

MEI
STRUCTURED MATHEMATICS

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C4 COMPREHENSION

COMPREHENSION - the act or capability
of understanding; an extract from a
text set as an examination, with
questions designed to test
understanding of it

(The Concise Oxford Dictionary)

How does this definition relate to the C4
comprehension and how do we prepare
students for the examination?

Presenter: Val Hanrahan

The comprehension rationale is:

The aim of the comprehension question is to foster the view among students that in learning Mathematics, they are acquiring skills which transcend the particular items of specification content which have made up their course.

The objectives are that students should be able to:

- (i) read and comprehend a mathematical argument or an example of the application of mathematics;
- (ii) respond to a synoptic piece of work covering ideas permeating their whole course;
- (iii) appreciate the relevance of particular techniques to real-world problems.

The specification statement is:

‘The ability to read and comprehend a mathematical argument or an example of the application of mathematics.’

The competence statements and notes are:

1. Be able to follow mathematical arguments and descriptions of the solutions of problems when given in writing.
(This may be tested using a real-world modelling context.)
2. Understand the modelling cycle, and realise that it can be applied across many branches of mathematics.
(Abstraction from a real-world situation to a mathematical description; approximation, simplification and solution; check against reality; progressive refinement.)

Past history:

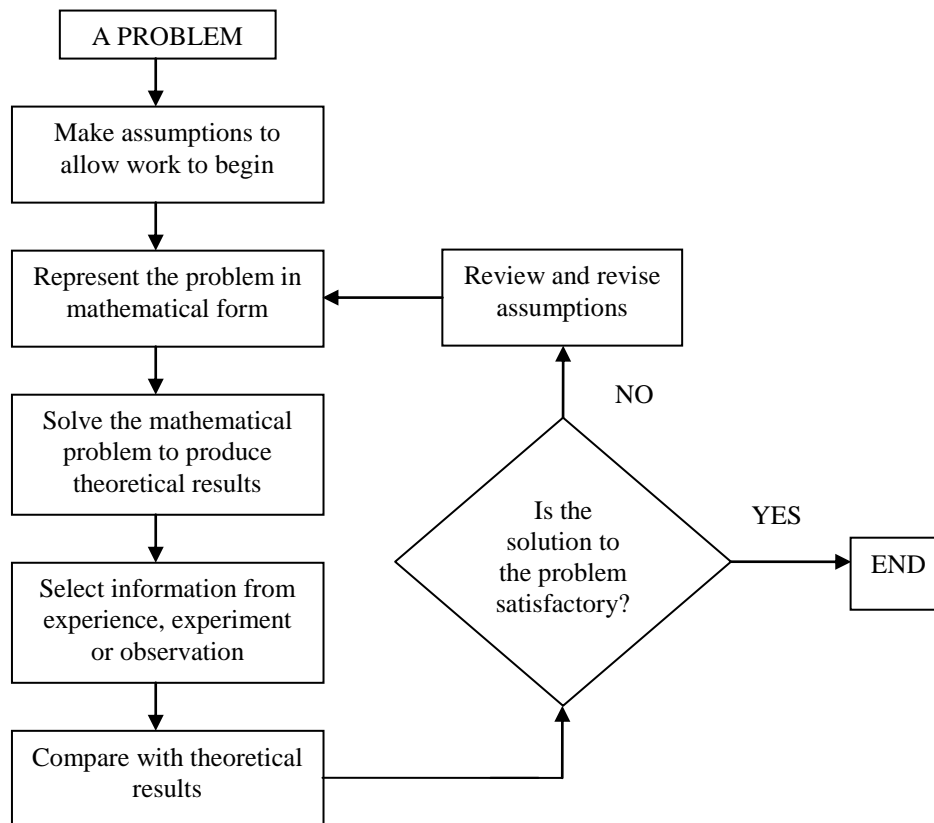
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| 1996-2000 | Tasks had a flavour of Statistics (to cover the variability element of the common core). They were marked out of 10. |
| 2000-2005 | Tasks were based on Pure Mathematics. They were marked out of 15 |
| 2005- | Tasks are still based on Pure Mathematics and are marked out of 18 |

Consequently the earlier comprehensions are no longer typical pieces. They may be used for practice so long as teachers and students are aware that those before 2000 could not be set and those for 2000-2005 do not have the right mark allocation.

Since 2000 there has been a printed question and answer booklet, rather like GCSE.

The modelling cycle

The modelling cycle is illustrated by a flow chart in the specification. The part which is relevant here is:



What skills are required for the C4 comprehension question?

Students need to learn how to:

- **read carefully** – not skim-read as they might read a novel. This could be set as homework and they could be asked to give a report on what they have read (oral communication) or possibly think up a question for the class to answer (one question per student is much easier than having to think up lots of them yourself!). Make sure that they realise that they need to know the answer.
- **understand** what they are reading - repeating passages if necessary – asking questions if they still don't understand. They may be required to read prose or a set of instructions. The mathematical content is not necessarily very advanced; in fact in some cases the mathematics is principally GCSE work.
- **be critical**. This comes naturally when you ask them to assess someone else's homework!

How best may students prepare for this part of the assessment?

- Use past papers, specimen papers and questions from the MEI Comprehension Pack. Past papers are available on the MEI site.
- It may also help if they are encouraged to **read** their Mathematics text book rather than just use it for the exercises.
- Read mathematics books and articles. Articles do not need to be wholly mathematical; Geography, Biology, Astronomy and Meteorology are among the topics that frequently give rise to suitable material. They may not fulfil the examination criteria, but that does not matter. Students should be encouraged to learn to assimilate mathematical ideas from the written word and not just from what the teacher tells them.

The Examination Question

The structure of the question is to assess a student's ability to:

- Interpret the information given.
- Explain the mathematics.
- Do some mathematics to extend the situation described.
- Do some mathematics in a similar, but different situation.
- Comment on a slightly different situation.

Care has been taken when preparing the questions to ensure that the language is readily accessible. However, candidates are allowed to take a standard English dictionary into the examination, and those for whom English is a second language are allowed a translation dictionary.

Suggested Procedure

- Read very carefully to get the gist of the article.
- Read again slowly, noting the mathematics that is required and mark any parts where there is a piece of mathematics about which you are not quite sure.
- Look at the questions and answer those you can.
- Consider the other questions, thinking them through carefully. Re-read the text as many times as necessary to understand what is being asked.
- Ensure that the work is written neatly and that you have left nothing on scrap paper that might be of use in the assessment.

Using the time allowed wisely

- Experience indicates that very few students fail to finish.
- The Specification allows up to an hour to finish and in general most students will need no more than 40 minutes. However, your examinations officer may wish to keep students at their desks for the full hour, as a steady trickle out of the room can be very disruptive for those remaining. Comprehensions from the current specification are longer than the earlier ones – be aware of this if you are using earlier questions as practice material and discourage students from rushing and trying to finish early.