriate equipment and produce the necessary risk assessments for the investigation.

You should collect results accurately and record them to an appropriate degree of accuracy throughout. Record your observations precisely. You need to show that you understand the need to repeat experiments where results are obviously incorrect and make appropriate comments. You should be able to complete calculations accurately and rearrange standard formulae when required. You will need to use your data as well as data obtained from other sources to give clear, reasoned and logical conclusions to your investigation.

Even if your activity went really well there will still be things that you could do to make it even better, and collect more reliable evidence. You need to think very carefully about this and do some scientific research to back up your suggestions. Typical questions you should ask yourself include:

- What could I do to get more reliable data?
- What are the strengths and weakness of the technique/method/procedure that I used?

You should be able to research and clearly explain the significance of your investigation, and explain how your findings might be used in the context of food, forensic or sports science.

Checklist for Unit 3 Investigation

Use the checklist to track your progress – put a tick in the appropriate box when you complete each task.

The shaded items are what you need to do extra to reach Stage 3.

Title of investigation:		
	Tick	
I have given a vocational application for my investigation		
I have described a vocational application for my investigation		
I have researched and explained the vocational significance of my investigation		
I have written a plan for my investigation	**Some help**	
	Little help	
	No help	
My plan is clear and someone else could easily follow it		
I have completed a risk assessment for the experimental part of the investigation	**Some help**	
	Little help	
	No help	
I have selected appropriate equipment for my investigation and used it correctly	**Some help**	
	Little help	
	No help	
I have recorded the data I obtained/measurements I made		
I have presented my results appropriately		
Where appropriate, my tables have the correct column headings/graphs have the correct axes		
Where appropriate, I have used the correct units in my tables/sensible scales on my graphs		
I have independently recorded my observations and results accurately using a consistent number of decimal places throughout		
I have repeated measurements and explained why		
I have not repeated measurements but I have explained why		
I have given a simple explanation using my measurements/observations		
Where appropriate, I have carried out some calculations on data		
I have used my scientific knowledge to make conclusions using my measurements/conclusions		
Where appropriate, I have carried out some calculations on data and checked them for accuracy and consistency		
I have referred to my data, other sources and scientific theory to make conclusions		
I have described what went well		
I have described the problems that occurred		
I have suggested an improvement and given a reason why the improvement would be better		
I have stated the strengths and weaknesses of my investigation		
I have described the changes I would make if I did the investigation again		
I have explained why these changes would improve the data/information that I have obtained		
I have given a vocational use for this investigation		
I have explained how this investigation could be used in a vocational setting		

Writing Your Unit 3 Report

Here is a suggestion for the format you could use to write your Unit 3 report. You might want to use this template only as a working draft document and choose to write your report(s) in quite a different way – that's up to you.

1 Title of my investigation

2 Purpose of my investigation

In this introductory section you should explain carefully the problem that you are investigating and link the investigation to either a specific food, forensic or sports science setting. Your teacher may provide a problem linked to a workplace in one of these areas.

3 How I plan to carry out my investigation

You could set your plan out as a series of steps, like this:

Step	Action	Deadline
1		
2		
3		
4		
5		
6		

4 The equipment I will need to carry out my investigation

You could include a list of the equipment that you will need. Alternatively, your teacher may give you a list from which you have to select the most appropriate equipment.

5 Risk assessment(s)

You should complete a risk assessment for each part of your investigation.

You could set out your risk assessment like this:

Activity/substance/ material	What is the hazard?	What is the risk?	What control measures are necessary?

6 Observations and measurements

- Where appropriate, you should carefully record your observations and measurements for your investigation(s) in tables.
- You should include headings for the columns of any table you prepare, and make sure you include the correct units.
- Don't forget to use the correct number of significant figures when you are recording your measurements.
- When recording observations you should be careful to record exactly what you have seen.
- You should also be able to summarise your results.

7 Calculations

- Where appropriate, you should use your results to carry out calculations.
- You should explain how you are going to use your measurements in any calculations that you carry out.
- You should present the outcome of your calculations in tables containing appropriate headings and units.

8 Conclusions

You should be able to use your measurements and/or observations to make accurate conclusions. You should show that you understand your results by referring to scientific knowledge gained during your course.

9 Evaluation

In this section you will need to ask – and answer – a number of questions about your investigation. For example:

- How good were my results?
- Did I have any problems completing the investigation?
- How strong are my conclusions?
- How could I improve my investigation?

10 Summary

This final part of your report is very important and should contain the answers to the original problem. You should be able to summarise and use your findings, conclusions and evaluation when giving an answer or recommendation in this final section.

Here are some examples of what you need to think about in your summary.

- How might a forensic scientist use the results of my investigation to link a suspect to a crime?
- How might a food scientist use the results of my investigation to make a recommendation to the Food Standards Agency?
- How might a sports scientist use the results of my investigation to make recommendations concerning particular materials for use in some type of sports clothing?