

## Learner Guide

# Cambridge International AS & A Level Thinking Skills 9694

For examination from 2020



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## Section 1: About this guide

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This guide explains what you need to know about your Cambridge International AS & A Level Thinking Skills course and examinations.

It will help you to:

- understand what skills you should develop by taking this AS & A Level course
- understand how you will be assessed
- understand what we are looking for in the answers you write
- plan your revision programme
- revise, by providing revision tips and an interactive revision checklist (Section 7).

Cambridge International AS & A Level Thinking Skills develops a set of transferable skills. These include critical thinking, reasoning and problem solving.

You can apply these skills across a wide range of subjects and complex real world issues. These transferable skills will equip you well for progression to higher education or directly into employment.

The approach in Cambridge International AS & A Level Thinking Skills encourages you to be:

- **confident**, using intellectual tools to analyse unfamiliar problems
- **responsible**, independently evaluating arguments and possible solutions to problems, and justifying their reasoning
- **reflective**, carefully considering various possible perspectives of an argument, and the diverse ways that a problem may be solved
- **innovative**, formulating further arguments based on unfamiliar source materials and devising problem-solving strategies
- **engaged**, using strategies and techniques for managing unfamiliar information and contextualised problems.

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## Section 2: Syllabus content – what you need to know about

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This section gives you an outline of the syllabus content for this course.

The Cambridge International AS & A Level Thinking Skills syllabus is divided into two sets of skills: Problem Solving and Critical Thinking. The skills within each of these sets is divided into four areas.

Problem Solving is divided into

- Organise information
  - extract the information that is relevant to the problem, including from tables and simple representation.
  - understand how the different pieces of information relate to each other.
- Process information
  - perform the appropriate calculations with the data to solve the problem.
  - search through the possible options to meet criteria.
  - use the results of the calculations to draw conclusions from the data.
- Analyse data
  - recognise alternative representations of data.
  - explain trends within sets of data.
- Consider wider problems
  - consider similar problems to one that has been solved by changing some details of the situation.
  - identify ways to model new features within a problem.

Critical Thinking is divided into

- Evaluate and use evidence
  - assess how credible pieces of evidence are.
  - assess how representative evidence is.
  - provide explanations for evidence.
  - form judgements based on evidence.
- Analyse reasoning
  - identify the key features of arguments (conclusions, reasons, etc.)
  - identify assumptions.
- Evaluate reasoning
  - identify various types of flaw that could be present in reasoning.
  - identify any weaknesses in reasoning and assess how they impact the strength of the overall argument.
- Construct reasoning
  - construct well-structured arguments.

Make sure you always check the latest syllabus, which is available at [www.cambridgeinternational.org](http://www.cambridgeinternational.org)

## Section 3: How you will be assessed

For AS Level you will take Paper 1 and Paper 2.

For the full A Level you will take Paper 1 and Paper 2, as well as Paper 3 and Paper 4.

### Components at a glance

The table below gives you further information about the examination papers:

Component	Time and marks	Skills assessed	Details	Percentage of the qualification
Paper 1 Problem Solving  (Written paper)	1 hour 30 minutes  50 marks	Problem solving	You answer <b>all</b> questions.	50% of AS Level  25% of A Level
Paper 2 Critical Thinking  (Written paper)	1 hour 45 minutes  50 marks	Critical Thinking	The paper is divided into two sections.  You answer <b>all</b> questions from <b>both</b> sections.	50% of AS Level  25% of A Level
Paper 3  (Written paper)	2 hours  50 marks	Problem Analysis and Solution	The paper contains 4 questions.  You answer <b>all</b> questions.	25% of A Level
Paper 4  (Written paper)	1 hour 45 minutes  50 marks	Applied Reasoning	The paper contains a set of documents on which all 4 questions are based.  You answer <b>all</b> four questions.	25% of A Level

### About each paper / component

Component	Time and marks	Questions	% of total mark	What is tested and % of total mark
Paper 1 Problem Solving	1 hour 30 minutes  50 marks	The paper has approximately 12 questions with a range of lengths, each of which provides a situation in which you will demonstrate problem solving skills.  You must answer all of the questions.	50% of AS Level  25% of A Level	Understand information 30%  Evaluate or process information 40%

Component	Time and marks	Questions	% of total mark	What is tested and % of total mark
		Answering the questions will usually involve some calculations. While these are not what you are being assessed on, writing down these steps as you work through the problem is a good way to demonstrate the problem solving that you are doing.		Suggest explanations, devise methods for solving problems 30%
Paper 2 Critical Thinking	1 hour 45 minutes 50 marks	<p>The paper is divided into two sections:</p> <p>You must answer all of the questions in both sections.</p> <p>In Section A the questions are based on some sources of evidence. Question 1 requires you to evaluate the evidence Question 2 requires you to construct a short argument using and evaluating some of the evidence provided in the sources.</p> <p>In Section B the questions are based on a passage. Question 3 requires you to analyse the reasoning in the passage. Question 4 requires you to evaluate the strength of the reasoning in the passage. Question 5 requires you to write a short argument.</p>	50% of AS Level 25% of A Level	<p>Understand information 30%</p> <p>Evaluate or process information 40%</p> <p>Suggest explanations, construct reasoned arguments 30%</p>
Paper 3 Problem Analysis and Solution	2 hours 50 marks	<p>The paper contains <b>four</b> questions.</p> <p>You must answer all of the questions.</p> <p>Each question tests the skills from the problem solving section of the course.</p> <p>While all questions could test any part of the problem solving skills, questions 1 and 2 are more focused on understanding and processing information, while questions 3 and 4 are more focused on suggesting explanations and devising methods for solving problems.</p> <p>Question 1 is worth 10 marks. Question 2 is worth 15 marks. Question 3 is worth 10 marks. Question 4 is worth 15 marks.</p>	25% of A Level	<p>Understand information 20%</p> <p>Evaluate or process information 40%</p> <p>Suggest explanations, devise methods for solving problems 40%</p>
Paper 4	1 hour 45 minutes	<p>The paper contains <b>four</b> questions.</p> <p>You must answers all of the questions.</p>	25% of A Level	Understand information 20%

Component	Time and marks	Questions	% of total mark	What is tested and % of total mark
Applied Reasoning	50 marks	<p>The questions on the paper are based on a set of documents (usually 5), which have a common topic.</p> <p>Question 1 requires you to analyse a piece of reasoning within one of the documents.</p> <p>Question 2 requires you to evaluate the strength of reasoning within one of the documents.</p> <p>Question 3 requires you to evaluate some of the evidence.</p> <p>Question 4 requires you to construct a reasoned argument.</p> <p>You should make sure that your reasoned argument for this paper makes use of evidence from the documents to support your position.</p>		<p>Evaluate or process information 40%</p> <p>Suggest explanations, construct reasoned arguments 40%</p>



## Section 4: What skills will be assessed

The areas of knowledge, understanding and skills that you will be assessed on are called **assessment objectives** (AO).

The examiners take account of the following skills areas (**assessment objectives**) in the examination papers

- Understand information and the relationships between different pieces of information.
- Evaluate or process information in order to draw conclusions.
- Suggest explanations, construct reasoned arguments and devise methods for solving problems.

It is important that you know the different weightings (%) of the assessment objectives, as this affects how the examiner will assess your work. For example, assessment objective 3 (AO3: Suggest explanations, construct reasoned arguments and devise methods for solving problems) is worth 30% of the total marks in Paper 1 and Paper 2. However, in Paper 3 and Paper 4, AO3 is worth 40% of the total marks.

Assessment objectives (AO)	What does the AO mean?	What do you need to be able to do?
<b>AO1: Understand information and the relationships between different pieces of information.</b>	Information can be presented in many different ways. The skill here is to be able to understand what is being presented to you (whether that is data in a table or chart or the key reasoning presented within an argument).	<p>Within problem solving, you need to be able to extract the relevant information from tables or charts and understand how different pieces of information relate to each other (a simple example would be that the number of items that you could buy is related to the amount of money that you have available.)</p> <p>Within critical thinking, you need to be able to identify the different components of the reasoning that is presented to you in arguments.</p>
<b>AO2: Evaluate or process information in order to draw conclusions.</b>	Information requires some processing in order for conclusions to be drawn from it. The skill here is to be able to carry out that process accurately.	<p>Within problem solving, you need to be able to perform the appropriate calculations with the data in order to solve the problem (the appropriate calculations may be obvious, or may need to be worked out by thinking about the relationship between the different pieces of information.)</p> <p>Within critical thinking, you need to be able to make judgements about the evidence or reasoning that has been presented. In many cases (such as evaluation of evidence) there are clear criteria against which you can do this.</p>
<b>AO3: Suggest explanations, construct reasoned arguments and devise methods for solving problems.</b>	The skill here is to be able to present your own ideas in a clear way and to be able to solve problems where there is no immediately obvious method.	<p>Within problem solving, you need to be able to suggest possible explanations for why a trend or feature has been observed in some data (for example, you might suggest that a sudden increase in sales for a book may have been caused by the timing of an advertising campaign). You also need to be able to use your understanding of the relationships between different pieces of information that you are provided with to create a method for solving particular problems.</p> <p>Within critical thinking, you need to be able to suggest explanations for evidence or other information, often as an alternative to an explanation already given. You also need to be able to construct reasoned arguments which demonstrate all of the structural features contained within the course. You need to be able to construct the arguments to avoid the common flaws in reasoning that you will have studied.</p>

## Section 5: Command words

The table below includes command words used in the assessment for this syllabus. The use of the command word will relate to the subject context.

Command word	What it means
Analyse	examine in detail to show meaning, identify elements and the relationship between them
Assess	make an informed judgement
Calculate	work out from given facts, figures or information
Compare	identify/comment on similarities and/or differences
Evaluate	judge or calculate the quality, importance, amount, or value of something
Explain	set out purposes or reasons / make the relationships between things evident / provide why and/or how and support with relevant evidence
Give	produce an answer from a given source or recall/memory
Identify	name/select/recognise
Justify	support a case with evidence/argument
Predict	suggest what may happen based on available information
State	express in clear terms
Suggest	apply knowledge and understanding to situations where there are a range of valid responses in order to make proposals

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## Section 6: Example candidate response

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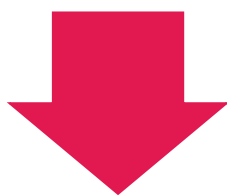
This section takes you through an example question and response. It will help you to see how to identify 'instruction words' (sometimes these are command words) within questions and to understand what is required in your response. An 'instruction word' or phrase, is the part of the question that tells you what you need to do with your knowledge, for example, you might need to describe something, explain something, argue a point of view or list what you know.

**All information and advice in this section is specific to the example question and response being demonstrated. It should give you an idea of how your responses might be viewed by an examiner but it is not a list of what to do in all questions. In your own examination, you will need to pay careful attention to what each question is asking you to do.**

This section is separated as follows.

### A. Question

The 'instruction' words in the question have been highlighted and their meaning explained. This should help you to understand clearly what is required by the question.



### B. Example candidate response

This is an model answer written in the style of a high level candidate response. Good points and problems have been highlighted.

## A. Question

The question used in this example is question 4 from Specimen Paper 4. The paper contains a number of documents which you will have studied while answering the first three questions of the paper.

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*You are advised to spend some time planning your answer before you begin to write it.*

'We should explore space.'

Construct a reasoned argument to support **or** challenge this claim, commenting critically on some or all of the documents and introducing ideas of your own. [27]

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Now let's look at the question to see what the 'instruction words' for this question mean for the answer.

You can choose either to support or challenge the claim made in the question, but you must provide a reasoned argument. It is therefore worth following the advice to plan your answer before writing it – identifying the main reasons that you wish to present and thinking about the logical order in which to introduce them. Answers do not have to argue a particular case to gain high marks – it is possible to gain full marks for an answer supporting the claim and for an answer challenging the claim.

There is also a requirement to comment critically on some or all of the documents, so you should ensure that your planning includes consideration of strengths and weaknesses in the reasoning within the documents, and whether the points made there support or challenge the claim.

A **strong** answer for question 4 should include:

- Clear structure and argument
- Critical, evaluative use of the documents
- Counter-arguments, including well-reasoned responses to them
- Valid conclusions and supported judgements.

Now let's look at the model responses to question 4.

## B. Example responses and comments

Two model responses are provided, one arguing in support of the claim and one arguing against it.

The model answer is presented on the left-hand side. The response has been typed and white spaces introduced between sections to make it easier to read. Comments are included to the right of the answer.

In this case, the examples are both high level responses to the question.

### Example response arguing in support of the claim:

*It is often said that humans are a curious species and this, in turn, is often cited as sufficient reason to spend money on space exploration, indeed it is mentioned early on in Doc 2 from NASA who, although they have a bias towards promoting the business in which they operate, undoubtedly have a lot of expertise. Satisfying human curiosity, however, is unlikely to convince everyone. We should explore space, and the reasons for this go well beyond mere curiosity.*

*It should be made clear that by 'explore space' I mean send crafts and people beyond the immediate confines of Earth's orbit for the purpose of gathering information about what is 'out there'. It is almost a given that the continued use of Earth-orbiting satellites is a worthwhile exercise, but we should not limit ourselves to this.*

*Space exploration has produced, and is likely to produce, benefits in terms of technological advancement that can be used on Earth. The author of Doc 1 claims the Apollo programme had no practical results and asks rhetorically of the Voyager space probe, 'What benefits has it brought?' The Apollo claim is plain wrong – most people are aware of the oft-cited Teflon and there are many other benefits from this and other space programmes. However, even if this claim in Doc 1 were correct, the absence of success in the past would not mean that future exploration would not bring benefits.*

*Doc 1 cites what are, on the face of it, more pressing problems here on Earth – diseases to cure, pollution to control, crops to improve. A flippant response would be that if we cure more diseases we will further increase an ageing population which would lead to more pollution and the requirement for more crops. More optimistically, it is possible, perhaps equally so, that technology or knowledge that helps with some of these problems would come from the space exploration or its development. Many discoveries*

The comment about Doc 2 includes a statement relating to the credibility of the source.

Clear statement of the conclusion.

The precise meaning attached to the phrase in the question is clarified.

The first reason supporting the conclusion is clearly stated, and one of the documents is referenced. There is a challenge to the claim in this document, and an indication of the flaw in using that reasoning to support the case for not exploring space.

A counter-argument from one of the documents is given and responded to effectively.

are made along the way as an unexpected by-product of scientific research.

Space exploration will bring economic benefits to the countries involved. Many gainsayers, including Doc 1, cite the enormous sums of money involved, and the claims about large sums of money could be corroborated by Doc 5. However, this is somewhat misleading as much of the 'wasted' money goes in wages to the people employed in the space programme which then feeds back into the economies of nations throughout the world, many of which are less wealthy. However, Doc 3 shows that it may well be possible to do things much more cheaply than the most commonly cited counter-examples. The exploration technology can then be sold to anyone who wishes to, for example, launch a commercial satellite.

Furthermore, space exploration might reduce our tendency to go to war with one another. Doc 5 presents some figures about spending on space programmes around the world. While Wikipedia is a notoriously unreliable source, 'hard' facts like this can be easily checked and are therefore likely to have some truth in them. The list seems to suggest that many of the agencies with smaller budgets will have to cooperate with one another or with the larger agencies in order to bring any projects to completion, perhaps in the style of the ESA, thus increasing international cooperation. Moreover, if it can be discovered that there is intelligent life outside the solar system, and it is very different from us, this might be reason for nationalistic squabbles over petty differences to subside.

Most governments like to keep the general public on side, particularly around elections and so many do not want to risk large proportions of their annual budget on uncertainly successful space missions. However, Doc 4 does imply that, in countries sampled at least, the public are on the side of space exploration.

This paragraph includes some discussion of the documents, including:

Recognising the corroboration between two documents.

A counter-assertion is responded to effectively, making use of evidence from one of the documents.

This paragraph introduces a second reason to support the conclusion and provides additional reasoning to support this point.

A further reason with supporting evidence from the text is provided in this paragraph, and a comment is made about

The 'reputable polling company' is likely to have some expertise in the accurate collection and representation of statistics and, as a commercial company, would not want to risk their reputation by publishing false or misleading statistics. It might be considered weak to generalise results from only 12 countries but, 12 countries from 3 continents could well represent a reasonable cross-section of world opinion, and certainly could reflect opinion within those countries sampled.

For many reasons, in addition to human curiosity, we should explore space. Indeed, one pressing Earth-based problem not mentioned by Doc 1 is that of global climate change, the consequences of which could be that the Earth becomes uninhabitable. If that happens our only solution as a species, or community of species, will be to go and live somewhere else, which will be hard to do if we do not explore space.

the representativeness of the small sample.

The final paragraph sums up the arguments presented concisely and clearly.

### Example response challenging the claim:

*It is often said that humans are a curious species and this, in turn, is often cited as sufficient reason to spend money on space exploration; indeed, it is mentioned early on in Doc 2. However, Doc 2 is written by NASA who, although likely to have some expertise, has a bias towards promoting the business in which it operates. Satisfying human curiosity is not a good enough reason to justify space exploration – we would never justify similar levels of spending on, for example, butterfly identification. We should not explore space, as it diverts precious resources from more pressing concerns here on Earth.*

*It should be made clear that by 'explore space' I mean send crafts and people beyond the immediate confines of Earth's orbit for the purpose of gathering information about what is 'out there'. It is true that the continued use of Earth orbiting satellites is a worthwhile exercise.*

*Space exploration has brought few tangible benefits. There exist many reports of serendipitous discoveries arising from space exploration but, when pressed, Teflon is the only example people ever come up with. Doc 1 claims there have been no benefits; this is a slight exaggeration but, despite Doc 1's hyperbole, the point remains that, in over 50 years, practical developments have been few. Spending similar sums in other spheres of innovation is just as likely to have yielded technological benefits. Indeed, Earth-bound projects have a higher probability of producing solutions to Earth-bound problems. Docs 1 and 5 cite enormous sums of money and none of the documents, even NASA, mentions specific commercial benefits from space exploration. Any commercial research and development project here on Earth with a budget in the \$ millions would soon be cancelled if it brought few tangible effects. Therefore, if space programmes were subject to the*

The first paragraph comments on the credibility of Document 2, and makes a clear statement of the conclusion, along with a brief statement of the main thrust of the argument that will be presented.

The precise meaning attached to the phrase in the question is clarified.

This paragraph gives the first reason in support of the conclusion and notes that Document 1 provides support to this view. There is a discussion about whether the claim in that document is correct, and the use of hyperbole within that document.

Reference is also made to potential flaws in reasoning that supports the case that space exploration has brought many benefits.



same constraints as commercial research and development programmes, they would presumably have been cancelled long ago.

Doc 1 cites some more-pressing problems here on Earth – diseases to cure, pollution to control, crops to improve. Although the author of Doc 1 is clearly biased, the point still stands. The money would be much better spent here on Earth, such as on the ‘poor sanitation’ in India mentioned in Doc 3.

Space exploration is very expensive, deep-space exploration even more so. Doc 3 suggests that affordable space travel might be upon us with the launch of the Indian Space Agency’s Mars mission. However, it is likely that the Mars mission itself is merely an expensive shop window display with which to advertise much more commercially viable low-Earth-orbit space technology. With this sort of project, India could really make money and do something about its sanitation problem.

Most governments like to keep the general public on side, particularly around elections and so most do not want to risk large proportions of their annual budget on uncertainly successful space missions. Doc 4 does imply that, in those countries sampled at least, the public are on the side of space exploration. However, the question ‘Do you agree that humans should explore space?’ is leading in the extreme. Undecided people are far more likely to answer in the affirmative. More telling is the lower levels of space-related enthusiasm among the older and, one could easily argue on the basis of experience, wiser generation. Thus, the graph in Doc 4 cannot be used to claim that space exploration is supported by informed public opinion.

There is an evaluative comment about one of the documents and a relevant reference to another.

The second point is made in this paragraph and is supported by evidence in the documents.

There is discussion of the validity of the evidence provided in Document 4.

*It has been said that space exploration might reduce our tendency to go to war with one another. India and Pakistan are famous rivals; Russia and China are close neighbours of India. According to Doc 5, all four countries have expensive space programmes (Pakistan less so). While Wikipedia is a notoriously unreliable source, 'hard' facts like the cost of a national space programme can be easily checked and are therefore likely to have some truth in them. The space race in general and the Indian space programme in particular seems likely to provide just another opportunity, or excuse, for petty nationalist posturing. While having a slightly shinier space rocket than your neighbour might not immediately lead to a declaration of war, it is unlikely to promote the spread of peace and harmony.*

*Humans are curious, but there are other ways to satisfy curiosity. The Earth is in trouble, the temperature is rising, the population is expanding, people are starving, biodiversity is reducing, and nuclear weapons have not gone away. We cannot afford to explore space and so we should not.*

A counter-assertion is given and responded to in a well-structured manner. The structure is clear and the supporting evidence is analysed carefully.

The final paragraph restates the conclusion clearly and concisely.

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## Section 7: Revision

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This advice will help you revise and prepare for the examinations. It is divided into general advice for all papers and more specific advice for Paper 1, Paper 2, Paper 3 and Paper 4.

Use the tick boxes  to keep a record of what you have done, what you plan to do or what you understand.

For more advice on revision, see the [Cambridge Learner Revision Guide](#) on our website.

### General advice

#### Before the examination

- Find out when the examinations are and plan your revision so you have time to revise. Create a revision timetable and divide it into sections to cover each topic.
- Find out how long each paper is, how many questions you have to answer, how many marks there are for each question, and work out how long you have for each question.
- Find out the choices you have on each paper, make sure you know how many sections there are and which sections you should answer from.
- When there is a choice of questions in a section, make sure you revise enough to have a choice.
- Know the meaning of the command words used in questions and how to apply them to the information given. Look at past examination papers and highlight the command words and check what they mean.
- Make revision notes. Try different styles of notes.
- Work for short periods then have a break. Revise small sections of the syllabus at a time.
- Test yourself by practising common procedures, such as working systematically through possible solutions or planning the structure of an argument.
- Make sure that you explain reasoning clearly by showing intermediate steps in calculations.
- Make your own dictionary or draw up a glossary of key terms for each section of the syllabus.
- Have a look at past questions so that you are clear of what to expect in an examination.
- Look at mark schemes to help you to understand how the marks are awarded for each question.

### In the examination

- Read the instructions carefully and answer the right number of questions from the right sections.
- Plan your time according to the marks for each question. For example, a question worth three marks requires less time and a shorter answer than one worth 10 marks. If a question has several parts, then the parts with more marks will need more time and more developed answers.
- Do not leave out questions or parts of questions. Remember, no answer means no mark.
- Read each question very carefully.
  - Identify the command words – you could underline or highlight them.
  - Identify the other key words and perhaps underline them too.
  - Try to put the question into your own words to understand what it is really asking.
- Read all parts of a question before starting your answer. Think carefully about what is needed for each part. You will not need to repeat material.
- Make sure that you understand which pieces of information are relevant to each question.
  - In problem solving questions make sure that you know which pieces of information from previous parts are still relevant.
  - In critical thinking questions make sure that you know which of the documents or sources you should be using for each question.
- Look very carefully at the resource material you are given.
  - Read the title, key, axes of graphs, etc. to find out exactly what it is showing you.
  - Look for dates, scale, and location.
  - Try using coloured pencils or pens to pick out anything that the question asks you about.
- Answer the question.** This is very important!  
Use your knowledge and understanding.  
Do not just write all you know, only write what is needed to answer the question.
- Plan your answers. Clear, concise, well-ordered, well-argued, well-supported answers get more marks than long, rambling, muddled, repetitious answers. Quality is better than quantity.
- Use technical terms in your answers as much as possible.
- Use the resource material given in the question to support your answer.
- Diagrams and written calculations can help you, and be used to support your answer. Use them whenever possible but do not then repeat the information in words.
- Make sure your writing is clear and easy to read. It is no good writing a brilliant answer if the examiner cannot read it!

### Paper 1 and 3 advice

- Show the steps required in any calculations that you need to do.
- When considering any scenario that requires searching through a set of possible solutions, work systematically to identify all of the possibilities.

### Paper 2 and 4 advice

- When evaluating the evidence, work through checking whether there is anything to say for each of the criteria.
- Plan your answers to the questions requiring arguments carefully by identifying each of the reasons you wish to use, etc.

## Revision checklists

In the next part of this guide we have provided some revision checklists. These include information from the syllabus that you should revise. They don't contain all the detailed knowledge you need to know, just an overview. For more detail see the syllabus and talk to your teacher.

The table headings are explained below:

Topic	You should be able to	R	A	G	Comments
<i>These are the core topics and advanced physical and human option topics</i>	<i>Content in the syllabus you need to cover</i>	<p>You can use the tick boxes to show when you have revised an item and how confident you feel about it.</p> <p>R = <b>RED</b> means you are really unsure and lack confidence; you might want to focus your revision here and possibly talk to your teacher for help</p> <p>A = <b>AMBER</b> means you are reasonably confident but need some extra practice</p> <p>G = <b>GREEN</b> means you are very confident.</p> <p>As your revision progresses, you can concentrate on the <b>RED</b> and <b>AMBER</b> items in order to turn them into <b>GREEN</b> items. You might find it helpful to highlight each topic in red, orange or green to help you prioritise.</p>			<p><i>You can:</i></p> <ul style="list-style-type: none"> <li><i>Add further information of your own, such as names of case studies needed.</i></li> <li><i>add learning aids, such as rhymes, poems or word play</i></li> <li><i>pinpoint areas of difficulty you need to check further with your teacher or textbooks</i></li> <li><i>include reference to a useful resource</i></li> </ul>

Note: the tables below cannot contain absolutely everything you need to know, but it does use examples wherever it can.

## Papers 1 [Problem Solving] and 3 [Problem Analysis and Solution]

Both papers test the same set of skills. In paper 3 the scenarios used to test the skills will be more complex and there will be more of a requirement to apply the skills in combination with each other.

Topic	You should be able to	R	A	G	Comments
1.1 Understand information presented as text, tables and diagrams.	<ul style="list-style-type: none"> <li>Understand information presented as text, tables and diagrams.</li> <li>Extract the information that is relevant to the problem to be solved.</li> <li>Extract data from related data sets that can be combined in the solution of a problem.</li> </ul>				
1.2 Understand the logical relationships between pieces of information.	<ul style="list-style-type: none"> <li>Understand descriptions of simple models.</li> <li>Identify necessary and sufficient conditions.</li> <li>Given a summary of some processed data, deduce some information about the original data.</li> </ul>				
2.1 Perform appropriate operations with information.	<ul style="list-style-type: none"> <li>Use one or more items of information appropriately to solve a given problem.</li> <li>Apply a model to a given situation.</li> </ul>				
2.2 Identify cases that satisfy given criteria.	<ul style="list-style-type: none"> <li>Search through all possible solutions to a problem to identify those which satisfy given criteria.</li> <li>Identify criteria that have not been met in a proposed solution.</li> </ul>				

Topic	You should be able to	R	A	G	Comments
2.3 Make appropriate deductions.	<ul style="list-style-type: none"> <li>Draw conclusions based on the information available.</li> </ul>				
3.1 Transform data.	<ul style="list-style-type: none"> <li>Recognise alternative representations of a set of information.</li> <li>Identify features of a model based on different types of representation.</li> </ul>				
3.2 Explain trends in data.	<ul style="list-style-type: none"> <li>Suggest possible explanations for trends in a set of data.</li> <li>Fit a model to the information available.</li> </ul>				
4.1 Identify the impact of a change to the problem.	<ul style="list-style-type: none"> <li>Consider the implications of a change to the scenario in which a problem is set.</li> </ul>				
4.2 Develop a model.	<ul style="list-style-type: none"> <li>Identify features of the situation being modelled which need to be included.</li> <li>Adjust a model to incorporate additional features.</li> </ul>				



Papers 2 [Critical Thinking] and 4 [Applied Reasoning]

Both papers test the same set of skills.

Topic	You should be able to	R	A	G	Comments
5.1 Evaluate evidence	<ul style="list-style-type: none"> <li>• Assess credibility of evidence                             <ul style="list-style-type: none"> <li>○ Reliability</li> <li>○ Plausibility</li> <li>○ Corroboration and consistency</li> </ul> </li> <li>• Assess representativeness of evidence                             <ul style="list-style-type: none"> <li>○ Number</li> <li>○ Selectivity</li> <li>○ Representativeness compared to the claim being made</li> <li>○ Assess presentation of data.</li> </ul> </li> </ul>				
5.2 Use evidence	<ul style="list-style-type: none"> <li>• Assess explanation for evidence.</li> <li>• Assess inference from evidence.</li> <li>• Suggest explanation for evidence.</li> <li>• Suggest inference from evidence.</li> <li>• Form a judgement based on multiple sources.</li> </ul>				
6.1	<ul style="list-style-type: none"> <li>• Recognise an argument.</li> </ul>				

Topic	You should be able to	R	A	G	Comments
Analyse the structure of arguments	<ul style="list-style-type: none"> <li>• Identify key elements of an argument and explain their function.</li> <li>• Identify unstated assumption in an argument.</li> </ul>				
7.1 Identify flaws in reasoning and assess their impact on the strength of the reasoning	<ul style="list-style-type: none"> <li>• Recognise and assess the impact of:             <ul style="list-style-type: none"> <li>○ Equivocation</li> <li>○ Conflation</li> <li>○ Circular argument</li> <li>○ Begging the question</li> <li>○ Invalid deduction</li> <li>○ Causal flaw</li> <li>○ Rash generalisation</li> <li>○ Sweeping generalisation</li> <li>○ Restriction of options (false dichotomy)</li> <li>○ Confusion of necessary and sufficient conditions</li> <li>○ Slippery slope argument</li> <li>○ Personal attack (<i>ad hominem</i>)</li> <li>○ Counter-attack (<i>tu quoque</i>)</li> <li>○ Straw man argument</li> </ul> </li> </ul>				

Topic	You should be able to	R	A	G	Comments
<p>7.2 Identify weaknesses in reasoning and assess their impact on the strength of reasoning</p>	<ul style="list-style-type: none"> <li>• Recognise and assess the impact of:                             <ul style="list-style-type: none"> <li>○ Support</li> <li>○ Consistency</li> <li>○ Reliance</li> <li>○ Appeal</li> <li>○ Analogy</li> <li>○ Responding to counter</li> </ul> </li> </ul>				
<p>8.1 Construct persuasive arguments</p>	<ul style="list-style-type: none"> <li>• Articulate a conclusion.</li> <li>• Provide reasons in support of a conclusion.</li> <li>• Develop strands of reasoning.</li> <li>• Structure reasoning by use of intermediate conclusions.</li> <li>• Strengthen reasoning by the use of appropriate elements:                             <ul style="list-style-type: none"> <li>○ counter-assertion/argument with response</li> <li>○ example</li> <li>○ evidence</li> <li>○ analogy</li> <li>○ hypothetical reasoning</li> </ul> </li> </ul>				

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