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Introduction to Critical Thinking

What is Critical Thinking?
Critical Thinking is a skill that involves understanding and evaluating reasoning. ‘Reasoning’ is often defined as ‘the act or process of drawing conclusions from facts, evidence, etc.’ In Critical Thinking, the word ‘critical’ is used to mean assessing strengths as well as weaknesses, rather than ‘being critical’ in the everyday sense.

This may sound remote from everyday life. In reality, we are reasoning every time we think about why, whether and how to do something, or whether to believe what someone is telling us. You may feel that your previous study along with your own abilities already enable you to think critically without you needing to study it further. However, practising Critical Thinking skills is like preparing for a sports event or training as a musician: however strong your natural ability, the right practice will enable you to perform better.

Critical Thinking is not a new subject. The ideas and concepts that make up its study were developed from philosophy and education. It has been part of university courses such as psychology, law and business studies (although not necessarily under the label of Critical Thinking) for many years. In the last five years, tens of thousands of students worldwide have taken A Level Critical Thinking.

Why study Critical Thinking?
Because it is interesting.
Because it is useful.
Because it is fun.

Studying Critical Thinking will enable you to:
understand and analyse what other people say and write
decide whether other people’s reasoning is strong or weak
assert your own point of view and argue convincingly.

This will help in your other studies and your life to:
makes rational decisions
give reasons for your own beliefs and actions
write logical, structured essays.

What is the best way to prepare for a Critical Thinking examination?
This book is designed to prepare you for the OCR AS Critical Thinking examination. By the time you have worked through it you should have developed skills in analysis, evaluation and writing your own cogent, structured arguments.

Working through the materials and activities in this book will help you to prepare for the examination. However, you can apply your Critical Thinking skills every time you write an essay or a report for the other subjects you are studying. It is also one subject you can practise when you read a newspaper or magazine, when you argue with your family and friends, and even when you watch a television ‘soap’.

OCR AS Critical Thinking
The OCR AS Level in Critical Thinking asks you to apply your skills in logical reasoning to evidence and arguments taken from a wide variety of sources and contexts.

The examination is modular. There are two units at AS Level that can be taken in the January and/or May examination sessions:
Unit 1 Introduction to Critical Thinking: a written examination of 1 hour 30 minutes
Unit 2 Assessing and Developing Argument: a written examination of 1 hour 30 minutes.

There is no coursework – the subject is assessed by examination only.

What does the examination assess?
The three Assessment Objectives are the criteria against which your answers will be marked in each unit. They coincide with the three skills identified as being central to the study of Critical Thinking.

AO 1 Analyse
‘Analyse critically the use of different kinds of reasoning in a wide range of contexts.’

AO 2 Evaluate
‘Evaluate critically the use of different kinds of reasoning in a wide range of contexts.’

AO 3 Develop
‘Develop and communicate relevant and coherent arguments clearly and accurately in a concise and logical manner’

Unit 1 represents 50% of the AS Level, and 25% of the A Level.
Unit 2 represents 50% of the AS Level, and 25% of the A Level.

You can use the AS Level to progress to an Advanced Level (A2) in Critical Thinking. This also has two units:
Unit 3 Ethical Reasoning and Decision-making (represents 25% of the A Level)
Unit 4 Critical Reasoning (represents 25% of the A Level).

You can find full details in the OCR specification, available at www.ocr.org.uk. There is a Heinemann textbook covering the A2 units.
Introduction to the Student Book and CD-ROM

Student Book

Units 1 and 2

Your AS Critical Thinking course is divided into two units. This Student Book provides an exact match to the OCR specification and as well as teaching material it includes activities, examiner tips and extension opportunities.

Exam Café

In our unique Exam Café you’ll find lots of ideas to help you prepare for your Unit 1 and Unit 2 exams. You’ll see the Exam Café at the end of Unit 1 and again at the end of Unit 2. You can Relax because there’s handy advice on getting started on your AS Critical Thinking course, Refresh your Memory with summaries and checklists of the key ideas you need to revise and Get the Result through practising exam-style questions, accompanied by hints and tips from the examiners.

Student CD-ROM

LiveText

On the CD you will find an electronic version of the Student Book, powered by LiveText. As well as the Student Book and the LiveText tools there are:

- suggested answers to the activities – indicated by this icon
- interactive activities to help develop your Critical Thinking skills further – indicated by this icon.

Within the electronic version of the Student Book, you will also find the interactive Exam Café.

Exam Café

Immerse yourself in our contemporary interactive Exam Café environment! With a click of your mouse you can visit three separate areas in the café to Relax, Refresh your Memory or Get the Result. You’ll find a wealth of material including the following.

- Revision Tips from students, Key Concepts, Common Mistakes and Examiner’s Tips.
- Language of the Exam (an interactive activity).
- Revision Flashcards, Revision Checklists and The Basics.
- Sample Exam Questions (which you can try) with student answers and examiner comments.

Introduction to Unit 1

Learning to be a critical thinker is about developing the ability to structure and connect one’s own thoughts and ideas logically and present them persuasively. The AS Critical Thinking course will help you acquire the skills necessary to be an effective critical thinker. The foundation for the whole AS and A Level Critical Thinking course is formed through the skills that are introduced in Unit 1.

The first part of the book covers Unit 1 and is itself split into two sections, which follow the format of the examination paper. Section 1 introduces the basic skills needed to analyse reasoning, that is to break arguments down into their component parts (reasons, conclusion, evidence, examples) and to describe how the elements relate to each other and to the argument as a whole. Section 1 also introduces some of the techniques used in evaluating reasoning, that is in judging whether the reasoning is strong or weak: identifying and assessing assumptions and evidence, etc.

In Section 2 of Unit 1 you will learn how to assess the credibility of sources, whether they are people, organisations or documents, by applying benchmarks, known as credibility criteria. Assessing credibility is a technique for deciding if something can be believed, but it does not tell you if something is true. Section 2 covers assessing the relative credibility of people or organisations. Together with the evaluation of evidence and information, this provides a means of reaching a judgement within a given context.

The skills needed for the Unit 1 examination will also help you to begin constructing your own structured arguments. This will be developed further in the part of this book covering Unit 2 of the AS qualification. In Unit 1 you will not be asked to identify flaws in reasoning or to assess the strengths and weaknesses of complete arguments. Those skills will be introduced in Unit 2.

Page 3 listed the three Assessment Objectives, or criteria, which are tested in AS Critical Thinking: analysing argument, evaluating argument and developing one’s own arguments. In Unit 1 the marks are divided approximately equally between all three of the Assessment Objectives.
Recognising arguments, conclusions and reasons

Learning objectives
- Understand the meaning of the key terms: argument, conclusion and reason.
- Identify simple arguments.
- Identify reasons and conclusions in simple arguments.
- Identify and use argument indicators.
- Understand that accuracy is important in Critical Thinking.

The meaning of ‘argument’

In everyday usage the word ‘argument’ means a quarrel, dispute or exchange of views. In Critical Thinking ‘argument’ has a very specific meaning. A Critical Thinking argument always includes:
- one or more reasons and a conclusion
- an attempt by the writer (or speaker) to persuade the reader (or listener) of something.

(You will notice in this book that we talk about the writer, or the author, and the reader of the written material we are considering. Exactly the same principles apply to thinking critically about reasoning in spoken language.)

Here is a very simple argument:

The weather is very cold today. Therefore you should put on a warm coat.

The reason (for accepting the conclusion) is: ‘The weather is very cold today.’ The conclusion is: ‘You should put on a warm coat.’

In terms of meaning, the conclusion comes last. However, when the argument is written (or said), its conclusion does not have to come at the end. It can be put at the beginning, the end, or (in longer arguments) anywhere, for example:

You should put on a warm coat because the weather is very cold today.

Conclusions
A conclusion is often a statement of a point of view which the writer (or speaker) wants to persuade the reader (or listener) to accept. It is usually:
- something that we might (or might not) do
- something we might (or might not) believe, accept or support.

Reasons
Reasons are the basis for persuading you that the conclusion is true. You will find that there are very many different ways in which a writer tries to persuade the reader to accept the conclusion, but for the moment we will look at simple reasons.

Argument elements or components
The reason (or reasons) and the conclusion are known as elements or components of argument. In later chapters you will learn about more components of argument.
**AS Critical Thinking for OCR: Unit 1 Section 1**

**Unit 1**

**Introduction to Critical Thinking**

**1 Recognising arguments, conclusions and reasons**

Sometimes written material may appear, at first glance, to be an argument, especially if it is a statement of something the writer believes, for example:

- Manchester United is the best football team in the world.
- Destroying the rainforest would be an environmental disaster.
- Anyone who is more than 70 years old should not be allowed to drive a car.
- Taxes are too high in this country.

Each of these statements is like the conclusion of an argument. But without a reason to support the statement, there is no argument. In Critical Thinking such statements are known as 'claims', and they can be turned into an argument when one, or more, supporting reasons is added.

**Identify an argument in source material**

We have seen that an argument is an attempt to persuade through the use of reasoning – an appeal to rational thinking processes. However, language is used for many purposes. These are some of the main ones:

- asking questions
- imparting information
- giving instructions
- expressing humour
- telling stories
- rhetoric.

You need to be able to tell the difference between other uses of language and argument.

**ACTIVITY**

Look back at the Key Terms definitions of ‘conclusion’ and ‘reason’. Identify the reason(s) and conclusion in each of the following arguments.

A  You enjoy dealing with different people. You should look for a career that involves dealing with people.

B  The bus service on this route is useless. We ought to complain to the bus company.

C  We are short of money this week. Beans on toast is cheap. We had better have beans on toast for tea today.

D  The sun is very strong today and you are going to lie on the beach. You should put on plenty of sun cream.

E  Heavy snow is forecast later on. The police have advised everyone to stay at home. You should stay home and not go to work.

F  You are allergic to dog hair. The friends you are going to visit have a dog. You ought to take some medication to reduce your allergic reaction.

**Key Term**

Claim

A statement or judgement that can be challenged.

**Pause for thought**

What other uses of language can you think of?

**Making others laugh – a vital use of language.**

Sometimes written material may appear, at first glance, to be an argument, especially if it is a statement of something the writer believes, for example:

- Manchester United is the best football team in the world.
- Destroying the rainforest would be an environmental disaster.
- Anyone who is more than 70 years old should not be allowed to drive a car.
- Taxes are too high in this country.

Each of these statements is like the conclusion of an argument. But without a reason to support the statement, there is no argument. In Critical Thinking such statements are known as 'claims', and they can be turned into an argument when one, or more, supporting reasons is added.
Sometimes there is a number of claims which together describe something that has taken place, without any attempt to persuade the reader, for example:

The jury took just 45 minutes to find Smith guilty. He was sentenced to five years in prison. The judge told him: ‘You are a menace to society.’

The writer does not attempt to persuade anyone of anything about Smith, and therefore it is not an argument.

**ACTIVITY 2**

Turn each of the claims in the previous box into an argument by adding one, or more, relevant reasons. Pick a team and sport of your choice for the first opinion.

**ACTIVITY 3**

Decide whether each of the following is an argument or not. If it is an argument, identify the conclusion and reason(s).

A. It is obvious that longer prison sentences cut crime.
B. The government should spend more on building new prisons. Other ways of punishing criminals are less effective than locking them up.
C. We had a nice apartment with a balcony overlooking the bay. There were plenty of bars and nightclubs in the town. It was a really good holiday.
D. I want to go on holiday after my exams. I find being by the sea is very relaxing and I will definitely need a rest after all that hard work. I ought to book a holiday at the seaside.
E. People ignore the fact that we have animal impulses, because we are supposed to be civilized, but our basic nature is that of the jungle.
F. The Prime Minister said that western nations had a duty to address global poverty. After the conference he visited a project to bring medical care to remote villages.
G. Democracy is the worst form of government except all those other forms that have been tried from time to time. (Sir Winston Churchill, 1947)

**ACTIVITY 4**

For each of the passages below, state whether it is an argument or not. If it is an argument add one more reason in support of the conclusion.

A. The train has not arrived at the station. This is because a tree has fallen and blocked the line.
B. The traffic is always heavy on Monday mornings. It is very important that you get to college on time. You should catch an earlier bus than usual.
C. A family with small children wanting a pet should get a dog rather than a cat. Cats can scratch small children when they are picked up and children will always want to pick up a cat. Dogs are too big to pick up and like children more than cats do.
D. I think I have caught a cold. My nose feels stuffy, my throat is sore and my head aches.
E. The fire which destroyed the company’s offices started in the canteen during the night. It spread very quickly through the office buildings because the company had not fitted smoke detectors.
Recognising arguments, conclusions and reasons

**Argument indicators**

Being able to identify whether something is an argument, or another use of language, is a very important skill in Critical Thinking. So far we have looked at simple arguments, where it is quite easy to spot the conclusion. In longer arguments the conclusion may come before the reasons, in the middle, or at the end. The writer may not have stated the conclusion explicitly or clearly, or the passage may contain information that is not strictly part of the argument.

Where this is the case there are other clues we can use to help identify whether or not something is an argument. Arguments often contain useful words, known as argument indicators, that signal what argument components we are looking at and help us to sort out the sense of the argument.

**Examples of argument indicators**

- **Indicating a reason**
  - because, as, since, due to, such as
- **Indicating a conclusion**
  - therefore, so, thus, it follows that, consequently, should ..., ought ...

Sometimes conclusion indicators can have uses other than showing that what follows is a conclusion, so you need to be careful to check that you really have found the conclusion.

### ACTIVITY 5

**a)** Identify the argument indicator words in this passage. State whether they indicate a reason or the conclusion.

We should all try to recycle more of our kitchen waste, since this would reduce the amount of waste taken to landfill sites, and also because kitchen waste can be turned into useful compost.

**b)** Arguments A–C below do not include argument indicators. Rewrite them with the words ‘because’ or ‘therefore’ in the right place to help show the reasons and the conclusion. (Take a look at the Pause for Thought box if you need some help.)

A. Trains are a better way to travel than a car. You can read during the journey and you do not need to worry about breakdowns or traffic jams.

B. Football is not as exciting as commentators suggest. Many games end 0–0 and results matter only for the teams at the top or bottom of a table.

C. The most popular meal in the UK is now chicken tikka masala. Spaghetti bolognese has replaced sausages and mash as a staple family meal. We should re-think our view of what constitutes classic British food.

**c)** Look back at the arguments in Activity 1 (page 8). Insert suitable argument indicator words in each to show the reason(s) and conclusions.

---

**Pause for Thought**

Read the comment and editorial pages in the newspaper. Look out for reason and conclusion indicators. What other argument indicators can you find that are not listed above?

---

**Remember**

The words in the box above are only indicators, not proof that the passage contains an argument. You need to find the conclusion and one or more reasons to be certain you have identified an argument.

---

**Exam Tip**

Being able to identify an argument, as well as the component parts of an argument, is a very important skill in Unit 1.
Unit 1   Introduction to Critical Thinking

Recognising arguments, conclusions and reasons

If you were asked to write down the conclusion, you might be tempted to put:

Football is not exciting.

However, the writer is not saying that football is not exciting. He says it is not as exciting as commentators suggest. He implies that he finds it quite exciting, but not to the extent that some people do.

In the examination the answer 'Football is not exciting' would not have been awarded full marks because it is not accurate enough.

If you were asked to identify one of the reasons you might have written:

Results don’t matter for most teams.

Again, this answer would have been too vague to have achieved full marks: the argument specifically says results matter only for the teams at the top or bottom of a table.

You also need to make sure that, when you use technical Critical Thinking terms, you can use them accurately and write them down correctly. In the examination marks are available for the quality of written communication; incorrectly spelling key words such as ‘reason’ and ‘argument’ is likely to mean that you cannot be awarded all the available marks.

Here’s a final (football) example to show the importance of precision when you use quotations.

In our interview with Sir Jack Hayward, the chairman of Wolverhampton Wanderers, we mistakenly attributed to him the following comment: ‘Our team was the worst in the First Division and I’m sure it will be the worst in the Premier League.’ Sir Jack had just declined the offer of a hot drink. What he actually said was: ‘Our tea was the worst in the First Division and I’m sure it will be worst in the Premier League.’ Profuse apologies.

The Guardian, 12 August 2003

Summary

You should now be able to:

■ identify simple arguments
■ analyse the structure of simple arguments
■ use argument indicators
■ understand the need for accuracy and precision in Critical Thinking.
Learning objectives

- Use common notation for the component parts of an argument.
- Understand and use counter-assertions and counter-arguments.
- Understand the nature of different claims.
- Recognise simple hypothetical reasoning.
- Understand the meaning of the term ‘assumptions’.
- Identify assumptions in arguments.
- Phrase assumptions with precision.

Using common notation for the component parts of an argument

You are probably used to using symbols and abbreviations in other subjects such as science and mathematics. In the same way, Critical Thinking makes use of a form of shorthand, sometimes called argument notation. It can help you to show argument structure more clearly and save time.

- **R** represents a reason.
- **C** represents a conclusion.

If there are several reasons, these can be shown as R1, R2, R3 and so on.

We will use this shorthand throughout this book and, in later chapters, we will use some more forms of notation for more complex argument components. When you write your own arguments, this notation is very useful in helping you to see the structure of what you have written. In the text that follows we will practise using it in simple arguments.

Using this shorthand, Argument D in Activity 3 (page 10) looks like this.

**R1** (because) I want to go on holiday after my exams.

**R2** (because) I find being by the sea is very relaxing.

**R3** (because) I will definitely need a rest after all that hard work.

**C** (therefore) I ought to book a holiday at the seaside.

Counter-assertions, counter-arguments, hypothetical reasoning and assumptions

Argument notation will be used throughout this book to help make the structure of arguments clear. You will find that if you start using it now, it will become very easy to use by the time you get to the exam.

Try this yourself with this short argument:

Animal experiments cause a great deal of suffering. The results of animal experiments are rarely applicable to humans. The continued use of animals in experiments cannot be justified.

This can be represented as shown below.

**R1** Animal experiments cause a great deal of suffering.

**R2** The results of animal experiments are rarely applicable to humans.

**C** The continued use of animals in experiments cannot be justified.
In the examination you will not be tested on the use of argument notation, but it is a useful tool to help you work out an argument’s structure and write down the structure clearly.

**Activity**

In each of the following arguments, there are two reasons and a conclusion. Identify these three elements using the appropriate notation.

A  Gas is an inexpensive way to heat your home. Gas heating boilers are small and neat. You should install gas central heating to heat your home.

B  Spending long periods in front of a computer screen can cause eye strain. You’ve been working on the computer for several hours. You should have a break from the computer.

C  Hair dye can ruin the condition of hair. You have had your hair dyed several times recently. You would be wise to use conditioner to improve the condition of your hair.

D  We need a new television. We ought to buy a Pentang. Pentang televisions have the latest technology.

E  This company has gained extra business in the last six months. People with up-to-date IT skills will be needed to help develop the new computer system. The company should recruit young people who have just left college.

F  The same old work and study routine gets very boring. Lack of exercise is making you feel unhealthy. You should try Soaks, the new and different fitness centre.

G  The government’s campaign to get us to eat more healthily is doomed to fail. The government should direct money towards researching the causes of obesity instead.

**Developing your own arguments**

In the Unit 1 examination you will not be asked to produce your own structured arguments, but it is a skill that you will need as you prepare for later units of the course. Practice at constructing and expressing your own arguments will help you to understand and analyse other people’s reasoning.

When you have drafted your argument, take time to review it and decide whether it really is an argument. Does it contain the essential argument components (reason(s) and conclusion)? Does it aim to persuade the reader of something?

**Remember**

Being an effective Critical Thinker means you can apply Critical Thinking skills to your own work. Precision and accuracy are as important when you write your own arguments as when you are identifying the elements in someone else’s argument.

**Counter-argument and counter-assertion**

So far we have looked at very short arguments. Longer passages, especially where they are discussing contentious issues, frequently contain a counter-argument. Here the author includes an opposing argument in order to dismiss it, or show its weaknesses, and therefore support their own argument. The counter-argument may be a single counter-claim (known as a counter-assertion), but it may also be a short argument with an explicit conclusion.

Here is an example of an argument that contains a counter-argument.

**The proposal to allow 16- and 17-year-olds to vote, like the pressure to sexualise them, is yet another attempt to turn young people prematurely into adults. It is claimed that they should be able to participate fully in society because at this age they can already pay taxes, leave home, marry, fight for their country and so on. All of these are irrelevant. Few teenagers do these things. Quite rightly they are busy enjoying themselves. Once they have developed emotionally and intellectually, and learnt from some mistakes, there will be time enough for them to vote.**

The author is arguing that the proposal to allow 16- and 17-year-olds to vote is one attempt to turn young people prematurely into adults. The counter-argument in italic type (that young people should be able to participate fully in society because they can pay taxes, etc.) is advanced only so it can be dismissed as irrelevant.

**Write four of your own arguments using two reasons and a conclusion. Some possible conclusions have been given to you. Alternatively, you could write your own.**

**Conclusion 1**  Therefore, you should buy me a coffee.

**Conclusion 2**  Therefore, you should give me a pay rise.

**Conclusion 3**  Therefore, my mobile phone is one of the best on the market.

**Conclusion 4**  Therefore, I (do not) need to eat more healthily.

**Conclusion 5**  Therefore, the local council should provide football/skateboarding/some other leisure facilities for young people.

**Conclusion 6**  Therefore, you should (not) stay in a job if you are unhappy.

**Conclusion 7**  Therefore, people aged over 70 should not be allowed to drive a car.

**Conclusion 8**  Therefore, marriage is (not) an outdated institution.

**Conclusion 9**  Therefore, the Royal Family should (not) be scrapped.

**Key Terms**

**Counter-argument**

An additional argument that is against, or counter to, what the conclusion seeks to establish. The writer normally presents the counter-argument in order to dismiss it.

**Counter-assertion**

If the writer presents a reason that would support an opponent’s argument, rather than a counter-argument, then the writer is making a counter-assertion/claim, rather than a counter-argument.
Here is an example of an argument that contains a counter-assertion.

We would be better off without modern gadgets. We waste a huge amount of money on them. It is commonly thought that they save time and labour, but we spend so much time choosing them, shopping for them and fixing them, that we actually spend more time and effort on the gadgets than we would have spent on the task they do.

Using argument indicator notation, CA stands for counter-assertion or counter-argument. So this argument could be written as follows.

| C | We would be better off without modern gadgets. |
| R1 | We waste a huge amount of money on them. |
| CA | It is commonly thought that they save time and labour, but |
| R2 | we spend so much time choosing them, shopping for them and fixing them, that we actually spend more time and effort on the gadgets than we would have spent on the task they do. |

The part of the argument in italics puts forward a point of view which disagrees with the conclusion. The author then says why it is wrong. This makes it a counter-assertion.

Words and phrases that indicate there may be a counter-argument or counter-assertion in a passage include the following.

- although, despite this, however, it has been said, it has been suggested that, contrary to this, on the other hand, some may argue

**REMEMBER**

Some of the indicator words above lead into the writer’s point of view; some of them lead into the argument or assertion that is being dismissed.

**PAUSE FOR THOUGHT**

What other counter-argument indicator words and phrases can you think of, or find in news articles?

**ACTIVITY**

Identify the counter-argument or counter-assertion in the following arguments.

| A | It is commonly taken for granted that the introduction of GM crops should be strictly regulated. Opponents claim that they will be unsafe for human consumption and take over the countryside. However, humankind has been genetically modifying plants and animals for generations through selective breeding programmes. GM crops are no more to be feared than eating a Golden Delicious apple or an egg from a hen. |
| B | Local pubs used to be full of people playing pool and darts, or just enjoying a drink in a convivial atmosphere. Since the ban on smoking in pubs, they have been practically empty. Even at weekends there are just two or three customers in the bar. Supposedly, the smoking ban was going to protect the health of workers and customers. But the smokers are still puffing away, out in the cold, and the non-smokers are sat outside with their smoking friends. The object of the ban has been defeated. |
| C | The council is yet again showing its complete contempt for local residents by closing libraries. Officials argue that people are using the library service less because nowadays cut-price books can be bought in supermarkets. This is not the point: public libraries were one of the great social innovations which made educational opportunities available to the poor. Libraries continue to be used when they introduce new services, such as reading clubs for children or free computer facilities. That is the solution the council should be adopting. |

• Might we be better off without so many modern gadgets?
Hypothetical claims, therefore, predict what will happen, if something else happens. You need to take care when you identify a statement as a hypothetical claim. First, the ‘then’ is not necessarily stated. We could write the previous example as: ‘If we don’t keep hospitals clean, more people will catch nasty bugs like MRSA.’

Second, some statements look similar to hypothetical claims, but are not. For example, ‘I want a winter suntan even if I get skin cancer from the sunbed’ is not a hypothetical claim, but a statement about what I want. However, ‘If you use a sunbed too often, then you may get skin cancer’ is a hypothetical claim, because it makes a prediction.

**ACTIVITY**

Read the following sentences and decide whether each is a hypothetical claim.

A. Children don’t get enough exercise.
B. I intend to visit France this summer, even if I can only afford it by stopping going out with friends.
C. If you visit France, you will find the way of life is far more relaxed than in this country.
D. You ought to go to Professor Bloxwich’s lecture, provided you have nothing else planned for today.

**Hypothetical reasoning**

**Claims**

Any part of an argument can be referred to as a claim. Almost everything that is said or written, other than questions, exclamations and instructions, is a claim. A claim might be a fact (‘Christmas day is on 25 December’), an opinion (‘The Christmas holiday is far too long’) or a statement of a principle (‘It is wrong to kill animals’). Reasons and conclusions are claims. A claim is therefore something that is stated, and that can be challenged.

The use of the word ‘claim’ suggests to us that we should not believe it until it is verified or supported with reasons or evidence. However, it is important to remember that in Critical Thinking most of the time we focus on how an argument works if we take its claims to be true. You will learn more about assessing claims in Chapter 5.

**Hypothetical claims**

As we have seen, a claim is any statement that can be challenged. A hypothetical claim is a statement in the form: ‘If this happens, then that will happen.’ Here’s an example.

If we don’t keep hospitals clean, then more people will catch nasty bugs like MRSA.

**Exam tip**

It is the ‘if … then … ’ form of the statement, and its status as a prediction, which makes it hypothetical.
Simple hypothetical reasoning
A hypothetical claim may be used as a reason or as a conclusion. When you see ‘if’ within a passage you should think about whether it is a reason or a conclusion – but remember it may be neither. It is the whole claim – the ‘if’ part together with the ‘then’ part – that forms a single component of the argument. As we saw earlier, a hypothetical claim looks at the consequences that might occur if something were the case. This can help us to make decisions about how to act, depending on what happens. In this example, hypothetical reasoning uses a hypothetical claim as a reason to support a conclusion.

If it rains, we will get wet. The children hate getting wet, so we should stay at home.

We cannot conclude that we will definitely get wet, because we do not know for definite whether it will rain. The rain is a hypothetical, uncertain event – an unfulfilled condition. But we can predict logical consequences and consider what will or would happen if it did rain. We can make plans for the future on the basis of this reasoning – and either take a waterproof coat or stay at home.

**REMEMBER**
A hypothetical claim within an argument may be a reason or a conclusion.

**ACTIVITY**
Identify the hypothetical reasoning in the following passages.

A Analysis by one police force of local crime figures has shown an unexpected pattern: crime increases when there is a full moon. If the government seriously wants to cut crime, then it should impose a curfew on known criminals every 28 days when the moon is full.

B The science of profiling people according to their postcode has become so accurate that it provides information about everything from our income and marital status, to our choice of car or soft drink. Call centres apparently now use sophisticated software to decide what order to deal with callers’ queries. If this is the case, then it explains why I’m always kept waiting 15 minutes before my call is answered by a bored operative: I live in an area with the wrong postcode.

C A tidal wave of schadenfreude will engulf the World Cup should France end up playing New Zealand in the quarter-final in Cardiff instead of Scotland or Italy in Paris. It will happen if Argentina keeps winning and would serve the French right for doling out matches to the Celts in return for the votes to beat England’s bid. Talk about being hoist with one’s own foie gras.

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**EXAM TIP**
You do not need to understand words in a passage which are unfamiliar, to be able to analyse the argument.

**KEY TERM**
**Assumption**
This is a missing reason in an argument. The writer accepts the assumption, but has not stated it. The assumption is essential for the conclusion to be drawn.

---

**TAKE IT FURTHER**
Consider the possible consequences of the following hypothetical events. Discuss in groups how likely these consequences are.

A If the government detains terrorist suspects without trial …

B If Britain leaves the European Union …

C If we spend December in New Zealand …

D If I have unprotected sex …

E If the people in this group survive a plane crash in the jungle, uninjured, but miles from help …

---

**EXAM TIP**
You do not need to understand words in a passage which are unfamiliar, to be able to analyse the argument.
This argument rests on the assumption that the reader wants to combat skin ageing by making his wrinkly skin look better. The argument could be written as follows.

R1 Phwoire is formulated by skin care specialists who fully understand the needs of men.
R2 Phwoire contains the latest anti-ageing bio-technology – octopeptide liposomes.
R3 You want to combat skin ageing by making your wrinkly skin look better.
C Therefore, you should trust Phwoire to combat skin ageing.

Here is another example.

Young people are not very interested in politics and tend not to vote. Most people who do vote are older and well-off. Governments tend to represent the interests of those who have voted for them. Elected governments do not represent all sections of society. Politicians should change their approach to ensure that more young people vote.

This argument rests on the idea – the assumption – that governments should represent all sections of society. (After all, if the writer believed the current situation was acceptable, they would not want politicians to change it.)

Although it is not stated, an assumption is part of the structure of an argument. Assumptions are a missing step, a missing reason that is needed to support the conclusion. Writing out the structure of the argument shows this more clearly.

R1 Young people are not very interested in politics and tend not to vote.
R2 Most people who do vote are older and well-off.
R3 Governments tend to represent the interests of those who have voted for them.
R4 Elected governments do not represent all sections of society.
R5 (assumption) Governments should represent all sections of society.
C Politicians should change their approach to ensure that more young people vote.

The assumption acts as the fifth, unstated, reason.

Finding assumptions is a very important Critical Thinking skill. You can expect to be asked to identify assumptions in the exam, so it is worth taking time to practise this particular skill.
You should therefore have written the following.

The author assumes that graduates from Oxford and Cambridge earn more only because of the fact they went to Oxford or Cambridge.

In this example the word ‘only’ is important. In some contexts, the use of the word ‘only’ could be too strong, but here it fits precisely.

**Techniques for answering questions about assumptions**

In the examination you will be asked to find assumptions in a passage which is longer than those we have looked at so far. By now you should understand that you need to find the missing step in the argument. In the examination, to be awarded full marks on the assumption questions, you need to be able to express the assumption very precisely. (We’ll look at this in more detail on pages 32–34.)

Look for the assumption(s) in the passage below.

If the Met Office’s powerful computers cannot make correct weather forecasts four days ahead, how can we trust computer projections that global warming will result in a disaster in two centuries’ time? The hurricane of 1987, which was missed by the Met Office forecasters only hours before it hit Britain, is a prime example of their inability to forecast the weather accurately.

Adapted from OCR’s January 2003 question paper

**Finding assumptions in more complex passages**

Read the following short argument and write down the assumption.

Graduates from Oxford and Cambridge are often found in senior positions in major British institutions. What is less well-known is that their salaries are often higher than graduates from other universities who have jobs of equivalent status and responsibility. So, whether it is fair or not, a place on an Oxford or Cambridge degree course is still a good guarantee of better earnings after university.

The argument suggests that a degree from Oxford or Cambridge in itself is enough to lead to a higher salary – not because these graduates work harder, are better at their jobs or are more talented, but because of where they went to university.

**ACTIVITY 10**

Identify an assumption in each of the following arguments. (Take a look at the Pause for Thought box for an example.)

A Raj wants to audition for a local band. He plays guitar but is also a good drummer. The band plays gigs all over the city and therefore Raj would need a car to transport his drumkit around with him to gigs. Raj does not have enough money to buy a car and consequently it might be better if he auditioned on guitar.

B The traffic is always heavy on Monday mornings. It is very important that you get to college on time. You should catch an earlier bus than usual.

You should therefore have written the following.

The author assumes that graduates from Oxford and Cambridge earn more only because of the fact they went to Oxford or Cambridge.

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Adapted from OCR’s January 2003 question paper
The writer moves from the failure of the Met Office’s computers to forecast weather accurately to a point about computer projections on global warming. The example given (the hurricane of 1987) is some time in the past. The failure on that occasion does not mean that computers used by other organisations cannot now forecast the weather correctly.

For the argument to work, it needs this assumption.

The Met Office’s computers are typical of/similar to other weather forecasting computers.

In the exam you would need to write:

The author must assume that the Met Office’s computers are typical of other weather forecasting computers.

**REMEMBER**

An assumption is necessary for the argument to work, but is a missing step. There may also be more than one assumption in an argument.

**ACTIVITY** 11

There is very often more than one assumption underlying an argument. Consider the suggested (possible) assumptions below and decide which really are assumptions needed for the argument about weather forecasting (page 29) and which are not.

- **A** The author must assume that the hurricane of 1987, which was missed by the weather forecasters, shows their inability to forecast the weather accurately.
- **B** The author must assume that the Met Office is not very good at weather forecasting.
- **C** The author must assume that the Met Office consists of a group of people with training in weather and climate who make weather forecasts.
- **D** The author must assume that computers are the only method of forecasting the weather.
- **E** The author must assume that there are no better or more powerful weather forecasting computers than those used by the Met Office.
- **F** The author must assume that the failure to forecast the hurricane was typical of weather forecasters’ failure to forecast the weather accurately.
- **G** The author must assume that the hurricane in 1987 was not much more difficult to forecast than normal weather patterns.

**Answers to Activity 11**

Possible assumptions A–D are not correct. E–G are assumptions. We shall look at A–D in turn to see why they do not work.

- **A** The author must assume that the hurricane of 1987, which was missed by the weather forecasters, shows their inability to forecast the weather accurately.

This is definitely a reason that supports the argument. However, it is a shortened version of the last sentence of the passage, so it cannot be an assumption, because assumptions are not stated.

- **B** The author must assume that the Met Office is not very good at weather forecasting.

This statement is certainly in a different language from that of the original passage, but it does not say anything new. The author states that the Met Office cannot make accurate forecasts four days ahead; statement B simply re-words that point as a more general comment. It does not add to the argument, and is not an assumption.

**REMEMBER**

Before you write down your assumption on an exam paper, check that you have not picked something that is in the passage but phrased it differently.

- **C** The author must assume that the Met Office consists of a group of people with training in weather and climate who make weather forecasts.

This is a factual clarification of a term in the passage, and so could help some people to understand the passage. (It is possible that some people do not know what the Met Office is.) However, definitions or clarification are not assumptions.

- **D** The author must assume that computers are the only method of forecasting the weather.

This looks tempting: it is not stated in the passage and you may think that there are other, and better, methods of forecasting the weather than computer models. However, the author does not need to assume this. The author is only arguing about the accuracy of computer forecasts of global warming disaster, not about any other methods of forecasting.
Read the passage below and the four statements that follow. Decide whether each statement is, or is not, an assumption needed by the argument in the passage.

For many years now, Britain has suffered a ‘brain drain’ of scientists attracted by the rewards of working in other countries. The government has announced that it is investing one billion pounds in science to raise scientific salaries to internationally competitive levels. It is also increasing the grant to postgraduate students. This will stop the brain drain and ensure scientists stay in this country.

A. The best British scientists have gone abroad to work.
B. The financial incentive is sufficient to persuade scientists to return to Britain.
C. The most important incentive to go to another country is financial.
D. Only scientists have been attracted by high financial rewards in other countries.

Adapted from OCR’s January 2002 question paper

**ACTIVITY 12**

Formulating assumptions

Once you have found an assumption, it is important that you word it carefully to ensure it is clear and accurate. In the examination students very often cannot be awarded full marks for questions about assumptions because they either make the assumption too strong or they make it too weak.

Consider this argument.

Loud music, lawn mowers and aircraft noise can all damage tiny cells in our ears and leave us with premature hearing loss. This can be a particular problem for young people because of the very high noise levels at rock concerts. Not surprising then that the number of Americans under 18 with some form of hearing loss has reached 1.3 million. It seems unlikely that rock musicians will turn down the volume, so the least that we can do is to advise young people to use simple, cheap ear plugs when they attend rock concerts.

Adapted from OCR's January 2007 question paper

**Formulating assumptions**

Loud music can cause premature hearing loss.

What must the author assume in order to argue this? Below are just three possible ways you could phrase the assumption. (Since the assumption is quite complex, there are many more ways it could be worded.)

- The 1.3 million American under-18s with hearing loss have regularly attended loud rock concerts.
- Some American under-18s with hearing loss could have attended loud rock concerts.
- A significant percentage of the 1.3 million American under-18s with hearing loss have regularly attended loud rock concerts.

This precisely expresses the assumption needed to support the conclusion. It includes all the key information.

The conclusion of the argument is:

The least we can do is to advise young people to use simple, cheap ear plugs when they attend rock concerts.
A strategy for checking whether an assumption really is necessary for an argument is to use the reverse test. This means working out the exact opposite of the assumption you have formulated and seeing how that relates to the argument. If you have the right assumption, then putting its exact reverse into the argument should mean that the argument does not work. Have another look at the argument about graduates from Oxford and Cambridge, which you first met on page 28.

Graduates from Oxford and Cambridge are often found in senior positions in major British institutions. What is less well-known is that their salaries are often higher than graduates from other universities who have jobs of equivalent status and responsibility. So, whether it is fair or not, a place on an Oxford or Cambridge degree course is still a good guarantee of better earnings after university.

The assumption was:

Graduates from Oxford and Cambridge earn more only because of the fact that they went to Oxford or Cambridge.

The reverse of the assumption would be:

Graduates from Oxford and Cambridge do not earn more (only) because of the fact that they went to Oxford or Cambridge.

If this is inserted in the argument, it no longer works. The argument now suggests that Oxford and Cambridge graduates earn more money through working harder or being more skilled or talented. So reversing the assumption and showing that the argument no longer works, gives a very strong indication that the original assumption was correct.
Counter-assertions, counter-arguments, hypothetical reasoning and assumptions

**Counter-assertions, counter-arguments, hypothetical reasoning and assumptions**

**Assumptions**

You should now be able to:
- use argument notation
- understand the nature of different claims
- recognise and use counter-assertions, counter-arguments, simple hypothetical reasoning and assumptions
- understand the importance of precision and clarity when you phrase assumptions.

**REMEMBER**

An assumption is never ever stated in the passage, but it is a reason that is needed to make the argument work.

**REMEMBER**

Finding an assumption is simply finding the bit that is missing from the argument.

**REMEMBER**

Longer passages usually rely on several assumptions. There is generally not one single answer that you have to work out, but several possible assumptions to find.

**REMEMBER**

Use the reverse test to check if you have correctly found an assumption.

**EXAM TIPS**

An assumption is a missing step. Don’t just write down something that is not written in the passage but is vaguely related to it.

An assumption is necessary to support the conclusion.

Check that what you have written is not already stated in the passage, but in different words.

Check that what you have written is not just a definition or clarification of a word or idea, in the passage.

Check very carefully the wording of the assumption you have written down. Precision is especially important to get full marks in identifying assumptions.

**EXAM TIPS**

Take care not to phrase the assumption too strongly.

Take care not to phrase the assumption too vaguely.

Use the reverse test to check if you have correctly found an assumption.

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**Summary**

You should now be able to:
- use argument notation
- understand the nature of different claims
- recognise and use counter-assertions, counter-arguments, simple hypothetical reasoning and assumptions
- understand the importance of precision and clarity when you phrase assumptions.

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You should now be able to:
- use argument notation
- understand the nature of different claims
- recognise and use counter-assertions, counter-arguments, simple hypothetical reasoning and assumptions
- understand the importance of precision and clarity when you phrase assumptions.
Factual claims
So far in this book we have looked at fairly simple arguments and we have seen that a reason gives support to a conclusion. In a simple argument it is relatively easy to identify the reasons, as the example below shows.

Ahmad’s old car is dangerously rusty and it breaks down almost every day. He has got a well-paid summer job at the local solicitors’ office. Ahmad should get a new car.

Here everything that is not the conclusion is a reason. We can analyse the argument as follows.

R1 Ahmad’s old car is dangerously rusty.
R2 It breaks down almost every day.
R3 He has got a well-paid summer job at the local solicitors’ office.
C Ahmad should get a new car.

In this example, all three reasons are facts. A fact is information that can be verified, and which is held to be true. Factual claims in an argument, therefore, consist of information that can be verified. We treat them as true, but our acceptance of their truth is suspended until we check the facts. (We could check whether the rust on Ahmad's car really is dangerous and how often it does break down.)

In this chapter we will look at the use of factual claims to support reasoning and the ways that this type of information may be presented.

Evidence
One of the key ways in which people try to support their arguments is by including facts (or what they think are facts). Sometimes such facts stand as reasons in their own right, as we have seen in earlier examples ('Ahmad’s old car is dangerously rusty' and ‘I am also asthmatic').

Often factual information is presented numerically or as statistical data in order to support a reason, which in turn supports the conclusion. In this case the supporting facts are known as evidence.

In Chapter 2, page 32, you met this argument.

Loud music, lawn mowers and aircraft noise can all damage tiny cells in our ear and leave us with premature hearing loss. This can be a particular problem for young people because of the very high noise levels at rock concerts. Not surprising then that the number of Americans under 18 with some form of hearing loss has reached 1.3 million. It seems unlikely that rock musicians will turn down the volume, so the least that we can do is to advise young people to use simple, cheap ear plugs when they attend rock concerts.

Adapted from OCR’s January 2007 question paper
The words in italics provide evidence to support the claim that premature hearing loss is a particular problem for young people because of noise levels at rock concerts.

Evidence can be in the form of:
- an example
- statistical or numerical data
- an estimate
- a factual claim
- a personal observation
- a statement from a source or witness.

Evidence indicator words are: for example, for instance, such as.

In this chapter, we will look at different forms of evidence and ways of evaluating evidence used to support reasons.

Examples

Examples are one form of evidence that provide a way of developing a reason. They illustrate the reason, giving a specific situation in which the reason holds. The purpose of examples, therefore, is to back up the reason, so that it provides good support for the conclusion.

There are two main ways of using an example to illustrate a reason. First, the author may give a list of specific examples – as in the following example.

Fruit that can be grown in the UK, such as apples, pears, raspberries, gooseberries and strawberries, has many advantages. It doesn't need to be transported around the world. It tastes superior. In short, it is by far the best choice.

The examples strengthen the reason by providing an image or concrete situation to develop it, rather than logical support. The example does not count as part of the reason, even when it is written in the middle of it as in this short argument. Identifying the reason precisely means leaving out examples and perhaps re-wording it. Here the reason is:

Fruit that can be grown in the UK has many advantages.

The second common use of examples is where the author illustrates a general idea through a more developed example.

You don’t need a large garden to grow your own food. Many kinds of fruit and vegetables can be grown in containers, which will fit even on a small balcony. For example, Uncle Brian grows potatoes in a dustbin, and tomatoes, peas, beans and strawberries, all in pots on the patio.

In the examination, you will not be asked to carry out statistical calculations. Neither will you be expected to use technical mathematical terms (such as observation or mean). However, understanding some basic statistical and numerical techniques will help you in evaluating numerical and statistical evidence when it is used to support an argument.

In the exam you may be asked about the use of examples in a passage.

**EXAM TIPS**

When you identify reasons in the exam, make sure you leave out any examples. You may also need to rephrase slightly if the reason is unclear when taken out of context.

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**Activity**

Identify the evidence and the examples in the following short argument.

Research carried out by the University of Hertfordshire involved interviewing 100 people aged between 22 and 45 who had been speed-dating. Chat-up lines that are questions rather than statements were found to be more successful. ‘I have a PhD in computing’, is off-putting but ‘What is your favourite pizza topping?’ evokes a positive response. So, if you want to chat someone up successfully, you should give them the chance to respond in a light-hearted way.

Numerical and statistical data as evidence

Statistics is about making sense of what is happening. Similarly, evidence is often presented numerically or as statistical data to make it clearer and easier to understand. For example, if you were choosing where to study, you would not necessarily want to read what every student at a local college thought of it: the statistic that 93% of students would recommend their college would be enough.

In the Unit 1 examination you may be asked to evaluate evidence presented in different forms. The way in which evidence is simplified, or summarised, or converted into numerical form, can present problems. In this chapter, we will therefore look at some common ways of collecting and presenting numerical evidence: surveys or research data, percentages and proportions, and averages. You may meet any of these in the examination.
Evidence in the form of surveys or research data

In choosing where to study, you might look at information on a number of colleges to help make a decision. You might want to look into the colleges’ IT facilities, the range of courses and subjects offered, the different sports clubs, the social activities, the canteen, the support available for students with academic or personal problems and students’ opinions.

In finding out about what local colleges offer, you are carrying out research. The characteristics that you are investigating (the colleges’ IT facilities, range of courses, subjects, sports clubs, etc.) can be identified. Once you have collected information on these characteristics, you have the information (known collectively as data) that could be represented numerically and, if you wished, analysed using statistical techniques.

Data is usually numerical, but could be descriptive. For example, you might want to describe the colleges’ canteen facilities as good, adequate or poor. Here are some more examples from everyday life that show the use of data.

On average I spend roughly £15 a week on travel.

You probably do not need to do careful calculations to have a fairly good idea of how much you spend on travel each week, but you are using numerical techniques when you estimate it.

It’s always curry on the menu in the canteen on Thursday.

Here the observations in the canteen in previous weeks have led to a factual statement about the food on offer every Thursday.

Research data can be collected by different methods. In the example of finding a suitable college, you would probably ask questions of staff and other students, and read the colleges’ brochures and publicity material. More formal methods of collecting research data include:

- taking measurements, e.g. recording weight and blood pressure of patients visiting the local health centre
- observation, e.g. watching and recording information about the behaviour of animals in the wild
- asking questions through questionnaires, e.g. asking customers about the customer service they receive at the supermarket.

When specialist researchers carry out their work, it is common to collect data based on a sample rather than investigating every possible case. Take the example of the supermarket chain that wants to find out customers’ views on the service at their local supermarket. In one week, each supermarket in a large chain would have tens of thousands of customers. It would be impractical to ask every customer their opinions, so the company would probably arrange to interview (or survey) only a sample.

If the research is conducted properly, the sample will be typical of all the customer types (e.g. old people, young parents with families, single people, etc.) and be large enough to give an accurate picture of the opinions of the range of customers.

Problems with evidence based on surveys and sampling

In using evidence to support an argument, many writers interpret, or use selectively, the outcomes of research or surveys. Sometimes the methods used to carry out the research itself are flawed. When you evaluate survey evidence in the examination, you need to think carefully about whether the evidence really tells us what the writer is claiming and whether the research methods might, or might not, be reliable.

Suppose we survey a class of 30 children and find that twelve of them are blonde, six have brown hair, six have red hair and six black hair. We can calculate that 40% of the class are blonde, and 20% respectively brown, red and black-haired. We cannot, however, extend this to the whole population. After all, if we surveyed a similar class of 30 children we would be very likely to get significantly different results. So whenever we look at evidence, we should ask whether the group it is based on is typical – or representative – of the wider group it is being applied to.

The converse is that we must also be careful about applying a statistic that represents the population as a whole to a small group. Suppose we knew that 60% of the UK population had brown eyes. We could not then conclude that exactly 60% of the children in one class have brown eyes.

What questions might we ask about the evidence below before drawing conclusions from it?

• Research data on animal behaviour can be collected through observation.

PAUSE FOR THOUGHT

What problems might there be in using a sample to find out about students’ opinions of the college where they study?
Researchers who worked with families and day care centres have found that children who are cared for at home by a parent until the age of 2 achieve higher levels in standard tests when they are 7 than children who attended day care centres.

We might want to ask these questions.
- Who funded the research? A specialist university department or a company that sells early learning packs designed for parents to use with their children?
- How many children were sampled? Two, 20 or 2000?
- Were the day care centres in similar social areas to the children who were observed at home?
- How well educated were the parents and the day care staff?
- How did the researchers get access to the children? Probably they could work only with parents who were willing to take part in the survey. These perhaps were parents who were happy with their role at home.

The answers to these and similar questions could show that the sample was unrepresentative, even if the survey was otherwise properly designed and carried out. For example, if the researchers worked only with parents willing to take part in the survey because they were happy to be at home, then we could conclude that it is academically advantageous for young children to be at home with a parent who is happy to be at home, not that it benefits all young children.

**PAUSE FOR THOUGHT**

Look again at Activity 15. What questions might you ask to help you assess the evidence about chat-up lines?

**Percentages and proportions**

Percentages can be a valuable tool for presenting data. The results of research surveys are often presented as percentages. However, percentages are often presented in ways that are misleading or provide no useful information. Consider this example.

We probably think we know what is meant by ‘Over 300 years’ family experience’ – generations of Celesta’s family going back 300 years have used similar powers. But what about ‘100% privacy’? Do similar services provide only 75% privacy?

As we can see, percentages often provide no useful information. The 100% privacy offered by Celesta is not an unusual example. Look at the next example.

Gleem washing-up liquid is 50% more effective.

We need to ask ‘More effective than what?’ and ‘How has the effectiveness of Gleem been tested?’

**ACTIVITY 16**

Identify the evidence in the following short arguments and state what form(s) the evidence takes. (You may need to look back at the list of different forms of evidence on page 40.)

A A survey reveals that while 40% of teenagers have no religious faith, the level of unbelievers drops to a mere 8% in the over-65 age group. The closer we get to the Pearly Gates, the more we hedge our bets.

Peter Rhodes, Wolverhampton Express and Star, 13 September 2007

B One major chain store has a new method of encouraging recycling: the UK’s first coat hanger amnesty will be held by Marks & Spencer. Research shows there are currently 530 million unused coat hangers stored in UK homes. This would equate to 17,000 tonnes of plastic that could either be reused or recycled. Customers can bring unwanted hangers into stores on the days of the amnesty and place them in the recycling boxes. This is a useful way to reduce waste dumped in landfill, but it would be far better if shops were to stop handing out coat hangers altogether.

C More than 3.5 million people in Britain – 6% of the population – belong to a gym or fitness club, presumably thinking that exercise improves their quality of life. However, growing numbers of scientists accept that punishing workouts are unnatural for the human body and may ultimately impair physical fitness, as demonstrated when Jim Fixx, the American pioneer of jogging, collapsed and died at the age of 52. In order to maintain good health, people should cancel their fitness club subscription and adopt a healthier lifestyle.

D The increase in numbers of a wild bird in Scotland despite its declining numbers in the rest of Europe has mystified experts. RSPB Scotland said it was delighted but it was a mystery as to why red-throated divers had done so well. Their numbers have risen from 935 to 1255 breeding pairs in twelve years. However, in Shetland the population has dropped from 700 pairs to 407. Dr Mark Eaton, an RSPB scientist, said: ‘We feared the numbers of red-throated divers might drop because the warming of the North Sea seems to be reducing stocks of the fish they feed on. Projections about the disastrous effects of global warming on wildlife clearly need revising.’

Adapted from www.birdguides.com/webzine/article.asp?a=110%
The ‘average’ or mean

The term ‘average’ is often used carelessly. Look at this example.

In recent school tests of 11-year-olds, 49% of children failed to reach the average reading level for their age group.

Of course they failed to reach the average reading level for their age group! There was something badly wrong with the tests if they produced any result but children of below-average ability achieving below-average results, children of average ability achieving the average results, and children of above-average ability achieving above-average results.

Let’s look at another example.

The average amount spent on lottery tickets is about £3 a week. This represents only 0.65% of the average income in Britain. Such a small amount completely undermines the idea that expenditure on the lottery is at the expense of more important and essential items such as nutritious food.

The ‘average amount’ in this example misleads in several ways. First, some people earn more than average; others earn far less. If a poor person spends the average £3 each week on lottery tickets, that may be a greater proportion of their family’s income than it is for someone who earns more. Second, ‘about £3’ is deceptively vague: it could be as little as £2.51 or as much as £3.49. We simply do not know. Third, we do not know how this ‘average’ was calculated.

The mean

Nine students took a test, and their results were as follows:

<table>
<thead>
<tr>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
</tr>
<tr>
<td>99%</td>
</tr>
<tr>
<td>45%</td>
</tr>
<tr>
<td>49%</td>
</tr>
<tr>
<td>52%</td>
</tr>
<tr>
<td>45%</td>
</tr>
<tr>
<td>53%</td>
</tr>
<tr>
<td>59%</td>
</tr>
<tr>
<td>45%</td>
</tr>
</tbody>
</table>

If asked to find the average, most of us would add up all nine marks, divide the total by nine, and say: ‘The average mark is 54%.’ This is not wrong, but it would be more accurate to say: ‘The mean mark was 54%.’ The mean is a very useful statistical representation. You will not be asked to do calculations in the exam. You just need to understand that the term ‘average’ will refer to the mean value.

Numerical and statistical evidence presented as graphs, diagrams or images

Very often it is easier to understand information if it is presented in visual form than if it is simply explained in text. Here is an example taken from a scientific article about the deep sea.


For many people the picture helps them understand what the article is about better than the textual information. Here is another example where some very complex information about Alzheimer’s disease and dementia is presented first in text, then in a table and a graph.
Dementia in an ageing population

The risk of developing dementia is strongly associated with ageing, although inheritable early-onset dementia does occur very rarely in people under 65 years. Population studies show that the prevalence (number of cases) roughly doubles every five years over the age of 60 (Table 1). The UK population is projected to increase to 69.3 million in 2051 from 60.5 million in 2006. Should prevalence rates remain unchanged over the next few decades, and as the population ages, the total number of dementia cases could more than double, from 750,000 in 2006, to 1.8 million in 2051 (Fig. 1).

Table 1. Prevalence rates of dementia by age.

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Prevalence of dementia (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60–64</td>
<td>0.9</td>
</tr>
<tr>
<td>65–69</td>
<td>1.5</td>
</tr>
<tr>
<td>70–74</td>
<td>3.6</td>
</tr>
<tr>
<td>75–79</td>
<td>6.0</td>
</tr>
<tr>
<td>80–84</td>
<td>12.2</td>
</tr>
<tr>
<td>≥85</td>
<td>24.8</td>
</tr>
</tbody>
</table>

Evaluating evidence

While reasons are normally general statements used to support a conclusion in an argument, evidence, on the other hand, is used to support, illustrate or develop a reason. Evidence may be facts that cannot be disputed (e.g. ‘Galileo claimed that the Earth moved round the Sun’) but often it takes the form of information, statistics or scientific data.

In the Unit 1 examination you do not need to dispute whether the evidence is true or not. What you do need to consider is whether the evidence itself is reliable and relevant. Reliable evidence should come from a source that is reputable, authoritative (or expert), and without a motive to mislead. (We will look at ways of judging the reliability of sources in Chapter 5.)

Statistics and other numerical evidence can mislead even if there is no motive involved. Often such evidence is simply misused. We need to question what is being hidden by the evidence, what is not being said, what is being twisted or manipulated, and what has been omitted because it did not fit the aim of the writer.

If we are told that ‘many people’ or ‘the majority’ support a particular measure, it is worth asking for the precise figures. It may turn out that 39% of people asked said they did agree, 38% disagreed, and the rest did not know or care. The writer is not necessarily dishonest, but is not giving the whole picture either.

Evidence and examples need to be relevant. Look at this argument.

It no longer makes economic sense for families to grow their own vegetables. The modern-day supermarket offers vegetables at a price that undercuts the cost of growing them yourself. Marina Kiblitskaya found that people in Russia spent considerably more money growing their own vegetables than if they had purchased them in local markets.

Adapted from OCR’s May 2003 question paper

In this passage the evidence relates to Russia and compares local market costs with home-grown produce. That is not a relevant example to support an argument about the relative costs of UK supermarket food and home-grown food.
ACTIVITY

a) Evaluate the evidence given to support the claims in the examples below.

A People were asked to name their favourite National Trust coastline in a survey. The white cliffs of Dover were runaway winners with 22% of the votes.

B

b) Look again at the arguments in Activity 16. Evaluate the evidence in them.

TAKE IT FURTHER

Evaluate the evidence to support the claims in the example below.

More money needed for gambling addicts

More money is needed to help gambling addicts. The Responsibility in Gambling Trust needs its funding increased from £4 million to £10 million, so that it can set up Britain’s first dedicated gambling addiction clinic. The Gambling Trust’s counselling helpline for problem gamblers took more than 30,000 calls last year, a rise of 34% on the previous year. The number of gambling addicts has risen to about 2% of the population, or about 800,000.

REMEMBER

When you are evaluating evidence and examples, you may need to ask these questions.

■ Is this evidence meaningful?
■ Who funded the survey or research?
■ What was the size of any sample?
■ Was the sample representative?
■ How was any survey conducted?
■ When was the survey carried out?
■ Are examples typical and relevant?

Personal observations and statements from sources or witnesses

As we saw on page 40, evidence may also be in the form of a personal observation or a statement from a source. In Chapters 5 and 6, when we learn about credibility of evidence, we will look in greater detail at these forms of evidence.

PAUSE FOR THOUGHT

As a group, look at a variety of newspapers (local and national), popular magazines and more serious magazines. Find examples of each of the following forms of evidence:

■ an example
■ statistical data (including graphs or tables)
■ an estimate
■ a factual claim
■ a personal observation
■ a statement from a source or witness.

Decide whether or not you think the evidence supports the reasoning in the article.

Summary

You should now be able to:

■ identify evidence and examples in argument
■ explain the purpose of evidence and examples in an argument
■ assess evidence from research or surveys by considering the questions that could be asked to clarify that evidence.
Using the Critical Thinking skills

In Chapters 1–3, we have learnt to identify the key elements of argument and begun to analyse simple arguments. We also learnt to recognise assumptions, hypothetical reasoning and different forms of evidence. In this chapter we will practise bringing together the skills learnt so far in order to analyse the structure of longer, and more complex, arguments.

The best way to prepare for the Unit 1 exam is to practise the Critical Thinking skills. In this chapter you will tackle activities which will help you to develop the skills. We will also begin to tackle the types of question that you can expect to meet in the first section of the examination.

Analysing the structure of longer arguments

First things first: finding the conclusion and the reasons that support it

When you start to analyse the structure of any argument, always begin by looking out for the conclusion while you read through the passage. Don’t forget that the conclusion indicator words (‘therefore’, ‘so’, etc.) can help you to spot the conclusion. You might expect to find the conclusion at the end the passage, but often it is in the first paragraph. However, it could be anywhere in the argument.

Look at this short argument, which we first met in Chapter 1 (page 10). Here the conclusion is at the end.

I want to go on holiday after my exams. I find being by the sea is very relaxing and I will definitely need a rest after all that hard work. I ought to book a holiday at the seaside.

We can see below that this would work just as well with the conclusion in the middle.

I want to go on holiday after my exams. I ought to book a holiday at the seaside. I find being by the sea is very relaxing and I will definitely need a rest after all that hard work.

It would also work with the conclusion at the beginning.

I ought to book a holiday at the seaside. I want to go on holiday after my exams. I find being by the sea is very relaxing and I will definitely need a rest after all that hard work.

Learning objectives

- Analyse the structure of longer arguments.
- Assess the extent and reasonableness of assumptions.
- Understand the link between reasons and conclusions.
- Evaluate how well reasons support conclusions.

PAUSE FOR THOUGHT

Try this yourself with this short argument, which you first met in Activity 5, page 13. Does it work?

The most popular meal in the UK is now chicken tikka masala. Spaghetti bolognese has replaced sausages and mash as a staple family meal. We should re-think our view of what constitutes classic British food.
Having found the conclusion of the argument you should look next for the reasons that support the conclusion. Often arguments are presented neatly with one reason in each paragraph, but never assume that this is the case.

**Distinguishing between reasons and evidence and examples**

In Chapter 3, we looked at a number of forms of evidence and examples. In the exam, you need to be able to distinguish between reasons and evidence. This means separating a reason from the evidence and examples that support it. Look at this argument.

"Infomania" can seriously interfere with your performance at work. Research carried out by the Institute of Psychiatry says that distractions caused by emails and telephone calls result in a ten point IQ drop in the average worker. So, if you want to work at your best, don't constantly check your emails, text and phone messages.

You probably spotted that the evidence (notated as 'Ev', as in the box below) was in the second sentence and that the argument could be analysed as follows.

| Ev | Research carried out by the Institute of Psychiatry says that distractions caused by emails and telephone calls result in a ten point IQ drop in the average worker. |
| R  | "Infomania" can seriously interfere with your performance at work. |
| C  | So, if you want to work at your best, don't constantly check your emails, text and phone messages. |

Real life articles often cannot be analysed as neatly as the short passages you have met so far in this book, but in the exam it may help you to mark up the passage using argument notation in this way.

Read the passage below and identify the conclusion, reason(s) and evidence.

Researchers have established that blonde females are discriminated against when applying for jobs. They found that a blonde woman and a dark-haired woman with the same qualifications, who applied for the same job, were treated differently. The blonde was offered lower pay and grading than the other woman. Therefore, outdated prejudices are still operating in the workplace.

In this passage the conclusion comes neatly at the end, flagged up by the argument indicator 'therefore'.

Outdated prejudices are still operating in the workplace.

It may have been a bit trickier to separate out the reasons and evidence. Using argument notation the structure is as follows.

| R1 | Researchers have established that blonde females are discriminated against when applying for jobs. |
| Ev | They found that a blonde woman and a dark-haired woman with the same qualifications, who applied for the same job, were treated differently. The blonde was offered lower pay and grading than the other woman. |
| C  | Therefore, outdated prejudices are still operating in the workplace. |

**Evaluating how well reasons support conclusions**

Up to now we have concentrated on breaking down arguments into their component parts (or elements). This is known as analysing argument. In the examination marks are awarded for evaluating reasoning as well as for analysing it – about the same number of marks for each of these skills.

Evaluating argument means asking: 'Do the reasons support the conclusion?' More simply you might ask: 'How well does this argument work?' In deciding how far a reason supports the conclusion, it helps to ask the following questions.

- Is the reason relevant to the conclusion?
- If the reason is relevant, does it make a difference to the conclusion?
- Would other evidence (not in the argument) make a difference to the conclusion?

Try applying these questions to this argument.

A recent survey has shown that the majority of people fear becoming a victim of violent crime. They avoid certain places – underpasses, train stations, city centres – as a result. The government should put more police officers back on the beat in order to prevent crime.

The conclusion here is that:

The government should put more police officers back on the beat in order to prevent crime.
The reasons (that the majority of people fear becoming the victim of crime, and that they avoid certain places) have some relevance to the conclusion in that they all relate to crime. However, the reasons do not support the conclusion well. People’s fear of crime is not the same as actual crime. Putting more police officers on the beat does not ensure that the places people avoid would be made safer.

**REMEMBER**

It helps to ask some questions when you are assessing evidence.

- Is it relevant?
- Is it representative?
- Is it reliable?
- Are the findings of any research ambiguous?
- Could the evidence be interpreted differently?

**ACTIVITY**

The passage below is from an article in a local council’s newsletter, which claims that the authority is recycling more rubbish than ever before and that recycling is beneficial. Assess the evidence used to support the claim in the article.

**Looking after the environment**

With the support of people in the borough, we now recycle more of our household rubbish than ever. In 2006/7, over 34% of your rubbish was recycled or composted – up from 30% the previous year.

This is great news, as it means more of you are recycling and more recyclable bits and pieces are being put to good use rather than thrown in the bin.

This is important because the waste that ends up in your wheelie bins goes to landfill sites, which create methane gas and contribute to global warming. Also nobody wants to live near to a huge pile of rubbish, so by recycling you’re helping to protect your environment.

An Audit Commission survey also showed that litter in the borough is at a very low level in 2006/07, making it one of the cleanest places in the country.

Adapted from Telford & Wrekin Council’s Insight, 22 July 2007

**Identifying hypothetical reasoning and counter-argument**

The exam questions may help you to identify these argument elements, by telling you which paragraph to find them in. Even if the question does not help you in this way, remember that argument indicator words and phrases may give you pointers.

**REMEMBER**

If the ‘if’ can be followed by a ‘then’, then hypothetical reasoning is present.

**REMEMBER**

Assumptions are unstated parts of an argument. This means that they are not written down. If you are copying something from the passage, it is not an assumption.
Assessing the reasonableness of assumptions

In Chapter 2 we looked at ways of identifying the assumptions (unstated reasons) that are necessary to make an argument work and how you can check whether the assumption you have identified really is correct.

In the examination you may be asked to assess the reasonableness of an assumption you have identified in an argument. To see how this is done let’s have another look at the Pause for Thought example about biofuel on page 28.

**R1** Using biofuel is a cheap way to run a car.

**R2** It is easy to convert an ordinary car engine to run on biofuel.

**Assumption** Biofuel is readily available locally.

**C** You should have your car engine converted to biofuel.

‘Biofuel is readily available locally’ is necessary for the argument to work, but it would not be a reasonable assumption, since there are very few biofuel outlets in the UK (450 registered suppliers at the time of writing this book).

You are not expected to provide this type of factual detail in your responses to questions about the reasonableness of assumption (although it is not wrong either). It would have been enough to write the following.

This is not a reasonable assumption to make, since proper biofuel is not currently available in as many places as you can get petrol or diesel.

Here is another example to try. Identify some assumptions which underpin this short argument and decide if each is reasonable or not:

You should train to be an accountant when you have finished your A Levels.

All businesses need accountants and they earn good salaries.

Some possible assumptions follow.

- **Assumption 1:** Earning a good salary is more important to you than other considerations.
  - This is a reasonable assumption to make about many young people, but not true of all.
- **Assumption 2:** There will be suitable vacancies for trainee accountants when you have finished your A Levels.
  - This is a fairly reasonable assumption because many accounting firms recruit lots of trainees, but it is not a very reasonable assumption, as there is a lot of competition for such vacancies and companies can be very selective when they make their appointments.

### ACTIVITY

Read the passage below. Then answer the questions that follow it.

The use of speed cameras is justified on the grounds that, since ‘speed kills’, anything that will discourage drivers from speeding must be a good thing.

However, the belief that speed in itself is a significant problem needs examination. Excessive speed is found to be a contributory cause in only 10% of accidents. The speed cameras do not deter people from speeding. In 2001, there were 1 million offenders caught on camera; in 2002, 1.5 million; in 2003, 2 million; and these figures have continued to rise.

Speed cameras do not even lead to a reduction in road deaths. From 1950 to 1993, there was a steady reduction in road deaths. But from 1994, there has not been this annual reduction despite the introduction of speed cameras.

The only police chief in the country who has opposed the use of speed cameras is in County Durham. His force uses traffic patrols instead. The accident rate in County Durham is 34% below the national average. There is an important issue here. Speed cameras do not record incidents of dangerous driving; they do not catch drink-drivers. Traffic patrols do. For the sake of road safety, speed cameras should be removed.

Adapted from OCR’s June 2004 question paper

a) Identify the conclusion of the argument in paragraph 4.

b) What element of argument is paragraph 1.

c) Identify the reason in paragraph 2 that supports the conclusion of the argument.

d) Identify the reason in paragraph 3 that supports the conclusion of the argument.

e) In paragraph 2 the author uses evidence of the number of offenders caught by speed cameras to claim that the cameras do not deter people from speeding. Identify the assumption underlying this use of evidence.
REMEMBER

When you analyse an argument (that is when you break it down into reasons, conclusions, evidence and other elements) you should follow these steps.

- Always identify the conclusion of the argument first.
- Then look for the reasons – those parts of the argument that support the main conclusion by giving you information that helps you to believe, accept or agree with the conclusion.
- The reasons may be supported by evidence – probably statistics – or examples.
- The meaning of any unfamiliar technical words can probably be guessed from the context and will not prevent you analysing the argument.
- You must pay attention to the small words – ‘some’, ‘all’, ‘only’, ‘always’ and ‘never’.

ACTIVITY 20

Analyse this argument.

Students concerned for their long-term health should avoid American football, as it is the sport most likely to cause neck injury in the USA. Researchers combined hospital admission numbers with sport participation figures across the USA in the 1990s. For every 10,000 participants, they found overall neck injuries in 5.85 football players. That’s more than the 2.8 hockey players and 1.67 soccer players combined.

ACTIVITY 21

Read the passage below. Then answer the questions that follow it.

Driving skill is an obvious but essential quality in an F1 driver. To achieve the fastest lap times, F1 cars are driven to the limits of safety. Drivers must have split second reaction times to avoid a devastating crash. To maximise speed, they must also place the car centimetre perfect lap after lap.

F1 drivers need cardiovascular fitness. A typical F1 race can last an hour and a half. They also need the strength to deal with turning corners fast. As Jensen Button turns into the flat right-hander at Silverstone’s Copse Corner, his neck muscles will be straining to support a weight equivalent to 30 bags of sugar. F1 drivers have to be among the very fittest athletes in the world to cope with the incredible strains that full throttle racing can place on the human body.

Drivers need to be competent engineers as well. They have to interpret the complex data beamed back to the pits, maintain a conversation with the engineer during the race and make adjustments to the car’s brakes, fuel mixture and other settings.

The right mental approach is critical. Drivers need to be self-motivated, have the desire to win, and be able to control their aggression. They have to perform under intense pressure in qualifying and during races. F1 drivers also have to shrug off the real possibility of death or injury.

Because drivers have to perform all these amazing feats at the same time, at 200mph, they must surely count among the elite of multitaskers.

Adapted from an article in Focus no. 152, July 2005

a) Identify the conclusion of the argument presented in the final paragraph of the passage.

b) Write down the reasons (one in each paragraph) the author uses to support their conclusion.

c) From paragraph 2, write down the evidence the author gives to support the reason.

d) From paragraph 2, write down the example the author uses to illustrate the reason.

• F1 drivers are multitaskers.
ACTIVITY 22

Read the following passage carefully. Then answer the questions that follow it.

There is a widespread belief that medical science has been responsible for the increased life expectancy and better health of people in western societies during the last 150 years. However, medical science has made little contribution to this improvement.

Figures from Chicago show that the key decline in infant mortality rates in Chicago was between 1870 and 1900. The chance of reaching the age of 5 increased from 50% to 75% in this period. These improvements were due to better sanitation and water supply. The vast majority of the population could not afford to visit the doctor. Medical science therefore had little to do with the drop in infant mortality.

In Britain, vaccination programmes became widespread only in the middle of the twentieth century, long after key improvements in life expectancy and health had been achieved. The main factor in these improvements was the action to improve the living conditions of the poor.

Clearly there have been great advances in surgical techniques in recent years, but they have not resulted in the dramatic improvements in life expectancy that resulted from public health improvements in the late nineteenth and early twentieth centuries. For example, in Chicago infant mortality fell by 122 per 1000 between 1890 and 1920, but by only 7 per 1000 between 1960 and 1990.

a) Identify the main conclusion, the reasons and the counter-assertion.

b) Identify the evidence and examples precisely.

c) Is the author’s use of evidence reasonable? Explain your answer with reference to the material in the passage.

ACTIVITY 23

Read the passage below. Then answer the questions that follow it.

The price of living longer

People are living longer and longer lives. Our concept of the age when people retire from work should be revised. There are a number of reasons why this will be essential.

Not only are people living longer, but the birth rate is also decreasing and this will result in a significant age imbalance in the population. Employers will have to recruit people in the 65-plus age group to compensate for the shortage of younger workers.

The concept of an age when one should ‘retire’ is a recent one. Figures from the 1921 UK census show that 53% of men in the age group 70–74 were still working in spite of pensions being available at the age of 70. This shows they chose to be economically active and not to isolate themselves from mainstream life.

Pensions experts have warned that, unless the retirement age is raised, the level of pensions must be reduced. The idea of a long autumn in your life while you are still biologically young is attractive, but if you are biologically young you should still be working.

a) Identify the conclusion of the argument presented in the first paragraph of the passage.

b) Write down the reasons (one in each paragraph) the author uses to support their conclusion.

c) From paragraph 3, write down the evidence the author gives to support the reason.

d) What must the author assume to argue as they do in paragraph 3? Explain whether this is a reasonable assumption to make. Refer to material in the passage in your answer.

e) Identify the hypothetical reasoning in the passage.

Summary

You should now be able to:

■ analyse the structure of shorter and longer passages, identifying reasons, examples, evidence, counter-argument, intermediate conclusion and the main conclusion
■ assess the extent and reasonableness of assumptions
■ evaluate how well reasons support conclusions
■ tackle exam-style questions.