



STUDY GUIDE

CRITICAL THINKING

UNDERSTANDING CRITICAL THINKING

This guide to critical thinking stresses the importance of asking and answering questions. In everyday life the term 'critical' is often seen as negative or destructive. Being critical in academic life, however, does not mean questioning things randomly, or for the sake of 'nit-picking'. Instead, academic work aims to get as near as possible to the truth. Critical thinking in any subject or discipline is the way in which this is done, along with the more specialised applications of theory, the methods and techniques, which have been developed for the subject. Critical thinking then, is the attempt to ask and answer questions systematically. This means asking the most useful questions in the most productive sequence in order to yield a coherent and credible 'story'.

Thinking critically means asking questions. Instead of accepting 'at face value' what you read or hear, critical thinkers look for evidence and for good reasons before believing something to be true. This is at the heart of what it means to be a scientist, researcher, scholar or professional in any field.

Whatever you are studying, critical thinking is the key to learning and to making progress.

GETTING STARTED

The common question words: **what, who, where, when, how**, and **why** will help you to get started; along with the phrases: **what if, what next, and so what**. Attempting to answer these questions systematically helps fulfil three vital functions for any serious study – **description, analysis and evaluation**.

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When thinking critically, you need to:

- **Describe** - e.g. to define clearly what you are talking about, say exactly what is involved, where it takes place, or under what circumstances. Fulfilling this function helps you to introduce a topic. More complex description will become analysis.
- **Analyse** - e.g. examine and explain how parts fit into a whole; give reasons; compare and contrast different elements; show your understanding of relationships. In this way analysis forms the main part of any in-depth study.
- **Evaluate** - e.g. judge the success or failure of something, its implications and/ or value. Evaluations lead us to conclusions or recommendations and are usually found at the end of a piece of academic work, a paper, chapter or other text.

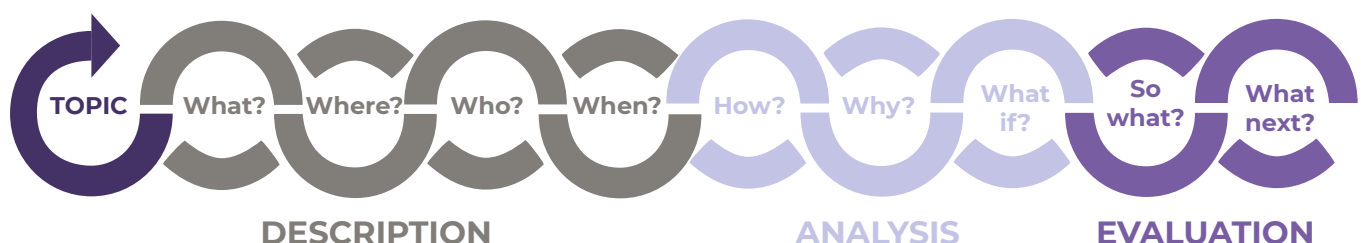
STRUCTURE: ORGANISING THOUGHTS AND MATERIAL

To summarise what we have said so far: the diagram below shows how asking and answering questions helps to fulfil the three key connected functions of description, analysis and evaluation. This is a reliable basis for introducing, discussing and drawing conclusions about your topic. Beginning with - what, this systematic questioning will encourage you to consider every aspect of your topic or question.

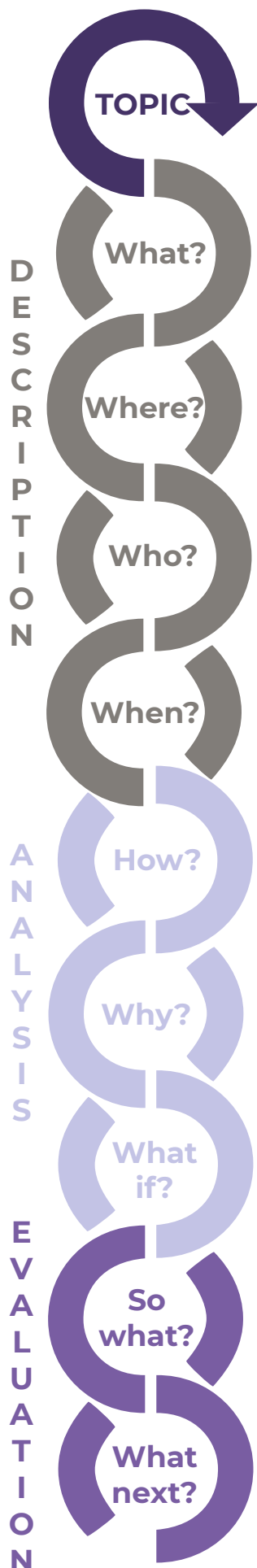
You should aim to address most, but not necessarily all, of these questions for your topic and subtopics. The crucial questions for almost any topic are: what, which identifies the issue; why, which explores it in depth, addressing causes and using theory; how, which helps you look at the processes at work; and so what, which helps you make judgements or conclusions, showing that you have reflected on implications.

The model (below) can be used in a number of ways at different stages of tackling an assessment. Use it before and during your reading; for planning the structure of a whole assessment; and also to structure each point within it.

CRITICAL THINKING MODEL



GENERATING CRITICAL THINKING



Use this model (left) to generate Critical Thinking. The model can be used in a number of ways at different stages of tackling an assessment. Use it before and during your reading; for planning the structure of a whole assessment; and also to structure each point within it.

Identify a **topic**. This can be your essay title, a subtopic, or a point you might want to explore in a particular section or paragraph. Write key words in the middle of a sheet of paper, or a blank document screen. This is the '**Topic or Issue**' in the diagram left. Or you could do it in a linear way and put these keywords in the place of a title, with the questions that follow spaced out in the margin, or as subheadings.

Try to answer the questions on the diagram starting with **what** questions. Your answers may become part of an introduction, defining your terms or identifying issues.

Using the **who, when and where** questions, generate descriptive background information. This will provide context or scene-setting material which is also useful for an introductory section.

How requires consideration of the ways that something operates or works – e.g. processes or procedures. Attempting to answer questions using '**how**' takes you from descriptive to more analytical work.

Why also moves you deeper into analytical territory. It gets you to find reasons, explanations or causes. Think about all the possible questions to do with '**why**' (see the model left for some suggestions). Answers to such questions are likely to emerge over time from your reading and use of specific theories and findings reported in academic journals; published books and research reports; or from other authoritative sources such as policy documents.

Asking questions using **what if** moves you into a more evaluative phase of your thinking. It helps you to consider the possible implications or results of a particular action. This question is also useful for considering predictive work done by others, or engaging in forecasting of your own.

So what? is really the key question for an evaluation. It gets you thinking about value or values, meaning and significance. It is also about discriminating between more or less important factors in any situation. It helps you to think through and justify your own position, and discuss its implications.

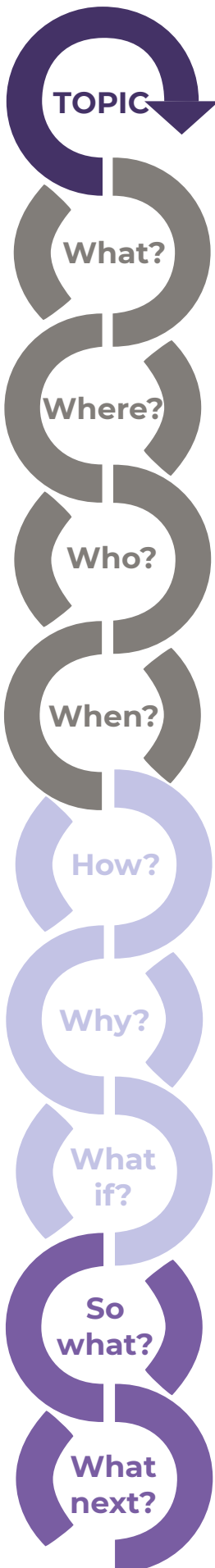
What next? might refer to recommendations and predictions that your argument has brought to light. It leads you to consider and plan for more specific actions that might be necessary in certain kinds of assessment, such as a project or business report.

CRITICAL QUESTIONS - A LINEAR MODEL

DESCRIPTION

ANALYSIS

EVALUATION



What is this about?
 What is the context / situation?
 What is the main point / problem / topic to be explored?
 Where does it take place?
 Who is involved?
 Who is affected?
 Who might be interested?
 When does this occur?

Introductory and background information to contextualise problem / topic

Why this argument / theory / suggestion / solution?
 Why not something else?
 Why did this occur?
 Why was that done?
 How does one factor affect another?

Exploring the relationship of parts to whole

How do the parts fit into the whole?
 How does it work In theory?
 In practice? / context?
 What if this were wrong?
 What are the alternatives?
 What if there were a problem?
 What if this or that factor were added? altered? removed?

Possible situations responses and alternative

So what am I saying about this?
 Is it successful / convincing?
 Why?
 So what does this mean?
 So what is the point / underlying issue / implication of this?
 In what way is this significant?
 What can be learnt from it?
 What needs doing / considering
 Is it transferable?
 Where else could it be applied?
 And how?

Implications
 Solutions
 Conclusions
 Recommendations

DEVELOPING DESCRIPTION INTO ANALYSIS

Notice how the three functions of Critical Thinking are not strictly separate, but lead into one another.

Here is a simple example of the model in action: imagine that a clinical education student who is reading a case study about examining a patient for a hearing loss. The student asks herself questions to help clarify her understanding of the extent and impact of the hearing loss.

| Description | | Description becoming analysis | |
|------------------------------|---|------------------------------------|---|
| What is the situation | Patient is experiencing hearing loss | What is the effect on the patient | Could be extensive or little effect |
| Where is the damage | Ear drum or middle ear or hair cells in the inner ear | How best to find out | Could look at pure tone audiometry tests and/or blood tests, imaging such as MRI, and balance tests |
| When | The hearing loss has happened over several years | Why this this type of hearing loss | Noise exposure, age or damage |
| Who is prone to hearing loss | Job type or income level or age group | Why is the patient presenting now | They have managed the condition by compensating for the loss, e.g. increased volume on TV |

The audiology student has to develop her answers to these questions in a written report or assignment by reference to academic research and audiology practice. She has to build an argument, to justify her view of the causes, impact and treatments for the patient's condition. In one of the audiology journals she might find:

“Hearing loss is a condition that is found in every part of the world and its effects have been experienced by humans over several millennia. Examination techniques and treatments have evolved from simple testing techniques such as tone tests through to balance and blood tests, and more recently, imaging such as MRI. The essential characteristics of older people experiencing hearing loss are muffling of speech and other sounds. Difficulty understanding words, especially against background noise or in a crowd. Trouble hearing consonants. Coping mechanism can be asking others to speak more slowly, clearly and loudly. Needing to turn up the volume of the television or radio.”

Notice how this text functions to describe by answering mostly **what, who where and when** type questions.

DEVELOPING ANALYSIS INTO EVALUATION

Now let's see how the student might also use the critical thinking model for analysis and evaluation:

| Analysis | | Analysis becoming evaluation | | |
|-----------------------------------|--|------------------------------|-----------|---|
| How has the hearing loss occurred | Damage to the hairs on the cochlea are evidence of damage from intense sound | ▶ | What next | Need to compare damage with other cases to check the scale of damage, need for more testing and possible treatments |
| How do the hairs look | Medium amount of damage | | So what | Very common to find loss of hearing from not protecting the ear, but given the length of time over which hearing has deteriorated, more damage would have been expected |
| Why has it happened | Not wearing protective ear coverings in work | | | |
| Why now | Too much stress on the ear over a period of time | | | |

In building her argument, the student might use her own reasoning prompted by the model, in combination with material she has read. Using her notes from a variety of sources, she might then produce a text like this:

Example of Description

A patient has presented with hearing loss which is not severe, but it is causing him some problems in work and in his social life. He has difficulty following conversations, particularly where there is a lot of background noise. The hearing loss has happened over several years. The ear appears to have suffered damage and on a first examination it appears that there is moderate hearing loss (World Health Organisation, Basic ear and hearing care resource, 2020). There is also the possibility that this loss may have happened in the workplace, which is common in the type of job that he does. The patient is anxious to find some resolution to his problem.

Example of Analysis

Upon examination it was found that there is damage to the hairs on the cochlea, suggesting that the patient has been subject to inappropriate noise levels (National

Centre for Environmental Health, 2019). It is known that excessive noise over a short or long period of time can cause loss of hearing to some degree. It is also, common in the patient's work environment for loss of hearing to occur, unless protective equipment is made available and used. The damage to the ear is typical of this type of working environment. It is possible that there may also, be other contributory factors that have contributed to his loss of hearing; although without further examination it is not possible to be sure.

Example of Evaluation

Although this loss of hearing is not particularly unusual, it is nonetheless interesting as it contributes to the body of information that is being built-up about workplace hearing loss. This loss of hearing appears to have been primarily due to the workplace, rather than a physical injury or some other cause. The patient's condition shows the importance of not only providing protective ear coverings, but also, educating and encouraging employee in the importance of wearing them. It is likely that the patient will need a hearing aid, but other options will also, be considered. He has been made aware of the, absolute, need to wear protective equipment to prevent further hearing loss.

The example above has been divided into 3 sections based on the planning model for the essay. The paragraphs have been marked-up, but you would not do this in an actual essay. Even though the paragraphs have been classified - most of the description happens in the first paragraph; the analysis in the second; and the evaluation in the third. There will always be instances where it is hard to say whether part of a text fulfils one or another function – and often two or more functions are being undertaken together. This is because using language and writing is not an exact or purely mathematical activity. People use words in different combinations and attempt to do things in various ways and for various reasons.

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CRITICAL WRITING

In order to be considered sufficiently 'critical', (academic) university level writing must go beyond being merely descriptive. Use the following table to compare the functions of writing in terms of being descriptive (D) on the one hand, or analytical (A) and evaluative (E) on the other.

| Descriptive writing | Analytical and evaluative writing |
|---|--|
| States what happened (D) | Identifies the significance (E) |
| States what something is like (D and A) | Judge strengths and weaknesses (E) |
| Gives the story so far (D) | Weighs one piece of information against another (A and E) |
| States the order in which things happened (D) | Makes reasoned judgments (A and E) |
| Says how to do something (D and A) | Argues a case according to evidence (A and E) |
| Explains what a theory says (D) | Shows why something is relevant or suitable (A) |
| Explains how something works (D and A) | Indicates why something will work (best) (A and E) |
| Notes the method used (D) | Indicates whether something is appropriate or suitable (A) |
| Says when something occurred (D) | Identifies why the timing is important (A) |
| States the different components (D) | Weighs up the importance of component parts (A and E) |
| States options (D and A) | Gives reasons for selecting each option (A) |
| Lists details (D) | Evaluates the relative significance of details (E) |
| Lists in any order (D) | Structures information in order of importance [etc.] (A and E) |
| States links between items (D and A) | Shows relevance of links between pieces of information (A) |
| Gives information (D) | Draws conclusions (E) |

(Adapted from Cottrell, 2005)

CRITICAL WRITING

The way academic writing follows this pattern, from description, to analysis, to evaluation, tells us something important about academic work – whether it is in the sciences, arts or humanities. All subjects, when studied at advanced levels, require these three things (description, analysis and evaluation) to be done, and in largely that order, to tell a coherent story which is supported by critical reasoning and evidence.

Academic work is intended to be - scholarly. This means it should be of a high standard and appropriate to the particular level of study it represents. It is usually assessed by a lecturer – who will be a critical reader. So far we have used the critical questions model to think about generating material; but it can equally be used to ask questions about, and assess other people's writing. You could try asking questions about a text to see how scholarly or scientific it is. Think about its claims to be true and your belief in these claims. Its use of reasons, evidence, or both to support its claims and the quality of those reasons and evidence.

An important way to demonstrate the quality of your arguments, or evidence in your academic writing is by referring to work by others. The status of this work depends on how authoritative it is. If you are a critical reader, you look for authority, in the form of references to relevant supporting work which has been published in academic journals, or text books. In these kinds of publications the content has been, peer-reviewed. This means that it should have been independently evaluated by another qualified academic who will have read it critically to ensure that the material it contains is factually accurate and that the reasoning behind it is sound. This is unlike the material which may often be found in newspapers, magazines or from many online sources, where the content may not have been checked by anyone else (though that is not true of quality newspapers), or where the work simply puts forward one person's opinion.

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