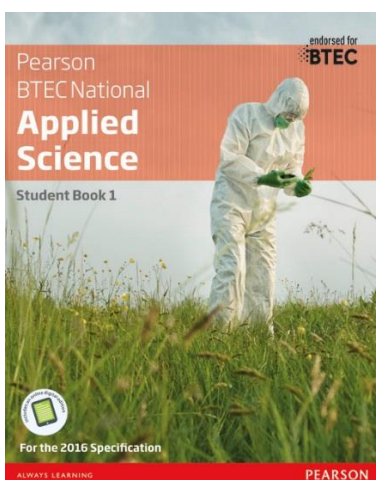


# BTEC Level 3 Nationals in Applied Science: Unit 1

**Your free sample of the student  
book: preparation for  
assessment**

**(BTEC National Applied Science: Student Book 1 (with  
ActiveBook),  
ISBN: 9781292134093)**



## Getting ready for assessment

This section has been written to help you to do your best when you take the assessment test. Read through it carefully and ask your tutor if there is anything you are still not sure about.

### About the test

The assessment test will last 90 minutes and there are a maximum of 90 marks available. The test is in 3 sections and will ask a range of short answer questions as well as some longer answer questions worth up to 6 marks.

Each section, Chemistry, Biology and Physics, will include:

- short answer questions worth 1–4 marks
- a longer answer question worth 6 marks.

Remember that all the questions are compulsory and you should attempt to answer each one. Consider the question fully and remember to use the key words to describe, explain and analyse. For longer questions you will be required to include a number of explanations to your response; plan your answer and write in detail.

### Preparing for the test

To improve your chances on the test, you will need to make sure you have revised all the key assessment outcomes that are likely to appear. The assessment outcomes were introduced to you at the start of this unit.

To help plan your revision, it is very useful to know what type of learner you are. Which of the following sounds like it would be most helpful to you?

Type of learner	Visual	Auditory	Kinaesthetic
<b>What it means</b>	Need to see something or picture it, to learn it	Need to hear something to learn it	Learn better when physical activity is involved – learn by doing
<b>How it can help prepare for the test</b>	<ul style="list-style-type: none"><li>• Colour-code information on your notes</li><li>• Make short flash cards (so you can picture the notes)</li><li>• Use diagrams, mind-maps and flowcharts</li><li>• Use post-it notes to leave visible reminders for yourself</li></ul>	<ul style="list-style-type: none"><li>• Read information aloud, then repeat it in your own words</li><li>• Use word games or mnemonics to help</li><li>• Use different ways of saying things – different stresses or voices for different things</li><li>• Record short revision notes to listen to on your phone or computer</li></ul>	<ul style="list-style-type: none"><li>• Revise your notes while walking – use different locations for different subjects</li><li>• Try to connect actions with particular parts of a sequence you need to learn</li><li>• Record your notes and listen to them while doing chores, exercising, etc. and associate the tasks with the learning</li></ul>

**Do not start revision too late!** Cramming information is very stressful and does not work.

## Useful tips

- **Plan a revision timetable** – schedule each topic you need to revise, and try to spend a small time more often on each of them. Coming back to each topic several times will help you to reinforce the key facts in your memory.
- **Take regular breaks** – short bursts of 30–40 minutes' revision are more effective than long hours. Remember that most people's concentration lapses after an hour and they need a break.
- **Allow yourself rest** – do not fill all your time with revision. You could schedule one evening off a week, or book in a 'revision holiday' of a few days.
- **Take care of yourself** – stay healthy, rested and eating properly. This will help you to perform at your best. The less stressed you are, the easier you will find it to learn.

## Sitting the test

Listen to, and read carefully, any instructions you are given. Lots of marks are often lost because people do not read questions properly and then do not complete their answers correctly.

Most questions contain command words. Understanding what these words mean will help you understand what the question is asking you to do.

Remember the number of marks can relate to the number of answers you may be expected to give. If a question asks for two examples, do not only give one! Similarly, do not offer more information than the question needs: if there are two marks for two examples, do not give four examples.

Planning your time is an important part of succeeding on a test. Work out what you need to answer and then organise your time. You should spend more time on longer questions. Set yourself a timetable for working through the test and then stick to it. Do not spend ages on a short 1 or 2 mark question and then find you only have a few minutes for a longer 4 or 6 mark questions. It is useful when reading through a question to write down notes on a blank page. This way you can write down all the key words and information required and use these to structure an answer.

If you are writing an answer to a longer question, try to plan your answers before you start writing. Have a clear idea of the point your answer is making, and then make sure this point comes across in everything you write, so that it is all focused on answering the question you have been set.

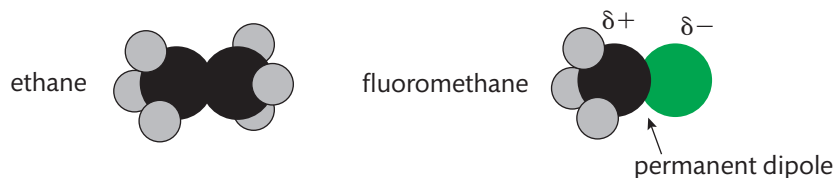
If you finish early, use the time to re-read your answers and make any corrections. This could really help make your answers even better and could make a big difference in your final mark.

## Hints and tips for tests

- Revise all the key areas likely to be covered. Draw up a checklist to make sure you do not forget anything!
- Know the time of the test and arrive early and prepared.
- Ensure that you have eaten before the test and that you feel relaxed and fresh.
- Read each question carefully before you answer it to make sure you understand what you have to do.
- Make notes as you read through the question and use these to structure your answer.

- Try answering all the simpler questions first then come back to the harder questions. This should give you more time for the harder questions.
- Remember you cannot lose marks for a wrong answer, but you cannot gain any marks for a blank space!

**Q.** Ethane and fluoromethane have similar-sized molecules.



► **Figure 1.62:** Fluoromethane and ethane

Explain why fluoromethane has a higher boiling point than ethane.

(2)

*Fluorine has the highest electronegativity of all elements.*

*This means there is a larger permanent dipole on the fluoromethane.*

*This is an 'explain' question. The examiner is looking for a fact and a reason or a 'because'. The question is worth 2 marks so 2 points must be made to gain these marks. The answer above would be worth both marks.*

**Q.** Potassium fluoride has many uses in manufacturing, synthesising and refining.

It converts chlorocarbons to fluorocarbons. It is used to etch glass and in the making of disinfectants. However, potassium fluoride is not made in the laboratory by reacting potassium with fluorine as this reaction is not safe.

Discuss why it is not safe to react fluorine with an alkali metal in a school laboratory.

(6)

This is a 6-mark levelled question. It is worth 2 pass marks, 2 merit marks and 2 distinction marks. You gain marks for showing understanding rather than there being 1 mark per point. The more detailed and in-depth your discussion, the more likely you are to gain 6 marks. You would be expected to use all your knowledge about fluorine to answer this question. You should consider position in the periodic table, reactivity, bonding.

Question number	Answer	Mark
	<p>Indicative content</p> <ul style="list-style-type: none"> <li>► Reactions between fluorine and alkali metals are vigorous and explosive.</li> <li>► Group 1 metals are the most reactive metals/as you go left to right on periodic table metals become less reactive.</li> <li>► As you go down group 1 the metals become more reactive.</li> <li>► Group 1 metals only have one electron in their outer shell.</li> <li>► Reactivity increases in the non-metals as you go from left to right across the period.</li> <li>► Reactivity decreases as you go down group 7/ fluorine is the most reactive non-metal.</li> <li>► Fluorine has a small radius because positive protons strongly attract negative electrons to it.</li> <li>► It has 5 electrons in its 2p sub-shell.</li> <li>► The p sub-shell can hold 6 electrons so fluorine is close to its ideal electron configuration.</li> <li>► Strong attraction by positive nucleus due to small size/one shell shielding.</li> <li>► Fluorine is a strong oxidising agent.</li> <li>► It forms strong ionic compounds with metals.</li> <li>► Fluorine easily gains one electron and alkali metals easily lose an electron.</li> </ul>	(6)
0	No rewardable content.	0
Pass level	A simple description of why it is unsafe. Learner will use the periodic table to show that the reactants are very reactive.	1–2
Merit level	Links ideas of electronic structure to reaction.	3–4
Distinction level	Links ideas of electronic structure to reaction in detail. May discuss strength of oxidising agent to reaction.	5–6

*Ans 1. It is not safe to react fluorine with an alkali metal because alkali metals and fluorine are both very reactive meaning that there might be an explosion. This is because alkali metals are on the left hand side of the table and the metals get less reactive as they go across the periodic table.*

This would be a pass-level answer. The candidate knows that an explosion will occur and knows how to use the periodic table to show this. The answer is quite simple and shows little understanding of why the elements are so reactive.

*Ans 2. Group 1 metals are highly reactive as they only need to lose one metal to form an ionic bond. The repulsion from the positive nucleus makes this easy to react. Fluorine is the most reactive non-metal. It is at the top of group 7 and the trend is that reactivity decreases down the group. Fluorine has a small radius it only has 2 shells so it is already small and the protons in nucleus are able to draw the electrons to it strongly making it even smaller. It has outer electron configuration of  $2s^2 2p^5$ . This means it has only got to get one electron to get a full outer shell. The small radius and only one shell shielding the nucleus mean the electron on the metal is strongly attracted to the charge on the positive. Fluorine is a very strong oxidising agent. All of these things means that when fluorine reacts with a group 1 metal the reaction will be vigorous and probably explosive so it is not safe to carry out.*

This would be a distinction-level answer. The candidate has discussed reactivity of alkali metals in general in relation to their position on the periodic table. They have discussed the electronic structure of fluorine in detail and have started to relate this to reactivity. They have then said why this makes the reaction unsafe. The ideas are mostly quite detailed and are linked.