GCE

AS and A Level Specification

Critical Thinking

AS exams 2009 onwards
A2 exams 2010 onwards

Contents

Vertical black lines indicate a significant change or addition to the previous version of this specification.

1 Introduction

1.1 Why choose AQA?

It's a fact that AQA is the UK's favourite exam board and more students receive their academic qualifications from AQA than from any other board. But why does AQA continue to be so popular?

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  Ours are designed to the highest standards, so teachers, students and their parents can be confident that an AQA award provides an accurate measure of a student's achievements. And the assessment structures have been designed to achieve a balance between rigour, reliability and demands on candidates.

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If you are an existing customer then we thank you for your support. If you are thinking of moving to AQA then we look forward to welcoming you.

1.2 Why choose Critical Thinking?

AQA Critical Thinking is characterised by the careful, reflective consideration of reasoned argument; and of the beliefs and claims that comprise arguments. A course leading to this qualification will present students with information, opinion and argument from a range of contexts – the sciences, arts and humanities, social sciences – as well as topics of general interest and concern. It will develop skills and encourage attitudes which complement their other studies across the curriculum, and help prepare them for the academic and intellectual demands of higher education, as well as future employment and life in general.

Critical Thinking is predominantly a practical, skills-based discipline. No specialist knowledge of particular academic subjects is required. However, a course in Critical Thinking introduces students to a range of concepts, terms and techniques that may be new to them, and which will enable them to reflect more constructively on their own and others' reasoning. The following specification lists and explains these skills and concepts, and offers guidance to teachers on introducing students to them.

Following this specification should be stimulating and enjoyable. It encourages curiosity, open-mindedness, inventiveness and imagination, as well as being rigorous in its methods. There should be room for humour, and for serious feelings and emotions, and an acknowledgement of the part these play in influencing people and shaping their beliefs. It should encourage students to respect the views of others, even when they are not inclined towards them, nor likely to be persuaded by them.

AQA Critical Thinking aims to develop the following intellectual attitudes and habits:

- fair-mindedness
- independence
- healthy scepticism
- care and persistence
- confidence in reasoning
- intellectual courage.

1.3 How do I start using this specification?

- Register to receive further information, such as mark schemes, past question papers, details of teacher support meetings, etc, at **http://www.aqa.org.uk/rn/askaqa.php** Information will be available electronically or in print, for your convenience.
- Tell us that you intend to enter candidates. Then we can make sure that you receive all the material you need for the examinations. This is particularly important where examination material is issued before the final entry deadline. You can let us know by completing the appropriate Intention to Enter and Estimated Entry forms. We will send copies to your Exams Officer and they are also available on our website **http://www.aqa.org.uk/admin/p_entries.html**

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- Almost all centres in England and Wales use AQA or have used AQA in the past and are approved AQA centres. A small minority are not. If your centre is new to AQA, please contact our centre approval team at **centreapproval@aqa.org.uk**

1.4 How can I find out more?

Ask AQA

You have 24-hour access to useful information and answers to the most commonly-asked questions at **http://www.aqa.org.uk/rn/askaqa.php**

If the answer to your question is not available, you can submit a query for our team. Our target response time is one day.

Teacher Support

Details of the full range of current Teacher Support meetings are available on our website at **http://www.aqa.org.uk/support/teachers.html**

There is also a link to our fast and convenient online booking system for Teacher Support meetings at **http://events.aqa.org.uk/ebooking**

If you need to contact the Teacher Support team, you can call us on 01483 477860 or email us at **teachersupport@aqa.org.uk**

2 Specification at a Glance

AS Examinations

AS Award 1771

Unit 1 – CRIT1
Critical Thinking Foundation Unit

50% of AS, 25% of A Level

1 hour 30 minutes written examination

70 Marks

Section A: Source related short answer questions.
Section B: Extended writing questions requiring candidates to present their own reasoning on a subject related to the source material.

Available in January and June

Unit 2 – CRIT2
Information, Inference and Explanation

50% of AS, 25% of A Level

1 hour 30 minutes written examination

70 Marks

Section A: Short answer questions requiring extracting and interpreting information, assessing claims and conclusions, drawing inferences and offering explanations.
Section B: One question requiring candidates to argue for or against a short statement or proposal.

Available in January and June

A2 Examinations

A Level Award 2771

Unit 3 – CRIT3
Beliefs, Claims and Arguments

25% of A Level

1 hour 30 minutes written examination

70 Marks

Section A: Short answer questions related to source material expounding a belief, theory or hypothesis.
Section B: Extended writing questions related to short but complex arguments or persuasive texts.

Available in June only

Unit 4 – CRIT4
Reasoning and Decision Making

25% of A Level

1 hour 30 minutes written examination

70 Marks

Questions based on a Case Study that will be part pre-released and part contained in the examination paper.

Available in June only

AS + A2 = A Level

3 Subject Content

Course structure

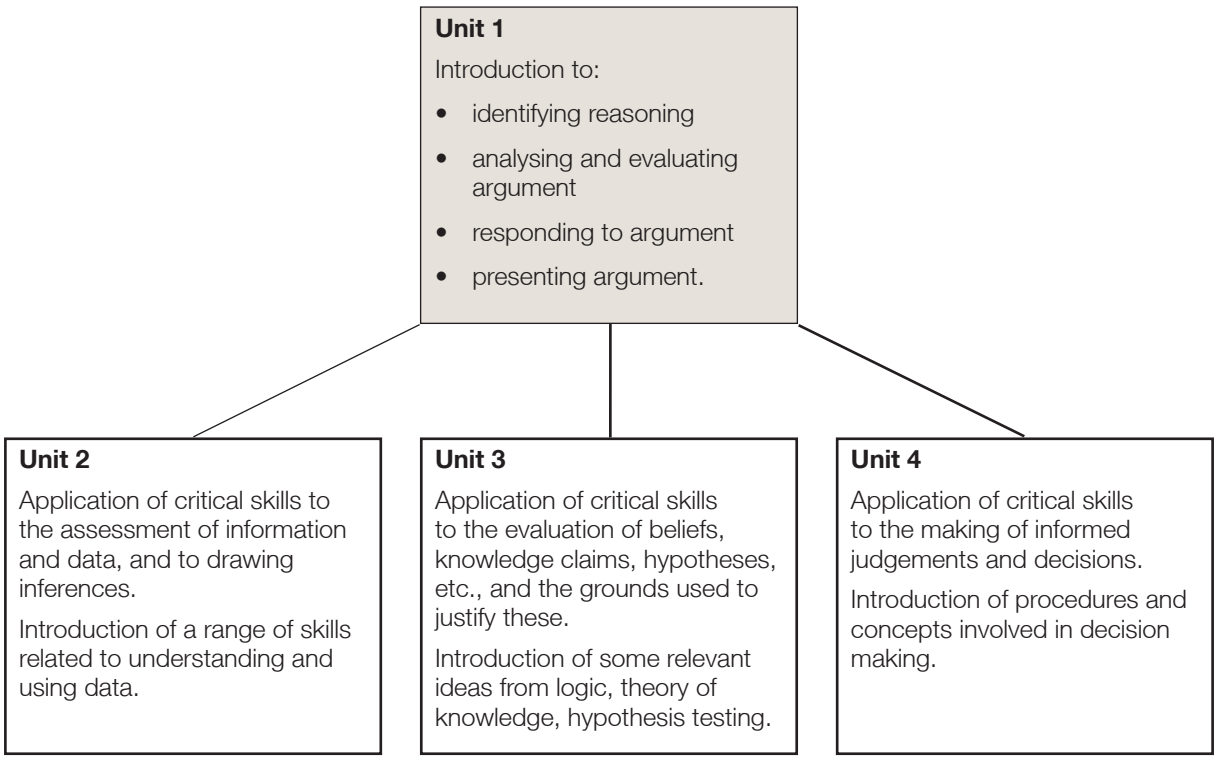
There is no pre-determined order in which the broad skills of Critical Thinking are introduced. It is in the nature of the subject that students progress in a spiral fashion marked by increasing complexity of stimulus material, more searching questions, and more informed and perceptive judgement on their part. The three Assessment Objectives are therefore addressed concurrently, so that from the beginning students are encouraged to apply all their analytical, evaluative and personal reasoning skills, and to continue to use them, with increasing confidence and assurance, throughout the course.

The units reflect this structure, with Unit 1 acting as a foundation unit which introduces the full range of critical skills and concepts at a basic level. It should be emphasised that the breadth of content in Unit 1 is compensated for by the introductory level at which it is taught and assessed. At the foundation level several teaching points can be covered in a single lesson or topic. For instance, using a short newspaper article as the stimulus, students can be asked:

1) to identify the elements of an argument – reasons and conclusion; (AO1)
2) to judge how well the reasons support the conclusion; (AO2)
3) to respond to the text with an argument of their own. (AO3)

In subsequent units the basic skills are applied and directed towards more specific goals, such as reasoning from data, testing hypotheses, and making decisions.

The progression can be summarised as follows:



Sources and materials

The teaching and assessment of Critical Thinking is predominantly text-based. However, 'text' should be understood in its widest sense, to include any item that may be used to elicit a critical response: spoken as well as printed, and graphical or pictorial as well as verbal.

Given the practical nature of the subject, the stimulus materials should as far as possible be 'real' or 'live' texts, from sources such as books, newspapers, audio or video recordings. Inevitably some artificial, paradigm examples are needed, and are used in parts of this specification to make or illustrate a teaching point. But the full value of Critical Thinking comes when the lessons are applied to real-world contexts. Accordingly, the materials used for the Critical Thinking examinations will, wherever possible, be taken from authentic sources, or at least be convincingly authentic in character.

Language and terminology

There is a small stock of technical terminology belonging to Critical Thinking. For example, some features of reasoning, good and bad, have special names: 'argument from analogy', '*reductio ad absurdum*', 'begging the question', '*ad hominem*', 'false dichotomy'. Students should come to know a range of these – by name and/or by description – and use them appropriately in their evaluations and responses.

In common with other academic fields, Critical Thinking also uses a number of words which are best described as *semi*-technical. These are words which have a general meaning and use, but also a restricted meaning within the subject. These include: 'argument', 'assumption', 'sound', 'valid', 'imply', 'entail,' 'consistent', 'necessary', 'strong', etc. Students should understand both the general and the special senses of these terms. All the technical and semi-technical terms required for this specification are explained in the Notes and Guidance within sections 3.1–3.4.

3.1 Unit 1 CRIT1 Critical Thinking Foundation Unit

This unit is intended to provide a general introduction to the subject of Critical Thinking. Students will have opportunities to develop the skills of analysis and evaluation, and to present some of their own reasoning.

Summary of content.

Students begin to:

- recognise when reasoned argument is taking place;
- recognise the area of discourse to which a particular argument or debate belongs;
- classify and evaluate different kinds of claim;
- analyse and interpret texts involving argument to reveal the structure of the reasoning;
- identify assumptions that are implicit in an argument;
- evaluate arguments, understanding that there are varying standards for assessing their adequacy;
- consider consequences and their impact on arguments;
- consider the impact of additional evidence, counter-examples, analogies etc;
- identify ambiguity and vagueness and understand the importance of clarifying terms;
- distinguish between the reasoning in an argument and the use of persuasive language;
- recognise bad (flawed) arguments, and be able to identify what is wrong with them (fallacies);
- draw comparisons and contrasts;
- use their experience of analysis and evaluation to present cogent arguments;
- acquire a basic vocabulary of terms associated with reasoning, and use them appropriately.

Detailed version of the content including notes and guidance

	By the completion of Unit 1 students should begin to:	**Notes and Guidance**
3.1.1	recognise when **reasoned argument** is taking place.	A basic skill of Critical Thinking is identifying examples of reasoned argument, and distinguishing argument from other forms of expressions, such as description, explanation, narrative. 'Argument' has a range of meanings and it is essential that students distinguish between them. At its broadest 'argument' can mean almost any device used to persuade or make a point. In this broad sense even a striking image and/or caption could be called an argument, e.g. in an advertisement or piece of propaganda. 'Argument' can also mean a dispute or quarrel. In the context of Critical Thinking, however, the term has a more restricted meaning. It mainly refers to texts which express reasoning: *reasoned* argument. The simplest such arguments consist of one or more reasons (premises*) and a conclusion. For example: [A] 'Passive smoking is a serious health hazard. Non-smokers should not be subjected to the antisocial habits of a thoughtless minority. Therefore it is right to prohibit smoking in all enclosed public spaces.' The first two sentences are the reasons; the last is the conclusion; and 'therefore' expresses the relationship between them – namely inference. (See 3.1.1a below) ***Note**: In this context 'reason' and 'premise' can be used more or less interchangeably. 'Premise' is the more formal term, and is the one used by logicians. 'Reason' is more descriptive of what an author is doing when offering support for a conclusion. The term 'grounds' can also be used, e.g. 'The author is saying that smoking should be banned *on the grounds* that it is a health hazard.'

3.1.1a **Inference** What distinguishes reasoned argument from other forms of expression is inference. In [A] it is inferred (concluded) from the first two sentences that it is right to prohibit smoking… (etc.). This contrasts with the next example which makes a series of claims, and does so in quite a contentious way, but has no explicit conclusion. None of the claims is drawn as an inference from any of the others, so it is not a complete argument (though its claims could be part of one):

[B] 'People who oppose a smoking ban are fond of talking about the rights of the individual. Of course, they mean the right of smokers to smoke, not the right of non-smokers to enjoy clean air. Smoking is a filthy habit which no one has the right to inflict on others.'

3.1.1b **Reasoning indicators** The conclusion of an argument is often signalled by connectives such as 'therefore…', 'so…', 'for that reason…', or synonyms of these. These are sometimes referred to as inference (or conclusion) indicators, and are useful linguistic clues for identifying conclusions in an argument. However, it is not necessary for the text of an argument to contain any such indicators, nor for the conclusion to be at the end, as in [A]. It could just as well have been written with the conclusion first:

[A_1] 'It is right to prohibit smoking in all enclosed public spaces. Passive smoking is a serious health hazard. And anyway non-smokers should not be subjected to the antisocial habits of a thoughtless minority.'

Alternatively an argument can be framed using the connectives, 'because…' or 'since…' etc., which indicate *reasons* rather than conclusions, e.g.

[A_2] 'It is right to prohibit smoking in all enclosed public spaces *because* passive smoking is a serious health hazard and non smokers should not be put at risk …(etc.)'

In [B], no insertion of 'therefore' or 'because' between any of the sentences makes sense, because no inference is taking place in [B]. Trying this out is a useful test for distinguishing arguments from non-arguments.

3.1.1c **Explanation** Students need to be aware that some texts bear superficial, resemblances to argument, and care must be taken not to confuse these. This is particularly so in the case of explanation. For instance:

[C] 'Ewan was sacked *because* he was seen smoking whilst serving drinks.'

Or:

'Ewan was seen smoking whilst serving drinks. *So* he was sacked.'

In neither of these examples is the author drawing a conclusion *that* Ewan was sacked (or that he was seen smoking whilst serving drinks). What the author is doing is explaining *why* he was sacked. In other words Ewan's sacking is merely asserted, not inferred.

3.1.1d **Dialogue** Arguments do not exist in isolation: they typically belong in the context of a dialogue or exchange.

Students should study extracts from debates in sound recordings and/or in transcript. They should be able to recognise features of dialogic reasoning: counter-argument, counter-example, critical questioning, refutation.

They should also be able to identify the issues that are being debated and summarise the main differences between opposing perspectives. For instance:

'(This dispute) is about smoking in public, but what really divides the two participants is the issue of government interference and how far it should extend. X's main premise is…' (etc.)

The purpose of dialogue is not always confrontational. Students should also consider examples of dialogue, where the aim is to reach the truth, resolve problems, answer questions, define concepts, etc., not just to 'defeat' an opponent. (Socratic dialogue.)

3.1.1e **Reported or embedded argument**

In common with other kinds of expression an argument can either be presented directly, as [A] is, or *reported* indirectly, for example:

'The author of the study claimed that it was right to ban smoking in public places given the harm it allegedly causes to the health of non smokers, and their entitlement not to be subjected…' etc.

Taken as a whole this passage is not an argument. But there is clearly an argument embedded within it which can be extracted and considered in the same way as a direct argument.

3.1.2 recognise the **area of discourse** to which a particular argument or debate belongs.

Students should be able to recognise some of the identifying characteristics of arguments in the different disciplines: maths, science, social science, history, ethics, the arts / aesthetics.

An *ethical* argument, for example, typically seeks to establish what is right or wrong, or what people ought, or ought not, to do.

A debate in *aesthetics* will typically be about the beauty, ugliness or artistic merit of some object, e.g. a building, poem, or piece of music.

A *scientific* argument will often be used to support a theory or hypothesis by offering evidence in the form of observations or data from experiments and investigation.

Identifying the area of discourse is an important consideration when it comes to evaluating arguments. (See 3.1.6 below)

It is particularly important for students to recognise ethical arguments and ethical debate. This is because so many subjects have an ethical dimension: law, politics, science, sport, entertainment, … For example, a scientific topic such as genetics cannot be explored without addressing some ethical issues.

3.1.3 **classify** and **evaluate** different kinds of claims.

Arguments consist of a sequence of *claims*.

A claim is the same as an assertion, and usually takes the form of a statement. However, claims are sometimes made using other grammatical forms, for example rhetorical questions:

'Why should non-smokers be subjected to the anti-social habits of a thoughtless minority?'

A single sentence may express more than one claim, for example:

'Smoking should be prohibited in all enclosed public spaces *and* there should be penalties for owners who fail to enforce this.'

Claims may be divided roughly into those that state facts and those that express opinions. However, not all claims can be classified quite so simply because not all claims are *factual in kind*. It is a fact that spinach is green, but not that spinach is disgusting: that is purely a matter of taste or opinion, and if someone says, 'That's true', the most they can mean is that they agree.

There are also many statements that are factual in kind (true or false) but unless or until they can be verified, they too remain expressions of opinion or belief, e.g.

'The dinosaurs were wiped out by an asteroid.'

Students should be very clear about how they use terms relating to fact and opinion. They should understand that a statement of fact tells us something that is true about the world, whereas an expression of opinion tells us what someone *believes* to be true, or to be right. Yet all of these can properly be called 'claims'.

Claims can be categorised under various headings, which denote the kind of assertion being made. Recognising these can be helpful when interpreting and analysing texts containing argument. Some useful labels are:

- **prediction**: a claim that something will happen in the future, or as a result of something else. Naturally, a prediction cannot be understood as a fact: at the time of making a prediction it is always an expression of opinion, even if it later turns out to be correct.

- **hypothesis**: a claim that is put forward for consideration, to be tested or investigated. The claim that an asteroid wiped out the dinosaurs is a hypothesis, because although there is some evidence to support it, it has not been established as fact.
- **causal explanation**: a claim about the reason why something has happened, or is as it is. 'The dinosaurs became extinct because of a massive natural disaster' is a causal explanation.
- **definition**: a claim about the meaning of a word or phrase; or the clarification of a concept. 'An enclosed public space is any indoor area where people meet for work or leisure…'
- **recommendation**: a claim about what should be done, or what policy adopted, in a given situation. 'Smoking should be prohibited only where food is served' is a recommendation.
- **allegation**: a claim that is made without complete proof, very often blaming or accusing someone. 'The government has not banned smoking in public because it fears it is a vote-loser' is an allegation.
- **value judgement**: a claim that something is good or bad, right or wrong, desirable or undesirable, etc. In other words it is a claim about the value, or worth, of something – or the lack of it. 'Smoking is a disgusting habit' is a value judgement.
- **statement of principle**: a general claim expressing a basic truth, rule or guideline. 'No one should take the law into their own hands' is a statement of principle.

In practice these labels often overlap. For instance, a hypothesis may consist of a prediction (or an explanation); an allegation may contain a value judgement, and so on. Nor is this an exhaustive list. As they progress students should be encouraged to expand and refine their vocabulary, e.g. to distinguish between prediction and speculation, or hypothesis and conjecture.

3.1.4 **analyse and interpret** texts involving argument to reveal the structure of the reasoning.

The purpose of analysis is to reveal the reasoning in a natural-language argument prior to evaluating or responding to it.

The conventional way to analyse an argument is to list the premises (reasons) and separate them from the conclusion by a horizontal line.

[A]

Passive smoking is a serious health hazard.

Non-smokers should not be subjected to the antisocial habits of a thoughtless minority.

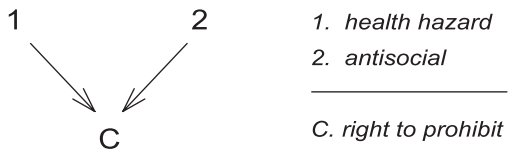
It is right to prohibit smoking in all enclosed public spaces.

3.1.4a **Structure** As well as listing the premises, students should be able to say how these relate to each other and to the conclusion. In other words they begin to analyse the structure of the reasoning.

This can be done in words, and/or shown diagrammatically. For example:

'In [A] the two premises are independent. They reinforce each other but each one provides a separate reason (one medical, one social) for claiming that a ban is justified.'

Or:



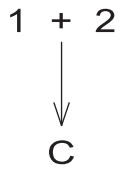
Compare this with the following argument:

[D]

Environmental smoke is a health hazard.

It is the job of the law to protect people from the risk of harm.

C Smoking should be prohibited in public spaces.



In [D] the second premise *depends* on the first, and vice versa, in its support for the conclusion. It is the claim that smoke is harmful, *combined with* the claim that law has a duty to protect people, that (arguably) justifies the recommended prohibition.

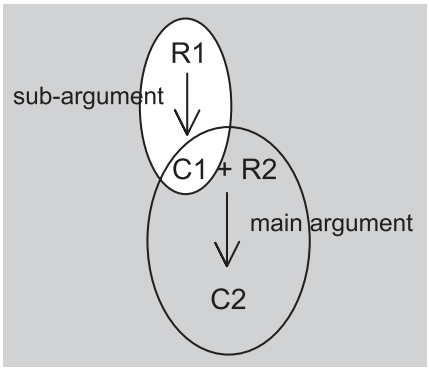
3.1.4b **Complex arguments**

[A] and [D] are simple arguments, in which the premises *directly* support the conclusion. In more complex arguments there may be one or more steps leading to the main conclusion. These can be thought of as sub-arguments each with its own (intermediate) conclusion. For example:

[E] 'Most prospective parents would prefer to have sons. Therefore, if the choice is made available, due to advances in technology, it is likely that eventually there will be many more males than females in the population. This would result in serious social problems, so we should prohibit the development of techniques which enable people to choose the sex of their children.'

Here there is a sub-argument linked to the main argument. The sub-argument concludes (C1) that if the choice is available there will eventually be more males than females. The reason (R1) is that (allegedly) most prospective parents would prefer to have sons. C1 is then coupled with a new premise (R2) that this would cause serious social problems. And from this is drawn the further conclusion (C2), that the enabling technology should be prohibited.

The structure described here can also be thought of as a 'chain of reasoning':



C1 can be called an 'intermediate conclusion' and C2 the main conclusion.

3.1.4c **Interpreting 'real' or 'live' argument**

Analysing argument should be rigorous and methodical. However, it is not always an exact science, and nor is it purely mechanical. The arguments that are encountered in real life are rarely as clear and straightforward as those used to introduce logic or argument analysis, or used as instructive examples here. As students move from these on to more authentic texts, with greater complexity and difficulty, analysis often requires a measure of judgement and interpretation as well as routine method.

Naturally students' comprehension skills will assist them in interpreting arguments (which will in turn sharpen their comprehension). However, Critical Thinking differs from ordinary reading comprehension in that it focuses on extracting the reasoning from a text, not just understanding its meaning. Accordingly no credit is given in the examination for simply summarising or paraphrasing a text.

3.1.4d **The Principle of Charity**

Sometimes there is more than one possible interpretation of a text and it may not be easy to determine which is the 'right' one. In such circumstances students should observe what is called the Principle of Charity. This states that where there appear to be competing interpretations, we should opt for the one that is the most rational or persuasive, rather than one that is weaker or easy to refute.

The purpose of critical analysis and evaluation is not to score points, but to understand and make a fair-minded response. If a text is not obviously intended as reasoning, and could be construed only as a very bad or irrational argument, then under the Principle of Charity other interpretations should be considered first, e.g. that it is just expressing an opinion, offering a suggestion, expanding or exploring an idea. For example:

[F] 'Many couples express a preference for either a boy or a girl, and yet after their child is born they would not change it for the world. There is nothing wrong with having a preference so long as it is not translated into a choice.'

It would be wrong to dismiss this as a 'bad argument' on the grounds that the first sentence does not give any support to the second. That should instead lead us to say that it is not an argument at all, and probably wasn't meant to be.

3.1.5 identify **assumptions** that are **implicit** in an argument.

An assumption is a claim that is made without reasons being offered to support it. We might say to someone who has just made a claim: 'You have no grounds for saying that: you are just *assuming* it.'

The initial premises in an argument, unless they are known facts, are generally assumptions, for example, R1 in example [E]:

'Most prospective parents would prefer to have sons.'

In this case the assumption is an explicit premise in the argument. But in many, if not most, real-life arguments there are important assumptions that are not made explicit. Recognising these implicit assumptions is a key part of the task of argument analysis, and may be of huge importance in any subsequent evaluation.

For example, underlying argument [E], there is an assumption that a significant number of parents would *exercise* the choice to have sons if they were given it. The assumption is not stated in the text but it is plainly implied. Also, if it were *not* assumed, then an imbalance in the population would not be the likely consequence, and the sub-argument would collapse.

Thus an unstated assumption may be as necessary to an argument as any of the stated reasons. In this respect it can be thought of as a 'missing premise' – sometimes called a *suppressed* premise – and it is helpful to students to understand many implicit assumptions in this way.

3.1.5a **The importance of assumptions**

The importance of detecting the assumptions implied in an argument cannot be over-stated. As we have seen, an assumption may be a crucial part of the reasoning. If it is a warranted assumption then there is no problem; but if it is false or questionable then it has serious implications for the evaluation of the argument. (See 3.1.6 below)

Authors of arguments may leave an assumption unstated for various reasons. They may consider it so obvious that it doesn't need spelling out. Alternatively they may see that it is questionable, and choose not to draw attention to it. For example:

[G] 'No one has anything to fear from giving the police random stop-and-search powers so long as they have nothing to hide. Opponents of these powers can only be helping to protect the guilty.'

This simplistic argument makes many assumptions, one being that police powers are never misused; another that no innocent person is ever wrongly accused or arrested. Since these are questionable assumptions, making them explicit would simply underline the argument's weaknesses.

3.1.6 **evaluate** arguments, understanding that there are varying standards for assessing their **adequacy**.

Students should be able to assess the quality of an argument objectively, regardless of their own views, and whether or not they agree with its conclusion(s).

A good (strong / effective / persuasive / reliable…) argument is one which offers *adequate* support for its conclusion. A poor (weak / flawed) argument is one in which the grounds are *inadequate*.

'Adequacy' in this sense is a semi-technical term. It has to do with the balance between the reasons and conclusion; but also with the standard of assurance we require from the argument in the first place.

3.1.6a **Varying standards**

There is a range of standards or criteria by which an argument may be judged. Selecting an appropriate one is the key to fair evaluation – i.e. determines what is adequate.

Some conclusions need to be established beyond *any* doubt; some beyond *reasonable* doubt; some merely on the balance of probabilities. Moreover, in many cases, (weather-forecasting, for example) a conclusion *can* only be drawn with a degree of uncertainty. These factors must be taken into consideration when evaluating reasoning.

For example, hearing a favourable weather forecast on the radio may be adequate grounds for arranging a barbecue, but not for determining the timing of a space-launch. The adequacy required varies in accordance with the severity of the consequences, should the conclusion be wrong.

If and when *certainty* is required an argument is adequate only if it meets the standard known as 'validity' (or more precisely, 'deductive validity'). This is discussed in more detail in section 3.3.6a. At AS Level it is sufficient for students to know that a valid argument is one in which the conclusion is inescapable: *if* the premises are true, the conclusion cannot be false.

However, relatively few real-life arguments meet this demanding standard, and those that do often seem trivial. Also, in real life we find and use many reliable arguments that are not strictly valid and, more importantly, do not *need* to be. What we need in practice are criteria that are sensitive to context or circumstance: which tell us whether an argument is fit for purpose. In short, we have to judge whether it is *adequate*.

3.1.6b **Evaluation** There are two separate factors which students need to consider when evaluating an argument. The first concerns the premises and whether or not they make credible claims. The second concerns the reasoning itself: whether or not the premises logically support the conclusion.

It is important to keep these two questions separate. Firstly, if the reasons given for a conclusion are plainly false (or not credible), then we would naturally dismiss the argument, however good its reasoning might be. But even if the reasons are demonstrably true, they do not necessarily guarantee the truth of the conclusion.

For example, it is understood that a massive asteroid hit the earth around 65 million years ago, and that dinosaurs became extinct around 65 million years ago. Both are by all accounts true but they do not give adequate support to the conclusion that an asteroid killed off the dinosaurs; and an argument which took that as a conclusion would rightly be rejected as providing inadequate support.

The failure of this reasoning could be expressed in a number of ways. We could simply say that the conclusion is too strong or definite. If it had claimed that an asteroid was the *likely* cause, that might have been acceptable, but to say that it was the cause implies certainty, and the reasons fail to provide that. Another way to challenge the reasoning would be to say that it makes a highly dubious assumption: that just because two events coincided they must have been connected.

Compare argument [D] above (3.1.4a): Here a fair evaluation would be that the reasoning itself is strong, but the premises questionable. For *if* passive smoking really is a health hazard, and *if* we accept that it is the job of government to protect people from risk, then the argument would be very hard to fault. But they are big *if*s, especially the second: it is largely a matter of opinion whether this is the duty of a responsible government or unacceptable intrusion / 'Nanny State'.

Lastly compare [A]. In this argument the reasons are as questionable as they are in [D]. But even if they were acceptable, they would not give adequate grounds for the conclusion. There is a large 'hole' in the argument – the questionable *assumption* (see 3.1.5) that it is right to prohibit something just because it is hazardous or because it is anti-social.

3.1.7 consider **consequences** and their impact on arguments.

Sometimes the weakness of an argument can be shown by considering a consequence which would follow from it.

For instance, if we accept [A] and its conclusion, would this 'open the door' to government-imposed prohibitions on other pastimes that are seen as hazardous or anti-social, some of which we may enjoy and think harmless? Unless we are willing to accept this consequence / pay this price, then we should think again about accepting argument [A].

3.1.8 consider the impact of additional evidence, counter-examples, analogies etc.

Another approach to evaluation is to consider what kind of claims might weaken (or strengthen) an argument. For instance, in [G] above (3.1.5a), if there were evidence that on occasions people from certain social groups have been victimised, or falsely arrested, that would be sufficient to cast doubt on the conclusion.

Suggesting and considering alternatives involves lateral and imaginative thinking skills. Students need to be aware of these dimensions to the subject. Questions for discussion which might help to develop these skills include:

'Where would you go to find extra support for this argument?'

or:

'If you wanted to challenge this argument, what different facts / situation / example / explanation would you put forward?'

3.1.8a	**Analogies**	Analogies (comparisons) are often used in arguments or counter-arguments to make a point. For example, suppose a speaker was arguing that in the US the possession of guns should be outlawed on the grounds that if it were there would be fewer shootings. A supporter of the existing, liberal gun-laws in the US might reply: 'Remember prohibition. Banning alcohol simply drove the sale of liquor underground and the result was more alcohol abuse not less.' Prohibition is used here to draw an analogy with banning guns. How persuasive, or otherwise, we find the analogy depends on whether we think there are significant parallels, e.g. between drinking and shooting.
3.1.9	identify ambiguity and vagueness and understand the importance of **clarifying terms**.	Many arguments turn on the way a particular expression is understood. Students should be aware that proper evaluation may involve clarifying the meanings of some words or phrases. For example, in [G] above (3.1.5a) the expression 'nothing to hide' could be taken in more than one way. Taken literally it could mean nothing *whatever* on your person that you might prefer to keep private – legitimate or otherwise. But in this context it almost certainly means nothing *incriminating*. The argument would make little sense otherwise. In [A] and in [E] the word 'serious' is used, of health hazards and social problems respectively. The term is vague, but also important. For in both cases acceptance or rejection of the argument could depend on where the line was drawn between serious and trivial / inconsequential.
3.1.10	distinguish between the reasoning in an argument and the use of persuasive language.	Arguments are typically intended to persuade. Reasoning alone, even if it is sound reasoning, may not achieve this. Arguments are often made more forceful by the use of persuasive, provocative and/or emotive language. Students should be aware of the power of certain words and phrases and the effect they can have on the audience. This is evident even in relatively restrained arguments, such as [A] (3.1.1). *Passive smoking* is a serious health *hazard*. Non-smokers should not be *subjected* to the *antisocial habits* of a *thoughtless minority*… Students can consider to what extent this argument would lose its impact if the italicised expressions were replaced with more neutral ones. In so doing they can see the bare, underlying argument for what it is, and evaluate it accordingly.
3.1.11	recognise **bad (flawed) arguments**, and be able to identify what is wrong with them (**fallacies**).	An argument is flawed if the conclusion does not follow reliably from the reasons – whether the reasons and/or conclusion are true or not. For example: [H] 'Garlic is a key ingredient in Mediterranean food, and people living in the Mediterranean region are known to suffer fewer heart attacks than northern Europeans. It would improve general health in the UK, therefore, if more garlic was eaten.' Both of the premises, in the first sentence, are true (allegedly). But, even so, they do not support the second. It is a *non-sequitur*, meaning it doesn't follow from the reasons given. There are at least two faults in the reasoning in [H]. One is the inference about general health from a claim about heart attacks alone. The other is the assumption that if people living in the Mediterranean are healthier it is garlic that *makes* them so. It might be the weather.

3.1.11a **Fallacies** The term 'fallacy' is often used in a loose way to mean any falsehood, for example in: 'It is a fallacy that garlic is a health-food.'

Used more precisely 'fallacy' means a claim or belief that is based on flawed reasoning, or the flaw itself. For example: 'it is a fallacy to claim that garlic is a health food on the strength of low heart-attack incidence in some countries where garlic is eaten.'

This is the way the term should be understood in Critical Thinking. In some cases fallacious reasoning is unintentional on the author's part. But on occasions it may be a deliberate ploy to 'win' a debate, or persuade the audience.

There are many different kinds of fallacy, or ways of describing a fallacy. Many have names (some going back centuries), and are often referred to as the Classic Fallacies. For both AS and A2 level in Critical Thinking, students should know a number of common fallacies – by name, by description, and by example – and should be able to recognise them when they encounter them. It will also assist them in making informed evaluations of argument.

By the end of Unit 1, students should be familiar with the following classic fallacies:

Ad hominem Challenging the author(s) of an argument, or holder(s) of a belief rather than the claim or reasoning itself. (The Latin name means literally 'at the man / person'.)

For example:

[I] 'Dr M, who opposed the 24-hour opening hours for pubs because it would encourage drunkenness, is himself a binge drinker. This completely discredits his argument.'

Clearly the doctor's drinking habits do not discredit his argument, even if they discredit him.

It should be noted that challenging the person is not always fallacious. If for example an argument is about the credibility of a claim, then it may be relevant and justified to challenge the author's motives, honesty, consistency, etc.

For instance, if Dr M was also on record as having supported the case for 24-hour super-casinos, despite a predicted increase in problem gambling, it would be fair to argue that he could not have it both ways.

***Tu quoque* – or justifying one wrong by another** Students will be familiar with the expression that two wrongs don't make a right. The same goes for arguments as for actions.

We see regular examples of this when governments respond to criticism by accusing the opposition of similar occurrences when they were in office.

'You can't call this bill a "stealth tax" when you yourselves introduced all sorts of taxes by the back door.'

This might be grounds for saying that the Opposition are being hypocritical; but on the question of whether or not it is right to call the bill in question a stealth tax, it is entirely irrelevant.

Tu quoque literally means 'You too'. However, it is no less of a fallacy when expressed in the third person: 'China's growing fuel consumption cannot be criticised given the level of consumption in the US.'

'Straw man' Misrepresenting or distorting an opposing viewpoint or argument in such a way that it is easily put down. Consider an argument which began:

'The urban cyclists' case for providing more bicycle lanes in city centres is just another excuse to attack the private motorist…'

This would be setting up a 'straw man' because there clearly are many good grounds for extending the provision of bicycle lanes which have nothing to do with attacking motorists, and to suggest that this is all its proponents are doing is to trivialise their case.

(By contrast see The Principle of Charity, 3.1.4d)

'Slippery slope' Assuming that a small or moderate change or concession will inevitably lead to extremes, either directly or in stages. For example:

[J] 'We can't permit students to remove their ties, or before you know it they will be coming to school in whatever clothes they like.'

Cause-correlation, and *post hoc* fallacy The fact that two events have both occurred, or two facts have emerged, does not mean that one has *caused* the other.

This is often referred to as the cause-correlation fallacy (or correlation = cause). Example [H] above (3.1.11a) is an example of confusing correlation with cause.

When the reason for assuming a causal connection is simply that one event has followed another, this is also known as the *post hoc* fallacy. For example, if the phone rings and a moment later there is a knock on the door, no causal connection can be assumed.

Over-generalisation; anecdotal evidence The use of a small number of instances to draw a general conclusion is unsafe. For example:

[K] 'Manchester is a crime-ridden city. Both times I've been there I've been mugged.'

This is a gross generalisation from just two particular cases. It is anecdotal evidence, and is inadequate to support the conclusion.

False dichotomy/ false dilemma Assuming that there are only two options (often extremes) when there may be others. For example:

[L] 'The Member for … has stated publicly that she will never support this Bill, so unless she wants to lose all credibility she will have to vote with the Opposition tonight.'

Given Parliamentary rules, the MP could abstain *and* that might allow her to keep her credibility. So the argument rests on a false dichotomy or dilemma.

(Also known as ***limiting the options***).

'Begging the question' An argument is fallacious if it assumes what is at issue, or what it sets out to conclude. For example:

[M] 'If you smack a child for whatever reason you deserve the same punishment as if you assault an adult. Therefore smacking children is no different from any other form of criminal assault and should be dealt with accordingly.'

The author concludes that smacking children is the same as assault and deserves the same punishment, but has more or less said this already in the preceding sentence.

This is also an example of **circular argument** or **circularity**.

Confusing necessary and sufficient conditions

This is a common reasoning error. Just because something is necessary for some outcome does not mean it is also sufficient. For example:

[N] 'The engine won't run unless fuel is getting through. So all you have to do to start it is clean the fuel line.'

According to the speaker fuel getting through is *necessary* for the engine to run, but it may not be the only fault. Therefore it is not *sufficient* for the conclusion, and the argument is fallacious.

Similarly the fact that something is sufficient doesn't mean it is necessary too. For example:

[O] 'A worn seal would cause a leak, so if you've got a leak then one of the seals must need replacing.'

A worn seal would be a sufficient condition for a leak to occur, but is not a necessary one: a split pipe, or something else entirely, could have been the cause.

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***ad hoc* argument**

When a claim has been made, and a legitimate objection raised, there may be no rational option but to revise the original claim. What is not acceptable is adding some special proviso, just to suit the argument, and then trying to say that the original conclusion still stands.

Take the argument that fishing is harmless fun for all concerned, based on the premise that fish experience no pain. Then suppose that convincing evidence is provided that fish *do* feel pain. It would be *ad hoc* reasoning to switch to the claim that fish don't feel pain *like humans do* – and still argue that fishing is harmless fun.

argument from ignorance

Argument that takes lack of evidence as grounds for denying something, or lack of contrary evidence as grounds for asserting something.

For instance, the fact that there was no proof of a link between mad-cow disease and CJD in humans was often cited (fallaciously) as grounds for declaring beef safe to eat.

Note that this would be fallacious even if, in fact, beef were safe to eat! It is not the claim that is fallacious, it is the reasoning.

confusion / equivocation

Sometimes an expression is misused, or used in a purposely confusing or ambiguous way. This is also known as *equivocation*, especially when the same word is used with different meaning in the same argument. It may result from ignorance or it may be a deliberate ploy to mislead.

Supposing someone reasoned: 'The average family has 2.4 children and the Burton family is about as average as you can get. Therefore the Burtons must have either two or three children.' The arguer would be guilty of equivocation and the argument would be fallacious because it depends on the two uses of 'average' being the same when clearly they are different.

This is a transparent example, used to illustrate a point, and most people would see through it. But used cleverly or subtly, equivocation can be much harder to recognise. It emphasises the need for *clarification of terms* – see 3.1.9 above.

3.1.11b **Appeals** Arguments often make some *appeal* in support of their claims: for example to authority, popular/majority opinion, emotion, sympathy, precedent. For example:

[P] 'Ask any motorist whether they would rather keep their cars or have cheap, efficient buses and trains instead, and they will choose their cars. The right policy for the government must therefore be to put road building at the top of the agenda.'

[Q] 'The Battle of Britain was the most heroic episode in World History. For, as Churchill said: "Never have so many owed so much to so few." '

Students should recognise when an appeal is being used as a persuasive device and assess what weight, if any, it adds to the argument. In [P], for instance, it is of little account what the majority of motorists want in deciding what is 'right policy'.

In [Q] the appeal to the authority of a great historical figure does not make the claim any truer, nor does it warrant the definition of heroism that is implicitly assumed. The strength of [Q] is rhetorical rather than logical.

3.1.12 draw **comparisons** and **contrasts**.

Identifying similarities and differences between objects of study is an important aspect of Critical Thinking.

Providing a clear definition or classification of something typically involves saying what *kind* of thing it is, and what *distinguishes* it from other things of that kind.

Students should be able to make observations of the form: A and B are similar in respect X, different in respect of Y. (For example, chess is like tennis, in respect of being a competitive game, but different in being non-physical, purely intellectual.)

They should be able to distinguish between *qualitative* and *quantitative* differences and between differences in *kind* and differences in *degree*. To compare two people's incomes is quantitative; to compare their lifestyles is qualitative. Similarly, income levels differ in degree, whereas lifestyles differ in kind. However, in some cases differences in degree are so great that they become differences in kind – for example the difference between the poor and the wealthy.

3.1.12a **Comparative evaluations** Students should recognise when a comparison involves a *value judgement*: 'A is better than B', 'A is more deserving than B,' etc.

When making comparative evaluations themselves they should give reasons; and/or state the *criteria* on which they base their judgement. For example: 'A's achievement is greater than B's *because it took more courage*…'

3.1.13 use their experience of analysis and evaluation to present **cogent arguments**.

In all four Units of the exam there will be questions which require candidates to respond to claims / arguments / issues, with clear and cogent arguments of their own.

In presenting their own reasoning, students should have begun to:

- give a clear statement of their conclusion;
- clearly state the main supporting reasons;
- where necessary support the main reasons with sub-arguments (see 3.1.4b);
- introduce examples and evidence where appropriate;
- cite general principles (see 3.1.3) that may support their argument/s;
- consider counter-arguments, possible objections, etc., and offer some response to these.

3.1.14 begin to acquire a basic vocabulary of terms associated with reasoning, and use them appropriately.

Students should have familiarity with the terms used and explained in the above specification. For example, they may be asked to identify a particular *fallacy* (3.1.11 above) in a given passage, or say which of two conclusions is an *intermediate* one, and which the main (3.1.4)

However, students are not obliged to use technical terms in their own responses, and if a correct answer is given in non-technical terms, it may receive full credit.

Unit 1 Assessment

Candidates will be assessed by means of a written paper lasting 1 hour and 30 minutes. The question paper will be based on a source booklet containing several short documents which may be accompanied by images and/or graphics. These will relate to a single topic or issue, or two or more related topics, and consist of background information and argument. One or more of the documents will be a debate or discussion, or exchange of views.

The question paper will have two sections, A and B.

Section A will require short written answers, assessing a range of skills and understanding summarised in the Specification: 3.1–3.14. Not all the points in the list will necessarily be addressed by a specific question in every examination.

There are two main categories of question in this section. The first sets specific tasks or questions, such as: 'Identify an implicit assumption…' or 'Is there a flaw…?'. Questions in the other category are more open and require candidates to select for themselves the point (or points) which are most relevant. These typically ask the candidate to: 'Comment critically …' or 'Critically evaluate…'

Section B will comprise one or two questions which give candidates the opportunity to present their own reasoning on a subject related to the stimulus materials.

No specialist knowledge of the subject matter will be assumed; nor will such knowledge give any advantage to candidates.

3.2 Unit 2 CRIT2 Information, Inference and Explanation

This unit focuses on data and information found in various formats. Students are assessed on their ability to make critical responses to information and its sources, and to draw reliable conclusions from it.

Unit 2 is an extension of the Foundation Unit and the following learning objectives should be seen as supplementing those in Unit 1.

Summary of content

Students extend their application of the skills and concepts introduced in Unit 1.

Additionally they:

- appreciate the various ways in which information or evidence can be presented;
- follow, and apply, basic methods of numerical and statistical reasoning;
- recognise significant patterns and correlations;
- offer plausible explanations;
- judge what can (and cannot) be safely inferred from a given body of information/evidence;
- use information and data provided to draw conclusions of their own; and construct reasoned arguments to support or justify them.

Detailed version of the *additional* content including notes and guidance

	On completion of Unit 2 students should *additionally*:	**Notes and Guidance**
3.2.1	appreciate the various ways in which **information** or **evidence** can be presented.	During Unit 2 students should gain experience in extracting information that is relevant to a given question or task from a range of sources – verbal, graphical, numerical, pictorial, etc. They should practise comparing information in different forms, and translating information from one form into another, e.g. from a graph into a verbal statement, from a report into a chart. They should discuss the advantages and disadvantages/limitations of different ways of presenting information, using criteria such as accuracy, detail, simplicity, and selectivity.
3.2.1a	**Motive, agenda**	Students should be aware that much evidence is presented with a purpose or agenda in mind, and may therefore be one-sided, slanted or selective. They should be able to identify bias when they encounter it, and/or recognise when data is presented in a misleading or exaggerated way.
3.2.1b	**Sources**	Part of assessing evidence involves considering its *source*. 'Source' in this sense might be a physical record or document, or the author of a claim or statement. Sources need to be judged in terms of their credibility: the degree of trust that can be placed in them. Thus it might be said that a photograph is a more reliable record of an event than a drawing made from memory, or that a convicted fraudster is a less reliable witness than a bank manager. Of course these presumptions may sometimes be unjust, but they are factors, among others, to be weighed in the balance. Students should apply a range of critical questions to their assessment of source-reliability. Factors to consider include: • the primary or secondary status of the source; • the reputation/reputability of a witness or author; • the possibility of vested interest on the part of an author (and the extent to which it might influence him or her to say one thing rather than another);

- the scope for error, e.g. the physical ability of a person to make a particular observation;
- the expertise or authority of an author (and whether or not their expertise is relevant to the claim/s being made);
- the degree of corroboration provided by other (independent) sources.

3.2.2 follow, and apply, basic methods of **numerical** and **statistical reasoning**.

When necessary or appropriate, students are expected to use basic forms of mathematical and statistical reasoning, to explain and justify inferences.

For example, they should be able to say with confidence whether or not a given set of data supports a particular generalisation, prediction, causal claim, or recommendation – and why.

3.2.2a **Mathematical knowledge**

The level of mathematical knowledge required for Critical Thinking AS-Level is generally pre-GCSE. It is non-specialist and broadly comparable to KS 2-3 of the National Curriculum*.

Students will need to understand basic applications of:

- percentages, ratio and proportion
- averages (mean and median)
- simple probability.

They should understand and correctly use terms such as 'range', 'frequency', 'distribution', 'cumulative', 'discrete / continuous variable'.

They should be able to read and interpret commonly used graphs and charts, particularly: bar charts; pie charts; line and scatter graphs; flow charts and tree diagrams; simple Venn and Carroll diagrams. They should know what is meant by extrapolating and interpolating, without necessarily using the terms.

Processing of data is sometimes required, but complicated or demanding calculations are not.

Calculators are not needed.

* Ma 2 (*Number & Algebra*) to KS2 levels; and Ma 4 (*Handling Data*) up to KS 3.

3.2.3 recognise significant **patterns** and **correlations**.

Students observe trends, patterns, etc., in the data they extract, and put their observations into words. For example:

'According to the figures, cases of … have fallen off steadily in line with the increasing incidence of ….'

They should be aware of the danger of equating correlation with cause. (See Unit 1: 3.1.11a)

3.2.4 offer **plausible explanations**.

Students should recognise when an explanation is needed, for example when findings are unexpected, unusual or anomalous. They should provide explanations and consider their plausibility.

A plausible explanation is one which is not far-fetched and which *would*, if true, account for something that has happened, or for some trend or correlation that has been observed.

For example, if the retail price of a certain product has risen sharply for no apparent reason, the explanation could be that all the companies that sell the product have formed a cartel to fix the price. This certainly could account for the rise, and it is not impossible or unprecedented (though illegal); so it is one plausible explanation.

3.2.4a	**Causal explanation**	A plausible explanation needs to be distinguished from a *causal* explanation (or cause itself). It would be jumping very hastily to a conclusion to infer from the sudden price-rise that a cartel *has* been formed and/or that a cartel is responsible. There may be other possible or equally plausible explanations which need to be considered and evaluated. If, for example, the raw materials used to manufacture this product had suddenly become scarce, that too could account for the price rise, and more simply and naturally than an alleged, illegal cartel. This would be especially so if other products made from the same materials had also risen in price. It would not entirely disprove the cartel hypothesis, but it would weaken it.
3.2.5	judge what can (and cannot) be **safely inferred** from a given body of information/ evidence.	Students need to be clear what is meant by a 'safe' or reliable conclusion; and, conversely, what factors can make a conclusion unsafe or unreliable. The terms 'safe' and 'unsafe' are used here in the way judges refer to convictions in a trial. Saying that a verdict is *un*safe does not mean it is necessarily wrong: it just means there are inadequate grounds or insufficient evidence to put it beyond reasonable doubt. For example, evidence that the volume of passengers travelling by train has risen year-on-year over a given period, coupled with figures on improved punctuality etc., do not mean that the travelling public is necessarily becoming more satisfied with train services. It would be unsafe (and unwise) to draw that inference. What makes this inference unsafe is the existence of other plausible reasons for travellers switching to rail, such as road congestion and cost of petrol. They may be disgusted with the rail service, but see no serious alternative.
3.2.6	use information and data provided to draw conclusions of their own; and construct reasoned arguments to support or justify them.	When building their arguments students should not just cite evidence, but analyse and evaluate it as well. They should assess: • how reliable it is; • how strong it is; • whether or not it supports or weakens their conclusion. Finally, they should take care that the conclusions they draw are consistent with their assessments – in particular that they do not claim too much on the strength of weak evidence.

Unit 2 Assessment

Candidates will be assessed by means of a written paper lasting 1½ hours.

The exam will be based on a set of source documents presenting information, either on a single topic or two closely related topics. Between them the documents will present data in a range of forms: verbal, numerical, graphical.

The question paper will consist of two sections, A and B.

Section A will contain a number of questions requiring short written answers. Candidates will engage in: extracting and interpreting information, assessing claims and conclusions, drawing inferences, and offering explanations.

Section B will present candidates with a short statement or proposal related to the examination topic(s), which they will be invited to argue for or against.

Both sections of the paper will require candidates to draw on skills from Unit 1 as well as Unit 2.

3.3 Unit 3 CRIT3 Beliefs, Claims and Arguments

In progressing to A2-Level, students develop and extend the foundation skills and understanding acquired at AS-Level, and apply these to more complex materials and challenging assignments.

In Unit 3 the focus is on the use of argument and evidence to justify beliefs, opinions, and claims to knowledge. It introduces students to a range of skills and concepts that can be applied to the critical evaluation of these.

Summary of content

Students extend their application of the skills and concepts introduced at AS-Level.

Additionally, they:

- demonstrate some understanding of the concepts of knowledge and belief and of their relevance to Critical Thinking;
- recognise and evaluate different kinds of evidence that are used to justify beliefs and claims to knowledge;
- recognise significant differences between certain claims, and take these into account when assessing the grounds;
- understand what is involved in testing hypotheses;
- recognise different patterns of reasoning and reasoning strategies;
- recognise and apply some basic logical ideas;
- recognise some features of ethical arguments and understand some of the problems of evaluating these;
- consider the function of principles, especially in ethical arguments;
- recognise and critically evaluate a range of common rhetorical devices and appeals, including those that are considered fallacious;
- apply the insights they have gained from assessing arguments in order to improve their own reasoning.

Detailed version of the *additional* content including notes and guidance

	In addition to the AS-Level requirements, students will be expected to:	**Notes and Guidance**
3.3.1	demonstrate some understanding of the concepts of **knowledge** and **belief** and of their relevance to Critical Thinking.	As part of the conceptual framework of Critical Thinking, students should have some understanding of what we mean by knowledge, discussed in general and non-technical terms. Questions for consideration might include: 'What can be known?' 'What does it mean to say I *know* (something)?' 'Does knowledge require certainty?' 'Can we know something that is not a fact?' Distinguishing between knowledge and belief has obvious relevance when evaluating arguments and evidence, and the extent to which they *justify* different claims. We might say, for instance, that such-and-such an observation provides grounds for a belief, or helps to confirm a hypothesis, but does not warrant a claim to knowledge. To make such evaluations students need to be confident in their own use of these terms, and to use them consistently. For example, students should consider whether knowledge is the same as certainty; and, if so, whether that means *absolute* certainty or *practical* certainty. Do some beliefs, if they are held with sufficient justification or conviction, have the same status as knowledge? Does a scientific theory that has provided grounds for countless correct predictions qualify as knowledge? These and similar questions, with examples, should be discussed.

Students should also understand and question the traditional 'three-part definition' of knowledge: that to say we *know* something means 1) that we believe it, 2) that we have good grounds for believing it, and 3) that it is true – often abbreviated to 'justified true belief'. Strong and useful as this definition is, it leaves a big question unanswered, especially relevant to Critical Thinking: What constitutes 'justification' or 'good grounds'? (See section 3.3.2)

3.3.1a **Scepticism**

Students should be aware of the role of *scepticism* as a critical tool, but also question how far it is rational and/or helpful merely to be sceptical. For instance, is it rational or helpful to insist that we don't *know* / can't be certain that smoking causes cancer, that the Holocaust really happened, that our senses give us reliable information about the outside world, or that unprovoked violence is always wrong?

These questions about the nature of knowledge should not be approached with the aim of reaching definitive answers, but to enhance students' critical awareness, and add rigour to their evaluative thinking.

3.3.2 recognise and evaluate different kinds of **evidence** that are used to **justify** beliefs and claims to knowledge.

The concept of justification is central to Critical Thinking and should be discussed in depth. People offer various kinds of justification for their beliefs and claims. These need to be identified and evaluated in response to questions such as:

'How justified is the author in claiming that…?'

'How strongly does the evidence justify the belief in / that…?

Students should consider the wide variety of sources of evidence which may be encountered. For example:

- direct acquaintance / evidence of the senses / first-hand experience;
- memory;
- the testimony of others;
- inference or deduction;
- power to explain;
- coherence with our other beliefs (or knowledge);
- authority / expert opinion / general acceptance / majority opinion / 'common knowledge';
- plausibility;
- lack of contrary evidence.

For the purpose of illustration, consider a claim that the occupants of a house (call them the Soprano-Twins) are 'known' drug dealers. How might some of the above forms of evidence be used to support or justify this allegation?

It may be based on the personal experience, or first-hand account, of someone (e.g. an undercover detective) who has been into the house and bought drugs from the Soprano-Twins.

It may be inferred from frequent observed comings and goings at the house.

It may be offered as an explanation as to how the Soprano-Twins can afford an extravagant life-style.

It may be 'common knowledge' in the neighbourhood.

It may fit with other information, e.g. police records / previous form, and so on.

It may be a combination of some or all of these.

Students should have opportunities to identify these and other categories of evidence in different contexts, and assess the degree of justification they provide.

3.3.2a **Empirical grounds**

Students should understand what is meant by *empirical* evidence and empirical methods, i.e. observation, measurement, experiment. For example, knowledge that the pitch of a sound becomes higher as its wavelength shortens is established empirically by varying the pitch and measuring the length of the wave.

We can verify this with our own eyes and ears; or we can accept it on the authority of scientists, text-books, researchers, etc. But either way it is from empirical evidence that such knowledge originates.

Whilst sense experience is the most reliable, if not the only, evidence we have for knowledge of the natural world, and is the basis for our scientific reasoning, it does not confer *certainty*; for there is always the possibility that we may be mistaken about what we see and how we interpret it.

Moreover, empirical evidence relies on a finite number of observations or experiments, so that there is no absolute guarantee that things will always remain the same in the future as they have in the past. We can make very reliable predictions on this basis, but we cannot claim certainty.

3

3.3.2b **Definition and self-evidence**

By contrast, a claim of the kind: 'The amplitude of a wave is its vertical height', requires *no* empirical evidence. If true, it is true simply *by definition*.

So is the statement that a triangle has three sides. It is not just an observed fact but a self-evident one, since anything that doesn't have three sides would not be a triangle. Such claims *can* be made with certainty.

Some claims have grounds that are part-observation, part-definition. The disputed claim, 'Pluto is a planet', depends on what is understood by 'planet' – a matter of definition. But it also depends on whether Pluto satisfies the terms of the definition, which is an empirical matter.

3.3.2c **Probability**

In the absence of certainty claims need to be assessed in terms of their probability. Probability is measured (by convention) on a scale from 0 to 1, with 0 meaning 'impossible' and 1 meaning 'certain'. 0.5 means 'evens' or 'fifty-fifty', and any point higher than 0.5 could be claimed 'on the balance of probabilities'.*

The question of whether a claim is justified typically comes down to two questions:

(i) 'How probable is … given the evidence/grounds provided?'

(ii) 'Is that degree of probability *adequate* to justify the claim?'

The notion of adequacy is introduced in Unit 1, (3.1.6). Its relevance is clear because without it question (i) would be a blunt instrument. The level of probability needed to justify a claim made can vary significantly from one claim (or one context) and another. In the law, for instance, a civil case can be settled on the balance of probabilities, whilst a guilty verdict in a criminal trial must be approaching 1 – 'beyond reasonable doubt'.

*__Note__: Candidates will not be asked in the examination to reckon probability mathematically but should understand the scale and be able to give meaningful descriptions of degrees of probability.

3.3.3 recognise significant differences between certain claims, and take these into account when assessing the grounds.

Claims differ in what they assert, and in how they assert it. Some claims are tentative; others more forthright or direct. An outright declaration such as:

(a) 'The Opposition cannot fail to win the next election' is obviously very different from a guarded claim like:

(b) 'If the trend continues, the Government look likely to lose…'

Even though these claims are both predicting broadly the same outcome, the manner in which they make it means that they require very different levels of justification. If the available evidence indicated that the Opposition were steadily opening up a lead in the opinion polls, that would give substantial justification for (b), but obviously not for (a).

3.3.3a **Strong and weak claims**

Claims like (a) and (b) are often described as 'strong' and 'weak' respectively. In this context 'strong' and 'weak' are semi-technical terms. A strong claim is one that asserts something boldly or categorically; or which says *more*. A claim that the Government will lose the next election *by a landslide* asserts more than a claim that they will simply lose, and is accordingly 'stronger'.

Claims can be qualified or modified, by various means, to make them stronger or weaker. Take the neutral claim,

'Alcohol should be avoided when taking antibiotics'.

This can be strengthened to read: 'Alcohol *must* be avoided when taking *any* antibiotic', or weakened to read: 'Alcohol *may* need to be avoided when taking *some* antibiotics.'

It is important to take the relative strength of claims into account when analysing and evaluating arguments. The impact of expressions like 'all', 'only', 'never', 'sometimes', 'may', 'must', 'necessarily', 'possibly', etc. should be appreciated. One such word can determine the adequacy or otherwise of a whole argument.

3.3.3b **Complex claims**

Claims can be simple or complex. Complex claims consist of two or more constituent claims linked by connectives such as 'and', 'or', 'if…(then)…', 'because'.

It is important when assessing the grounds/arguments for such claims that the whole claim is taken into account, not just the parts. For example,

'Interest rates will have to rise if low inflation is to continue'

is a conditional statement that is true or false as a *whole*. (It does not require that interest rates will have to rise, or that low inflation will continue, but that low inflation cannot continue *without* a rise in interest rates.)

Causal explanations, similarly, are complex. For instance:

'The National Socialists rose to power because the Treaty of Versailles was so punitive'

is true only if the treaty was punitive *and* had the effect of bringing the National Socialists to power.

Examples like these should be used to emphasise the importance of careful analysis.

3.3.4 understand and use some non-technical methods to test **hypotheses**.

Students should recognise when a claim is presented as a hypothesis (see Unit 1: 3.1.3).

Hypothesising should be distinguished from mere guessing (conjecture, speculation). Typically a hypothesis is based on sufficient grounds to make it worth considering, but insufficient to establish it as fact. A hypothesis may be plausible, may accord with certain facts, may be widely believed, etc., but still leave room for some degree of doubt.

Making and testing hypotheses plays a major role in scientific reasoning, and in statistics, where the methods are formal and mathematical. In Critical Thinking students are not required to understand or use these methods. But similar, non-technical reasoning is often required to judge the strength of hypotheses in a wide range of contexts.

A criminal investigation, for instance, typically consists of naming a suspect (hypothesis) and then looking for evidence to confirm or disconfirm the suspect's guilt.

Take the hypothesis: 'X is guilty' (of a certain crime). One way to test this would be to consider the *hypothetical* claim that:

'If X is guilty, then at least one of the many witnesses should be able to recognise X in a line-up.'

If one or more witnesses *does* recognise X, then the hypothesis is strengthened, though it is by no means proved. (X may have been an innocent bystander.) If no one recognises X – when it is clear that they would have recognised him if he *had* been there – then the hypothesis is seriously weakened.

In many cases a single negative result is enough to rule out a hypothesis completely. For instance, the claim that a particular strain of avian flu cannot 'jump species' would be proven false at a stroke if one case of flu in a different species were discovered. However, the same cannot be said of negative evidence, or lack of evidence. The observation that the strain in question has never been known to jump species does not mean that it cannot.

A good hypothesis is one that survives many tests without negative results. But this is never sufficient to make it an unassailable fact.

3.3.4a **Predictions**

Testing hypotheses can be thought of in terms of the success they have in making correct *predictions*.

Take, for example, the scientific theory that the ocean tides are caused (primarily) by the gravitational effects of the sun and moon and that the height of tides is governed by positions of the sun and moon relative to the earth. If this theory is correct it should be possible to use it to predict high and low tides, spring tides etc. with a high degree of accuracy. And, as we know, tides are predicted accurately in this way, providing overwhelming evidence for the theory – so much so that in practice we would call it fact rather than hypothesis.

Hypotheses can also be confirmed or disconfirmed by the outcomes of tests and experiments. For example, it was predicted that if the gravitational theory of tides was right, tides would occur, at the expected times, on any expanse of water – even a paddling pool. The prediction was made ahead of the technology that allowed such minute effects to be detected. Since then they have been accurately measured, adding yet further confirmation to an already convincing theory.

Of course an extreme sceptic (see above 3.3.1a) might object that tidal predictions have proved accurate *to date*, but that there is no absolute certainty they will continue to do so. Strictly speaking this is true, and if anomalous tides were to start occurring without explanation, the gravitational theory would have to be revised. But this is highly improbable, and unless or until any such anomaly is observed, the theory remains as close to certainty as scientific reasoning can take us. It is at the very least 'beyond reasonable doubt': the highest standard we have for *practical* certainty.

To summarise: hypotheses typically allow us to make predictions. Each prediction that turns out to be correct helps to back up the hypothesis – it is often referred to a *confirming instance*. A prediction that turns out to be wrong is a *disconfirming* or *falsifying* instance.

A reliable hypothesis – e.g. an enduring scientific theory – is one which 1) *could* be falsified by one or more wrong predictions, but which has not been falsified; and 2) has many confirming instances.

Another way to express 1) is to say that a hypothesis is 'strongly resistant to falsification', or 'stands up well to attempts to falsify it'.

3.3.5 recognise different **patterns** of reasoning and reasoning **strategies**.

At AS-level students are required to recognise argument by its general form: reasons leading to a conclusion.

At A2 analysis should be deeper than this. Students should look for different patterns of argument that commonly occur, and learn to identify different strategies that authors use in their arguments.

Three important examples follow in 3.3.5a/b/c.

3.3.5a **Suppositional reasoning**

This form of argument takes a claim of the form: 'Suppose / imagine / assume such-and-such…' and assesses what would follow from it: its consequences.

It is a particularly useful strategy if the aim is to draw the *opposite* conclusion: I wish to conclude P, so I start by supposing 'not-P'. If '*not*-P' has unacceptable consequences – especially absurd or contradictory consequences – I can safely infer P.

This variation of suppositional reasoning is called *reductio ad absurdum* (abbr. RA), which is self-explanatory, even in Latin.

To give an example of suppositional and RA reasoning , consider the dispute following the 2006 Football World Cup Final, when the French captain, Zinedine Zidane, playing in his last match, was sent off for head-butting the Italian, Marco Materazzi. Initially Materazzi denied provoking the attack. The following was typical of media responses:

[R] 'Suppose, as Materazzi claims, he did not provoke Zidane. That would mean this great national idol *made a decision* to end his career with a random act of violence, inevitable sending-off, and likely defeat for his country. Ridiculous? Of course. Yet that is exactly how Zidane's career did end. Materazzi must therefore have given serious provocation.'

3.3.5b **Argument to the best explanation**

Hypotheses are often justified by their ability to explain facts, or things that have been observed (phenomena). The argument goes as follows:

(H stands for *hypothesis*, O for one or more *observations*):

H would – *if true* – explain O, and would do it better than any other hypotheses. Therefore H is *probably* true.

It is known as 'argument (or inference) to the best explanation' and is widely used in scientific reasoning, as well as in everyday contexts, where we use it habitually.

Suppose, for example, I am stuck on a motorway in traffic that has not moved for half-an-hour. I assume there has been an accident, not because I have any direct evidence but because – if there *had* been an accident – that would account for the standstill; and account for it better than, say, road-works, which normally allow some flow of traffic.

Two important criteria should be considered when looking for the 'best' explanation. They are:

- *scope*: how much else (besides observation O) the hypothesis would explain.
- *simplicity*: how little else would have to be assumed to accommodate the hypothesis.

Recalling the example in Unit 2 (3.2.4): a secret, illegal price-fixing cartel could explain the sudden high cost of a particular product, but if many other products made of the same materials also rose in price, a scarcity of those materials would have much more explanatory scope. It would also be much simpler: it would require less stretching of the imagination or further explaining.

Of course, events do sometimes have *extraordinary* explanations, but ordinary explanations are more common and therefore more probable. Consider the example in 3.3.4a: the powerful hypotheses that tides are explained by gravitational attraction. *Theoretically* this could be challenged by an alternative explanation that the rise and fall of the tides is caused by the breathing of the sea-god, Poseidon, which just happens to keep time with the passage of his fellow deities, the Sun and Moon! Obviously this is not suggested as a serious contender (in the 21st century), but it is illustrative. What makes it a weak hypothesis is not just its quaintness to modern ears, but the fact that it fails the twin tests of scope and simplicity.

3.3.5c **Argument from analogy**

Argument from or by analogy makes use of an allegedly parallel example or case. For instance, the argument for a fairer distribution of wealth might be supported by drawing an analogy between the state and the family:

> [S] 'No caring or dutiful parent would give one of their children huge rewards, and another little or nothing, for the same effort. Governments also have a duty of care for their citizens, so to permit the massive inequalities that exist in western society is indefensible.'

An argument from analogy stands or falls by how similar the analogue is *in the relevant respects*. A state and a family differ greatly in scale and complexity, but all the argument requires is that they share similar duties of care. If they do, they give a form of support for the conclusion.

Evaluation of arguments like [S] would thus rest on how *fair* or appropriate the reader considers the comparison to be.

3.3.6 recognise and apply some basic logical ideas.

Students should have a basic understanding of a range of *semi-technical* concepts, and refer to them appropriately if they use them in their own reasoning and evaluation. For example:

contradiction / contradictory: Two claims are contradictory (i.e. contradict each other) if one is the opposite of the other so that they cannot both be true. It is a contradiction to say that the planet is heating up and that it is *not* heating up. Clearly, if an argument inescapably leads to a contradiction, it is not an acceptable argument.

converse: The converse of a claim does not necessarily follow from the claim itself, e.g. If all drug-dealers are criminals, it does not follow – conversely – that all criminals are drug-dealers.

conditional / hypothetical: Claims of the form 'If P then Q' are conditional / hypothetical: It doesn't mean that either P or Q are true, but that *if* P is, then Q is.

implication / entailment: The claim, 'If P then Q' means, 'P *implies* Q' – i.e. 'Q must be true if P is', or; Q *follows from* P'. In this sense 'imply' and 'entail' mean the same, (though 'imply' can also be used, more loosely, to mean 'suggest').

circularity: (see 'Begging the question': 3.1.11a)

generalisation / general and particular: A generalisation is a wide ranging claim. It is a generalisation that liquids solidify when cooled, compared with the *particular* claim that water solidifies when cooled. Care must be taken not to over-generalise from particular instances or examples. It is legitimate to argue from the claim about liquids to the claim about water (since water is a liquid), but not from the particular to the general. (See the fallacy of over-generalisation, 3.1.11a).

counter-example: Counter-examples are typically employed to challenge generalisations. For instance, the claim that all coniferous trees are evergreen is falsified by the counter-example of the larch, which is coniferous and deciduous.

necessary and sufficient conditions: A necessary condition is one which must apply for some outcome to follow, but may not by itself be enough to make it follow. A sufficient condition is one that *is* enough by itself for the outcome to follow, but may not be necessary.

For example, in a best-of-three-set tennis match it is necessary to take at least one set in order to win the match, but obviously not sufficient. Winning two consecutive sets is sufficient to win the match, but not necessary – winning the first and third would be sufficient too. Winning any two sets is both necessary and sufficient. Playing with the new Super-Slambo racket is neither necessary nor sufficient.

Many reasoning errors consist of confusing necessary with sufficient conditions. (See fallacies: 3.1.11a)

validity: (See deductive validity below)

3.3.6a **Deductive validity**

Students should be able to distinguish between deductive and non-deductive reasoning, and know the basic definition of validity.

What is distinctive about a deductive argument is that it offers certainty. If you accept the premises of a deductively valid argument the conclusion is inescapable. For example:

[T] 'The two men known as the Soprano-Twins sell drugs. Anyone who sells drugs is a criminal. Therefore the Soprano-Twins are criminals.'

So long as the two premises are true, it has to be true that the Soprano-Twins are criminals. By definition:

a deductively valid argument cannot have true premises and a false conclusion.

Accordingly, the following argument is *invalid*:

[U] 'Anyone who sells drugs is a criminal. The Soprano-Twins don't sell drugs. So they are not criminals.'

Clearly the conclusion could be false even if both premises are true. The Soprano-Twins could be car thieves. Hence [U] is a fallacy.

To be more precise, [U] is a *formal fallacy*. Its flaw has nothing to do with its content – drug-dealers, criminals, etc. Any argument with the same form as [U] will be invalid. For instance:

[U_1] 'Anyone who drives a Ferrari is rich. Claudia does not drive a Ferrari, so Claudia is not rich.'

This form, or pattern of reasoning, can be shown by substituting letters or symbols for the variable parts:

Any A is a B; (or All As are Bs);

X is not an A;

So X is not a B.

It is important when talking of validity not to confuse it with the truth or falsity of the claims. Consider:

[V] 'If the Soprano-Twins were criminals they would be in prison. As you can see, they are living happily at home with their mother. So they are not criminals.'

Unacceptable as it is, this is *not* an *invalid* argument. Its form is:

'If P then Q, but not-Q. Therefore not-P'

and all such arguments are valid. What is wrong with [V] is not its reasoning but its first premise, which implies (falsely) that all criminals go to prison!

3.3.6b **Deduction and 'real' argument**

It is fairly unusual in real-life contexts to find arguments which are purely deductive; and those which are tend to sound artificial or contrived (like [T], [U] and [V]). Partly this is because, in practice, fully-fledged deductive reasoning is rarely necessary. If someone wanted to argue the point that [T] argues, they would be more inclined to say something like:

[T_1] 'The Soprano-Twins are criminals – they sell drugs.'

Strictly speaking [T_1] is not valid; but it is not a fallacy either, nor a bad argument. Using the language of Critical Thinking we would say that [T_1] makes an implicit *assumption* (see 3.1.5a) that anyone who sells drugs is a criminal. And because it is a warranted assumption, we can say that the conclusion follows. We might also want to add (or clarify) that 'drug' here means the illicit kind and/or that the Soprano-Twins are not pharmacists.

We could even say that, if these missing premises are added, [T_1] is valid. However, it would be wrong to take from this that the only way to evaluate an argument favourably is to force it into a deductive mould.

Another reason why deductive arguments may sound contrived is because typically they achieve very little. If we know that the Soprano-Twins sell illicit drugs, and that doing so is a crime, the conclusion of [T] tells us nothing we did not know already. It doesn't really even warrant an argument. An argument is really useful only if, without it, the conclusion would be in some doubt, or if its audience needs some persuading.

The real point of interest in the Soprano-Twins case would surely be whether or not they *actually* sold drugs, (not whether doing so would make them criminals). And that is not something that can be settled by deduction, but by the production of evidence and the weighing of probabilities.

3.3.6c **Non-deductive reasoning**

Most arguments of practical interest do not aspire to deductive validity and could not achieve it if they did. The kind of grounds they offer can at best confer probability.

For example:

[W] 'The Soprano-Twins have an expensive lifestyle but live in a run-down area where drug use is rife. Both have police records involving illicit, drug-related activities. One of them has served time. There are constant comings-and-goings at their house at all times of the day and night. When their premises were raided by the police, traces of banned substances were found on carpets and furniture and a quantity of cocaine was found in a cupboard. Therefore the two men must be drug dealers.'

This is not a *valid* argument because even if the reasons are true, the conclusion may still be false.

But rather than say that [W] is *invalid*, we should see that the question of its validity or invalidity is not applicable. Evaluation should be aimed instead at asking:

(1) What degree of probability does the conclusion require?

(2) Do the reasons / evidence / grounds provide it?

In other words, is the argument *adequate*?

In this case a very high degree of probability is required because of the strong wording of the conclusion: '…the two men *must* be drug dealers…'. This is not established by the reasons given. They would not be enough to convict the Soprano-Twins in a court of law. So for that sort of purpose we would have to say that argument [W] was inadequate.

3.3.6d **Logic and Critical Thinking**

Teachers and students may wish to know how much formal logic is relevant and/or recommended.

In short, those who gain no knowledge of formal logic (beyond the brief discussion above) will not be disadvantaged when following this A-Level course in Critical Thinking.

Nonetheless, the subjects are related, and some text books make more of the relationship than others. Also it can provide useful insights. For example, the concept of deductive validity can be helpful in identifying formal fallacies, such as the one in [U] above (3.3.6a).

Those who feel comfortable with it, and who find it insightful, should not be discouraged from exploring certain aspects of elementary logic, and there are suggestions in the support materials for further reading.

However, even logicians will admit, formal logic is not best equipped to deal with the complexities of ordinary-language argument; and however far it is pursued logic will not provide all the answers to Critical Thinking questions.

3.3.7 recognise some features of **ethical arguments** and understand some of the problems of evaluating these.

Arguments leading to value judgements, and/or ethical claims, raise special issues for evaluation.

As a general rule *factual* claims do not provide adequate grounds for strong assertions about what is good or bad, right or wrong, or what people should or should not do. (This is often abbreviated to the maxim that 'an *ought* cannot be derived from an *is*'.)

For example:

[X] 'Head injuries are a common occurrence among cyclists, and treating head injuries costs the NHS millions of pounds a year. It is quite wrong for anyone to cycle without wearing a helmet.'

In [X] two (allegedly) factual claims are used to support a moral judgement – an opinion. The latter only follows if some assumption is made to the effect that it is wrong to take risks and/or do things which might cost the NHS money. But this is no less judgemental than the conclusion itself.

However, this does not mean there are not very often 'good' or 'compelling' reasons for acting one way rather than another, and factual evidence can often supply those reasons. Ethical arguments can be discussed and evaluated in those terms.

3.3.8 consider the function of **principles**, especially in ethical arguments.

Students should be able to identify arguments which, explicitly or implicitly, rest on principles. They should also make use of principles, where appropriate, in their own reasoning.

A principle differs from other claims by being more general. For example, in [X], what was concluded was quite specific but what was assumed was a general, action-guiding principle about not behaving in ways which might cost the NHS money. This could in turn be subsumed under an even more general principle that no one should do anything that might impose unnecessary costs on public services, or the tax-payer – or simply 'others'.

The more general a principle is the more widely it applies; but also the more vulnerable it is to counter-examples or exceptions (see 3.3.6 above). Whilst it might seem reasonable to make cyclists wear helmets, would we (*by the same principle*) want to make pedestrians do the same?

This question would be relevant to a critical evaluation of, or challenge to, argument [X].

3.3.8a **Major ethical theories / key concepts**

Some acquaintance with major ethical theories and associated principles can help students to make informed responses to ethical arguments. For example:

- the principle that we should do what brings the greatest happiness to the greatest number (Utilitarianism);
- the principle that we should never treat people as means to an end;
- the principle that we should treat others only as we would wish to be treated ourselves (the so-called Golden Rule).

Certain key concepts should also be discussed, and applied to the evaluation of beliefs and arguments. For example:

- the concept of *rights*;
- means and ends;
- the concept of *harm*;
- duty, responsibility, blame;
- autonomy (freedom to act independently).

3.3.9	recognise and critically evaluate a range of common **rhetorical devices** and **appeals**, including those that are considered fallacious.	In real-life argument it is common to find a wide variety of persuasive language, or rhetoric, at work. This may be a way of disguising an otherwise poor argument, or a legitimate way of enhancing good argument. It should not be thought that calling part of an argument 'rhetoric' is necessarily pejorative. However, critical evaluation of an argument requires the ability to separate these two elements. When an argument is analysed, the rhetoric should as far as possible be set aside, so that the reasoning can be assessed on its own merits. Students should be able to recognise when rhetorical devices are being used, when they are legitimate, and when they constitute fallacies such as the Straw Man, Slippery Slope, false dilemma, equivocation... (see Unit 1, 3.1.11a).
3.3.10	apply the insights they have gained from assessing arguments in order to improve their own reasoning.	By the end of the unit students should be arguing more cogently, applying informed self-evaluation, and taking steps to avoid fallacies.

Unit 3 Assessment

Candidates will be assessed by means of a written paper lasting 1 hour and 30 minutes.

The question paper will consist of two sections, A and B.

Section A will centre on a text or set of short texts expounding a belief, theory, or hypothesis. The questions, which will require written answers, will ask candidates to assess the justification for holding the belief, advancing the hypothesis, etc.

Section B will present one or more short but complex arguments or persuasive texts. Questions will require students to analyse and evaluate the text(s) and respond to them with critical comments.

3.4 Unit 4 CRIT4 Reasoning and Decision Making

Students draw on the skills and insights gained through the course and use them, selectively and appropriately, to present a reasoned argument leading to a decision.

Summary of content

Students:

- consider and explain why a decision, in a given situation, is required;
- develop a strategy for informed and reasoned decision making;
- list and assess available choices / options;
- use various sources of information to identify and assess consequences;
- understand the concept of value in relation to decision making;
- assess whether certain consequences count for or against a particular choice, and to what extent;
- judge between competing options and make considered decisions; and support decisions with well-reasoned argument;
- critically evaluate reasoning that is used to support decisions;
- communicate their ideas and arguments clearly and cogently.

Detailed version of the *additional* content including notes and guidance

	Students will additionally be required to:	**Notes and Guidance**
3.4.1	consider and explain why a decision, in a given situation, is required.	A decision is required when circumstances present us with two or more options to choose between, *and* when the choice that is made may have significant consequences. No decision is required if, either way, the consequences are unimportant. There may be a choice of trains I could catch to get from A to B; but if I am in no hurry and there are plenty of trains it is *inconsequential* which one I decide to take. The circumstances that require decisions are varied. Some have practical implications, such as financial gain or loss, missed job-opportunity, health issues, risk of injury. Others involve judgements of an ethical nature: for example, whether to tell a truth which might cause distress; whether to advise a friend to have an abortion; or whether it is right or wrong to hunt foxes. Some require decisions about what to believe: for example, which theory to accept about the origins of life – natural selection, intelligent design, etc. Many circumstances involve a mixture of these. Two examples will be considered in the following guidelines: 1. whether or not to take out a warranty on a new purchase; 2. what policy should be adopted on genetic modification (GM). It should be noted that a decision, in this context, does not always mean a personal decision: 'What should *I* do?' 'How should I respond?' The question may take a general, impersonal form, as it does in example 2. But either way it is *I* who am making the decision, so that my interests, my values and beliefs will be relevant to the argument. In this respect impersonal decisions can be thought of in hypothetical terms: '*If* I had to decide…I would do / say …' It is not an acceptable answer to say: 'It doesn't concern me' or, 'It's not my problem'.

3.4.2 develop a strategy for informed and reasoned decision making.

Students should understand that the aim of the exercise is to reach the *best possible decision*, given the information available. It is not to make an arbitrary decision, or take their own existing view and then argue for it.

Various strategies can be adopted to achieve this aim, but the following components are common to all of them:

- identifying the *options* (see 3.4.3 below);
- considering the *consequences* of each option in terms of their *likelihood* and their *importance* (see 3.4.4 below)
- judging between the options in the light of these considerations.

3.4.3 list and assess available choices / options.

Taking the GM example, the question could be reduced to a choice between the following:

A. give free rein to GM;

B. proceed cautiously with limited trials;

C. place a prohibition on all GM procedures for the foreseeable future.

This is not necessarily an exhaustive list. Other options may be suggested, for example: 'Actively encourage GM research', but care must be taken that options are not too similar. The list should represent the full *range* of options, but they should be *distinct* options.

In the other example, whether to take out a warranty, the choices are imposed: Yes or No.

For practical reasons the number of options students work with should be kept to a minimum: preferably just two or three. More, and the task becomes unwieldy.

3.4.4 use various sources of information to identify and assess consequences.

Once the need for a decision has been shown, and the broad options set out, the next step is to identify some possible consequences (PCs) of particular choices.

For example, for GM:

Option A	**Give GM free rein**
PC1	Crop yields increase and improve farmers' productivity / profit
PC2	GM crops transfer their herbicide tolerance to related plants, creating 'super-weeds' and other environmental problems
PC3	Many people are deeply upset at scientists interfering with nature / 'playing god'.
PC4	Process spirals out of control / gross hybrids or mutations / Frankenstein scenario

Again, this is not intended to be a complete catalogue of possible outcomes, but an illustrative sample.

The most important consideration when compiling the list is that it includes consequences both sides in the debate might raise. Some students may already have strong views on the subject. The danger for them is that they will either select possible consequences that favour their position, or that they will select those they can easily dismiss. They should therefore be reminded of the fallacy of *Straw Man* argument (see Unit 1, 3.1.11a).

3.4.4a **Information and sources: collection and selection**

To identify and assess consequences students must have access to adequate information. In the Unit 4 examination a range of information will be provided in the form of pre-release materials.

Similar resources will be needed for classroom activities, but students can and should be encouraged to obtain a large part of this themselves, not only prior to the activity but also as questions arise in the course of the work. This will have two benefits: it will emphasise to the students how essential information is to decision making; and it will greatly reduce the burden on teachers. Resource packs that students produce can also be stored for future use, e.g. examination practice.

Sources of information should be as varied as possible, including, for example: factual reporting, statistical data, research findings, argument and opinion, images, perhaps (occasionally) poems or stories. Sound and/or video recordings can be used as well as the printed word, and where appropriate these may be incorporated into the pre-release materials for the exam.

Not all information related to a topic will be directly relevant to the decision in question. It is good for students to realise this and to learn the importance of *selection* when referring to documents and other sources.

3.4.4b **Assessing likelihood and importance**

This is the core component of the exercise.

Using available data, students assess the consequences they have identified in terms of their likelihood, and their importance. They need to have a clear understanding of what this entails.

Obviously an outcome which is highly *likely* to result from an option will count for more than one which is a remote possibility. However, even a remote possibility counts for something if it has hugely important implications, e.g. matters life and death. Take PC4 above: No matter how unlikely scientists might estimate it to be, it is not impossible. And given the nightmare scenario that it conjures up, it cannot be left out of the reckoning. On the positive side, if there were even a faint chance that GM might solve the problem of world poverty, that would have to weigh on its side.

Similarly an outcome which is judged to have limited importance may count for little even if it is certain, or almost certain, to happen. To many minds the danger of super-weeds (PC2) is in this category: there is a lot of evidence that tolerance-transfer is happening already, but because it is considered controllable its relative importance is downplayed.

The consequences which must count the most, of course, are those we consider both likely *and* serious. For increasing numbers of people the danger of climate change is now in this league.

If we think of this mathematically, we would say the two factors were multiplied by each other:

likelihood x seriousness

3.4.4c **Probability and decision theory**

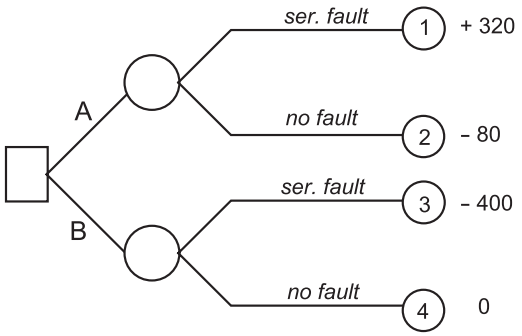
Likelihood, in the sense used here, is closely related to probability, and although the likelihood of an outcome can often not be quantified, some acquaintance with basic mathematical probability theory is useful. (See 3.3.2c above). Students should know how to express simple probabilities descriptively, arithmetically, or diagrammatically, e.g. probability trees.

They should know how to read, interpret and construct simple decision trees. Take example 1: whether or not to take out extended warranty on some valuable item – say, a new laptop. This is a common dilemma on which people tend to make a snap decision, which they might well reverse if they had approached it more critically.

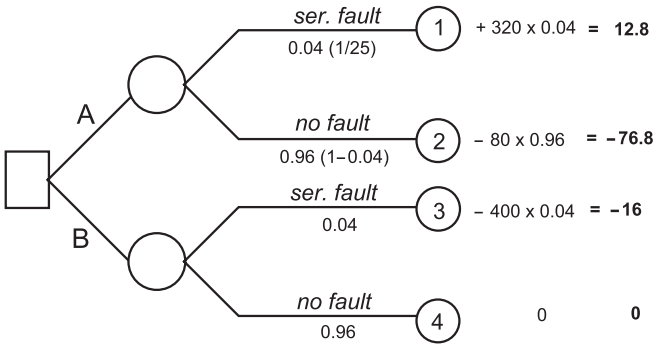
Suppose the laptop costs £400, and the extended warranty, offering repair or replacement cover up to three years, costs £80. Suppose, too, that we have data for this make of laptop which shows that during the period of the extended warranty, 1 in 25 machines develop a serious/irreparable fault.

The options, as we have seen, are: A Take the warranty, or B decline it. The possible consequences of A include: 1) *saving* up to £400 (less £80) in the event of a fault, and 2) *spending* £80 for nothing, in the event of there being no fault. The consequences of B include: 3) *spending* up to £400 in the event of a fault, and 4) *saving* £80 (i.e. spending nothing) in the event of no fault.

A basic decision tree could be used to represent these outcomes and the corresponding benefits or costs.



On the basis of this we might be persuaded that buying the extended warranty is a good decision: spend £80 now, or risk £400 later. But this takes no account of probability/likelihood. To complete the picture we need to combine both factors – i.e. multiply them:



We can now see that A may not be such a good option: the high probability of wasting £80 against the slim chance of saving £320 compares badly with the slim chance of losing £400 and the high probability of losing nothing. (Added up, A scores -64 and B -16.) Certainly if you were buying 25 laptops it would make no sense to buy warranties for all of them! So, statistically, the best decision would appear to be B.

However, the above reasoning makes the assumption that the cost is the only matter of importance. Many people buy warranties not on the strength of statistics at all, but for peace of mind, which they consider to have a real *value*. (See 3.4.5 below)

Their reasoning may be: 'It's *worth* £80 to know that *if* there is a fault it won't cost me a lot of money I may not have.' If they really value this reassurance, that could give outcome 2) a neutral score, rather than a negative one, making A the better decision.

Exercises like this, using simple statistical tools, will help many students, especially the mathematically minded, to see how *importance* (in this case the size of the gain or loss) *and* likelihood (probability) relate to each other, and how both have a role in assessing consequences.

They should therefore have opportunities to analyse statistical information and employ some simple statistical reasoning.

3.4.4d **Risk and uncertainty**

Students should understand the difference between decision making *under risk* and decision making *under uncertainty*. In the case of risk the probabilities of the outcomes are known; in the case of uncertainty they are not. Deciding whether or not to take out the extended warranty was a decision made under risk. Deciding whether or not to trust GM food would largely be a decision made under uncertainty.

In between are cases in which it is possible to *estimate* risk, if only crudely. But genuine uncertainty means I have no grounds even for an estimate: the best I can do is assume a probability of 0.5, knowing that it means anything from 0 to 1.

But there are also cases where there is neither risk nor uncertainty. Again, taking the GM example, one possible consequence (PC1) was that crop yields would increase. Since GM crop yields have already shown an increase over non-GM, there is no question of likelihood to consider: it is a fact. All that needs to be taken into account is its importance, or *value*.

3.4.5 understand the concept of **value** in relation to decision making.

The value we attach to things largely determines how important we consider the consequences to be. If the laptop in example 1 had had a value of £4000 instead of £400, the importance of consequences 1) and 3) would have been ten times greater, altering the balance in favour of taking out the warranty.

But a 'value', as we saw, can vary from person to person, and some values are more quantifiable than others. Monetary value is easily quantified; peace of mind less so. Saying: 'Peace of mind is *worth* £80', is a value *judgement*, rather than a factual statement about actual cost.

Similarly the importance we assign to PC2 depends on values:

> GM crops transfer their herbicide tolerance to related plants, creating 'super-weeds'.

Unless I place a high value on the preservation of the natural environment, then PC2 may not have as much importance as, say, the need to grow more and better crops to feed a growing world population.

The importance we place on different consequences also raises ethical questions (See 3.3.7). The proper question with ethical decisions is not, 'What *do* I value' but 'What *should* I value?' Take, for example, PC3:

> Many people feel deeply upset at scientists interfering with nature / 'playing god'.

Students should appreciate that the importance of this claim does not depend on whether they agree with the 'many people' in question, but whether or not it *matters* that they feel deeply upset. The principle (see 3.3.8) that it is always wrong to inflict harm or hurt on people, without good cause, means that PC3 has to be taken seriously. It may not, in the end, prevent someone from deciding ethically in favour of GM. But it would require them to argue that the benefits outweighed the distress.

3.4.6 assess whether certain consequences count for or against a particular choice, and to what extent.

In many cases there is no difficulty saying which side a particular consequence counts for. The possible loss of £400 is obviously a count against the option of not taking out a warranty. Similarly, PC2 would be a count against option A, in the GM debate; for it would be hard to see how the risk of creating super-weeds could possibly be an advantage.

In certain instances, however, the same outcome can be seen to have pluses and minuses. Take PC1:

> Crop yields increase and improve farmers' productivity / profit.

		For GM farmers this would be a plus. For third world consumers it *could* be a plus, if the problems of distribution were overcome – a big 'if'. For poor farmers, who may not be able to afford GM seeds and chemicals, PC1 may just increase the competition they face, and be a clear count against. Students should take care not to be too simplistic in assessing the way consequences relate to an option. They should consider wider implications and knock-on effects as well as direct consequences, and recognise that gain to one community or system may mean loss or harm to another.
3.4.7	judge between competing options and make considered decisions; and support decisions with well-reasoned argument.	The last step in the process is to evaluate the outcomes for each option and decide which one is the strongest. Students should appreciate that because of the need to consider values, this will rarely be a simple tally of pros and cons. The option of giving free rein to GM scores badly on three out of four of the anticipated consequences: only increased yields count for it, and even then with reservations. However, it could still be argued that increasing food production is such an urgent priority that, *if* GM could achieve it, that would outweigh all the negative consequences. These are the kinds of argument students will have to raise for or against their decisions. Credit will be given not for the particular decision they reach but for the skill with which they reflect on the issues and apply the strategy.
3.4.8	critically evaluate reasoning that is used to support decisions.	Students should recognise when reasoning is being used to justify a decision. They should use the critical skills they have acquired, and their understanding of decision-making strategy, to analyse and evaluate such arguments – their own and those of others.
3.4.9	communicate their ideas and arguments clearly and cogently.	Students should be able to communicate a reasoned decision having considered various options. Consequences, likelihood, importance and values should be considered when constructing arguments.

Unit 4 assessment

Candidates will be assessed by means of a written paper lasting 1 hour and 30 minutes.

The paper will be based on a topic or issue for which one or more decisions are required.

The stimulus material for the paper will be in two parts. The bulk will be in the form of pre-release material issued some time before the exam. This will give students and teachers the opportunity to think about and discuss the topic prior to the exam. It will also provide students with some information, data and opinion which they can draw on when giving their own reasoning in the exam.

The pre-release package will not give any indication of the questions and assignments in the exam. One or more shorter passages will be provided on the day, and the questions will be directed primarily or exclusively at these unseen texts.

The paper will consist of sections A, B and C.

Section A will consist of questions based on statistical information, related to the examination topic. Much of this may be unseen until the time of the exam. Candidates will have to analyse and evaluate the data and draw conclusions from it. The questions will assume some knowledge and understanding of simple probability and decision theory.

Sections B and C will constitute a decision-making exercise. There will be questions requiring candidates to critically evaluate argument or arguments in the pre-release and unseen material, plus a question requiring an extended piece of writing.

4 Scheme of Assessment

4.1 Aims

AS and A Level courses based on this specification should encourage candidates to:

- understand the importance of examining knowledge and beliefs critically
- recognise, analyse and evaluate their own and others' beliefs and knowledge claims in a variety of contexts
- recognise and evaluate assumptions
- evaluate reasoning of different kinds, including common and important species of reasoning
- make connections and synthesise information and arguments
- generate their own arguments and express them clearly.

4.2 Assessment Objectives (AOs)

The Assessment Objectives are common to AS and A Level. The assessment units will assess the following Assessment Objectives in the context of the content and skills set out in Section 3 (Subject Content).

AO1 Analyse critically the use of different kinds of reasoning in a wide range of contexts.

AO2 Evaluate critically the use of different kinds of reasoning in a wide range of contexts.

AO3 Develop and communicate relevant and coherent arguments clearly and accurately in a concise and logical manner.

Quality of Written Communication (QWC)

In GCE specifications which require candidates to produce written material in English, candidates must:

- ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear
- select and use a form and style of writing appropriate to purpose and to complex subject matter
- organise information clearly and coherently, using specialist vocabulary when appropriate.

In this specification QWC will be assessed in all units by means of Assessment Objective 3.

Weighting of Assessment Objectives for AS

The table below shows the approximate weighting of each of the Assessment Objectives in the AS units.

Assessment Objectives	Unit Weightings (%)		Overall Weighting of AOs (%)
	Unit 1	Unit 2	
AO1	17	11.5	28.5
AO2	17	17	34
AO3	16	21.5	37.5
Overall weighting of units (%)	50	50	100

Weighting of Assessment Objectives for A Level

The table below shows the approximate weighting of each of the Assessment Objectives in the AS and A2 units.

Assessment Objectives	Unit Weightings (%)				Overall Weighting of AOs (%)
	Unit 1	Unit 2	Unit 3	Unit 4	
AO1	8.5	5.75	6.5	7	27.75
AO2	8.5	8.5	9.25	8	34.25
AO3	8	10.75	9.25	10	38
Overall weighting of units (%)	25	25	25	25	100

4.3 National Criteria

This specification complies with the following.

- The Subject Criteria for Critical Thinking
- The Code of Practice for GCE
- The GCE AS and A Level Qualification Criteria
- The Arrangements for the Statutory Regulation of External Qualifications in England, Wales and Northern Ireland: Common Criteria

4.4 Prior learning

There are no prior learning requirements.

Any requirements set for entry to a course following this specification are at the discretion of centres.

4.5 Synoptic Assessment and Stretch and Challenge

Synoptic assessment in AQA Critical Thinking is assessed in the A2 units by the requirement to integrate thinking, analytical and evaluative skills in order to develop an appreciation of how they relate to one another and how each may contribute to the understanding of issues being studied.

Examples of ways in which synoptic assessment might be conducted include:

- Extended writing questions, requiring candidates to draw together and apply skills acquired and developed throughout the course and demonstrate transfer of skills;
- Internal and formative assessment requiring candidates to research/investigate an issue or problem drawing on skills acquired and developed during the course.

The requirement for Stretch and Challenge at A2 is met by:

- the use of a variety of stems in the questions – for example analyse, evaluate, critically consider, assess, outline, suggest – to elicit a full range of response types and thereby avoid a formulaic approach
- ensuring connectivity between parts of questions, avoiding questions that are too atomistic
- the requirement for extended writing in Unit 3 and Unit 4
- using a range of question types and synoptic questions.

4.6 Access to Assessment for Disabled Students

AS/A Levels often require assessment of a broader range of competences. This is because they are general qualifications and, as such, prepare candidates for a wide range of occupations and higher level courses.

The revised AS/A Level qualification and subject criteria were reviewed to identify whether any of the competences required by the subject presented a potential barrier to any disabled candidates. If this was the case, the situation was reviewed again to ensure that such competences were included only where essential to the subject. The findings of this process were discussed with disability groups and with disabled people.

Reasonable adjustments are made for disabled candidates in order to enable them to access the assessments. For this reason, very few candidates will have a complete barrier to any part of the assessment.

Candidates who are still unable to access a significant part of the assessment, even after exploring all possibilities through reasonable adjustments, may still be able to receive an award. They would be given a grade on the parts of the assessment they have taken and there would be an indication on their certificate that not all the competences had been addressed. This will be kept under review and may be amended in the future.

5 Administration

5.1 Availability of Assessment Units and Certification

Examinations and certification for this specification are available as follows:

	Availability of units		Availability of certification	
	AS	A2	AS	A Level
January 2009				
June 2009	✔		✔	
January 2010	✔		✔	
June 2010	✔	✔	✔	✔
January 2011 onwards	✔		✔	
June 2011 onwards	✔	✔	✔	✔

5.2 Entries

Please refer to the current version of *Entry Procedures and Codes* for up to date entry procedures. You should use the following entry codes for the units and for certification.

Unit 1 - CRIT1
Unit 2 - CRIT2
Unit 3 - CRIT3
Unit 4 - CRIT4

AS certification - 1771
A Level certification - 2771

5.3 Private Candidates

This specification is available to private candidates. Private candidates should write to AQA for a copy of *Supplementary Guidance for Private Candidates*.

5.4 Access Arrangements and Special Consideration

We have taken note of equality and discrimination legislation and the interests of minority groups in developing and administering this specification.

We follow the guidelines in the Joint Council for Qualifications (JCQ) document: *Access Arrangements, Reasonable Adjustments and Special Consideration: General and Vocational Qualifications.* This is published on the JCQ website (**http://www.jcq.org.uk**) or you can follow the link from our website (**http://www.aqa.org.uk**).

Access Arrangements

We can make arrangements so that candidates with disabilities can access the assessment. These arrangements must be made **before** the examination. For example, we can produce a Braille paper for a candidate with a visual impairment.

Special Consideration

We can give special consideration to candidates who have had a temporary illness, injury or indisposition at the time of the examination. Where we do this, it is given **after** the examination.

Applications for access arrangements and special consideration should be submitted to AQA by the Examinations Officer at the centre.

5.5 Language of Examinations

We will provide units in English only.

5.6 Qualification Titles

Qualifications based on this specification are:

- AQA Advanced Subsidiary GCE in Critical Thinking, and
- AQA Advanced Level GCE in Critical Thinking.

5.7 Awarding Grades and Reporting Results

The AS qualification will be graded on a five-point scale: A, B, C, D and E. The full A Level qualification will be graded on a six-point scale: A*, A, B, C, D and E. To be awarded an A*, candidates will need to achieve a grade A on the full A Level qualification and an A* on the aggregate of the A2 units.

For AS and A Level, candidates who fail to reach the minimum standard for grade E will be recorded as U (unclassified) and will not receive a qualification certificate. Individual assessment unit results will be certificated.

5.8 Re-sits and Shelf-life of Unit Results

Unit results remain available to count towards certification, whether or not they have already been used, as long as the specification is still valid.

Candidates may re-sit a unit any number of times within the shelf-life of the specification. The best result for each unit will count towards the final qualification. Candidates who wish to repeat a qualification may do so by re-taking one or more units. The appropriate subject award entry, as well as the unit entry/entries, must be submitted in order to be awarded a new subject grade.

Candidates will be graded on the basis of the work submitted for assessment.

Appendices

A Performance Descriptions

These performance descriptions show the level of attainment characteristic of the grades at A Level. They give a general indication of the required learning outcomes at the A/B and E/U boundaries at AS and A2. The descriptions should be interpreted in relation to the content outlined in the specification; they are not designed to define that content.

The grade awarded will depend in practice upon the extent to which the candidate has met the Assessment Objectives (see Section 4) overall. Shortcomings in some aspects of the examination may be balanced by better performances in others.

AS performance descriptions for Critical Thinking

	Assessment Objective 1	Assessment Objective 2	Assessment Objective 3
Assessment Objectives	Candidates should be able to: • analyse critically the use of different kinds of reasoning in a wide range of contexts.	Candidates should be able to: • evaluate critically the use of different kinds of reasoning in a wide range of contexts.	Candidates should be able to: • develop and communicate relevant and coherent arguments clearly and accurately in a concise and logical manner.
A/B boundary performance descriptions	Candidates characteristically: a) apply the language of reasoning appropriately and precisely to the context b) demonstrate a secure understanding of the overall structure of the argument c) identify subtle and complex arguments accurately, for example distinguishing intermediate from main conclusions and/or recognising a counter argument where present.	Candidates characteristically: a) recognise and evaluate particular types of reasoning, using appropriate methods b) identify flaws in reasoning, explaining accurately what is wrong c) recognise and clearly articulate assumptions that are necessary for the argument to work d) evaluate critically the credibility of evidence using a range of appropriate criteria e) interpret and clarify key terms and ideas, where appropriate.	Candidates characteristically: a) communicate an effective argument clearly, accurately and coherently using appropriate language b) present relevant further arguments with exemplification and a measure of persuasion, for example giving a counter and/or supporting argument that focuses on the correct conclusion.

A

AS performance descriptions for Critical Thinking continued

	Assessment Objective 1	Assessment Objective 2	Assessment Objective 3
Assessment Objectives	Candidates should be able to: • analyse critically the use of different kinds of reasoning in a wide range of contexts.	Candidates should be able to: • evaluate critically the use of different kinds of reasoning in a wide range of contexts.	Candidates should be able to: • develop and communicate relevant and coherent arguments clearly and accurately in a concise and logical manner.
E/U boundary performance descriptions	Candidates characteristically: a) display some evidence of applying the language of reasoning at a basic level to the context b) recognise the gist of the argument and/or some of the reasons.	Candidates characteristically: a) comment on some obvious features of reasoning, such as comparisons, causes and examples b) identify obvious errors in reasoning with some understanding of what is wrong c) recognise that there are gaps in the reasoning without necessarily expressing the assumptions clearly or accurately d) make superficial comments about the sources of evidence with statements that tend to be narrative and descriptive e) make simplistic observations about the terms and ideas used.	Candidates characteristically: a) convey a basic argument, for example by presenting straightforward examples and/or objections b) construct arguments without necessarily recognising the precise conclusion of the stimulus.

A

A2 performance descriptions for Critical Thinking

	Assessment Objective 1	Assessment Objective 2	Assessment Objective 3
Assessment Objectives	Candidates should be able to: • analyse critically the use of different kinds of reasoning in a wide range of contexts.	Candidates should be able to: • evaluate critically the use of different kinds of reasoning in a wide range of contexts.	Candidates should be able to: • develop and communicate relevant and coherent arguments clearly and accurately in a concise and logical manner.
A/B boundary performance descriptions	Candidates characteristically: a) apply the language of reasoning appropriately and precisely b) demonstrate a secure understanding of the overall structure of a range of argument types c) identify subtle and complex arguments accurately.	Candidates characteristically: a) recognise and evaluate particular types of reasoning, using appropriate methods b) use terminology accurately to identify flawed/ questionable reasoning, explaining precisely what is wrong c) recognise, articulate clearly and evaluate the impact of any assumptions on the argument d) evaluate critically and precisely the credibility of sources of evidence and the impact of their judgements on the persuasiveness/ strength of the argument e) interpret and clarify, where appropriate, key terms and ideas, commenting on the impact of the lack of clarity on the argument and on the effect of the clarification.	Candidates characteristically: a) communicate effective complex arguments clearly, accurately, coherently and fluently, using appropriate language b) present relevant arguments clearly, precisely, accurately and persuasively by selecting appropriate issues and combining different points of view c) recognise contrasting points of view, where appropriate, and identify the reasoning underpinning them d) identify and evaluate clearly and precisely the arguments on each side.

A2 performance descriptions for Critical Thinking continued

	Assessment Objective 1	Assessment Objective 2	Assessment Objective 3
Assessment Objectives	Candidates should be able to: • analyse critically the use of different kinds of reasoning in a wide range of contexts.	Candidates should be able to: • evaluate critically the use of different kinds of reasoning in a wide range of contexts.	Candidates should be able to: • develop and communicate relevant and coherent arguments clearly and accurately in a concise and logical manner.
E/U boundary performance descriptions	Candidates characteristically: a) apply the language of reasoning in an appropriate and precise way b) recognise, in the context of a range of arguments, the overall gist of the argument and/or some of the reasons.	Candidates characteristically: a) recognise and begin to evaluate particular types of reasoning, although methods used might be simple or not appropriate b) use some terminology to identify flawed/questionable reasoning, demonstrating some understanding of what is wrong c) recognise and begin to articulate assumptions, commenting in a simplistic way on the impact of the assumptions on the argument d) make sensible comments on the credibility of sources of evidence, without necessarily explaining the full impact of their comments on the persuasiveness/strength of the argument e) interpret and clarify terms and ideas, where appropriate.	Candidates characteristically: a) communicate a complex argument clearly in an unsophisticated way b) present relevant arguments clearly by selecting appropriate issues and combining different points of view c) recognise contrasting points of view, where appropriate, and identify simple reasons underpinning them d) begin to evaluate the reasoning on both sides in a simplistic way.

B Spiritual, Moral, Ethical, Social and other Issues

Since this specification is set within a developing contemporary context and is characterised by the careful, reflective consideration of reasoned argument and of the beliefs and claims that comprise arguments, it offers candidates ample opportunity to explore and understand a wide range of spiritual, moral, ethical, social and cultural issues.

Through the study of the units candidates are able to evaluate their own relationship within society. The discussion and analysis of the content of the course similarly encourages understanding of moral and ethical issues; candidates will face constant challenge in debate and study which will foster recognition and sympathetic awareness of others' beliefs and values.

Few, if any, contemporary issues can be studied without reference to the social and cultural context within which they occur. Throughout the course candidates will be encouraged to consider information, opinion and argument from a range of contexts. They will form opinions and make judgements which take these contexts into consideration.

European Dimension

AQA has taken account of the 1988 Resolution of the Council of the European Community in preparing this specification and associated specimen units. This specification offers ample opportunity for the European dimension to be included in the discussion of contemporary issues.

Environmental Education

AQA has taken account of the 1988 Resolution of the Council of the European Community and the Report "Environmental Responsibility: An Agenda for Further and Higher Education" 1993 in preparing this specification and associated specimen units. The specification is designed so that it can be used as a medium for improving environmental education. This should arise through the careful, reflective consideration of reasoned argument related to environmental matters.

Avoidance of Bias

AQA has taken great care in the preparation of this specification and specimen units to avoid bias of any kind.

C Overlaps with other Qualifications

There are no explicit overlaps between Critical Thinking and other qualifications. By its very nature, however, a course in Critical Thinking will involve candidates drawing from their experience of other qualifications and subjects.

D Key Skills - Teaching, Developing and Providing Opportunities for Generating Evidence

Introduction

The Key Skills Qualification requires candidates to demonstrate levels of achievement in the Key Skills of Communication, Application of Number and Information Technology.

The units for the 'wider' Key Skills of Improving own Learning and Performance, Working with Others and Problem Solving are also available. The acquisition and demonstration of ability in these 'wider' Key Skills is deemed highly desirable for all candidates, but they do not form part of the Key Skills Qualification.

The units for each Key Skill comprise three sections:

- What you need to know
- What you must do
- Guidance.

Candidates following a course of study based on this specification for Critical Thinking can be offered opportunities to develop and generate evidence of attainment in aspects of the Key Skills of:

- Communication
- Application of Number
- Information Technology
- Working with Others
- Improving own Learning and Performance
- Problem Solving.

Areas of study and learning that can be used to encourage the acquisition and use of Key Skills, and to provide opportunities to generate evidence for Part B of the units, are signposted on the next page.

The above information is given in the context of the knowledge that Key Skills at level 3 will be available until 2010 with last certification in 2012.

Key Skills Qualifications of Communication, Application of Number and Information and Communication Technology will be phased out and replaced by Functional Skills qualifications in English, Mathematics and ICT from September 2010 onwards. For further information see the AQA website: **http://web.aqa.org.uk/qual/keyskills/com04.php**

Key Skills Opportunities in AQA GCE Critical Thinking

	Unit 1	Unit 2	Unit 3	Unit 4
Communication				
C3.1a	✔	✔	✔	✔
C3.1b	✔	✔	✔	✔
C3.2	✔	✔	✔	✔
C3.3	✔	✔	✔	✔
Application of Number				
N3.1	✔	✔	✔	✔
N3.2		✔		✔
N3.3		✔		✔
Information Technology				
ICT3.1	✔	✔	✔	✔
ICT3.2	✔	✔	✔	✔
ICT3.3	✔	✔	✔	✔
Working With Others				
WO3.1	✔	✔	✔	✔
WO3.2	✔	✔	✔	✔
WO3.3	✔	✔	✔	✔
Improving Own Learning and Performance				
LP3.1	✔	✔	✔	✔
LP3.2	✔	✔	✔	✔
LP3.3	✔	✔	✔	✔
Problem Solving				
PS3.1	✔	✔	✔	✔
PS3.2	✔	✔	✔	✔
PS3.3	✔	✔	✔	✔

GCE Critical Thinking (2770) 2009 onwards

Qualification Accreditation Number: AS 500/2281/7 - A Level 500/2274/X

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Further information is available at:
http://events.aqa.org.uk/ebooking