Syllabus Thinking Skills 2021. (Problem solving Part)

The Thinking Skills subject content is divided into two parts, Problem Solving and Critical Thinking.

Problem Solving

The Problem-Solving content is presented in four areas:

- Organize information
- Process information
- Analyze data
- Consider wider problems.

Problem Solving is about making use of the information available to deduce further information, draw conclusions and make choices and decisions. Very often problems will involve numerical information, but problem solving is **not** a test of mathematics. Only basic numeracy is expected, although these numeracy skills are a vital part of the toolkit for solving many problems. Confidence in working with numerical information and performing mental arithmetic is therefore important for developing efficient problem-solving skills, but the focus of the syllabus is to develop the problem-solving skills themselves.
Students are expected to have basic numeracy skills, including understanding of percentages, ratio and proportion.
They should also understand the simple statistical measures of mean, median and mode, and be able to represent the chances of something happening in precise numerical terms (i.e. as a fraction, decimal or percentage). Simple algebraic skills can be a very powerful tool for problem solving, particularly for more complex problems. These skills include the ability to represent and manipulate information, and relationships between pieces of information, concisely and efficiently. However, these algebraic skills will never be assessed directly; the focus of the syllabus is on developing the student's ability to make valid problem-solving insights and deductions, whether they make use of these tools or not.

Assessment overview

Paper 1
Problem Solving 1 hour 30 minutes (50 marks)
Compulsory questions based on a variety of scenarios.
This paper assesses Problem Solving subject content.

Assessment objectives and weighting in %

The assessment objectives are:
1. Understand information and the relationships between different pieces of information. 30 %
2. Evaluate or process information in order to draw conclusions. 40 %
3. Suggest explanations, construct reasoned arguments and devise methods for solving problems. 30 %

Subject content

Candidates are expected to use these skills in Paper 1 Problem Solving.

1 Organize information

1.1 Understand information in the various forms in which it is presented
Candidates should be able to:
• Understand information presented as text, tables and diagrams
• Extract the information that is relevant to the problem to be solved
• Extract data from related data sets that can be combined in the solution of a problem

1.2 Understand the logical relationships between pieces of information

Candidates should be able to:	Guidance
• Understand descriptions of simple models • Identify necessary and sufficient conditions • Given a summary of some processed data, deduce some information about the original data	• Simple models may be described as: - instructions for calculations based on the value of some parameter, such as the distance to be travelled. The calculation to be performed may vary when the value of the parameter moves past a threshold value. -rules that should be followed, such as the ways in which traffic moves through a junction

2 Process information

2.1 Perform appropriate operations with information.

Candidates should be able to:	Guidance
• Use one or more items of information appropriately to solve a given problem • Apply a model to a given situation	The operations may involve performing some calculations. The operations to be performed may be obvious, such as when calculating the total price of a basket of shopping from the individual prices, or may need to be deduced, such as when working out the amount of time that needs to be allowed for a set of events to take place. Models may take a variety of forms, including calculations to be made based on a set of input data and simulations of events taking place over a period of time.

2.2 Identify cases that satisfy given criteria.

Candidates should be able to:	Guidance
• Search through all possible solutions to a problem to identify those which satisfy given criteria • Identify criteria that have not been met in a proposed solution	There may be only one possible solution that satisfies all the criteria or there may be a set that needs to be listed. In some cases, it may be required to know the number of solutions that satisfy the criteria. In problems that have been defined with a set of criteria, possible solutions need to be checked against each of the criteria to confirm that they are all met.

2.3 Make appropriate deductions.

Candidates should be able to:	Guidance
• Draw conclusions based on the information	Use pieces of information and the relationships that exist between them to determine new pieces of information. This could involve considering rules about the way in which numbers can be placed within a specified pattern or taking some examples of a given situation and working out a further case. Given a situation with a range of options available, consider the consequences of the different actions that could be taken and deduce which one gives the best outcomes. Given a set of numerical information, make inferences about the reasons why the data follows particular patterns.

3 Analyze data

3.1 Transform data.

Candidates should be able to:	Guidance
• Recognize alternative representations of a set of Information	Identify equivalent representations of data such as a pie chart that represents the same data as a bar chart. Identify relationships between features of an object, such as identical shapes in opposite corners of a tile so that copies of the same object can be identified after rotations or other transformations.
• Identify features of a model based on different types of representation	For example, from a graph representing a model, interpret the gradient appropriately in the context of the model.

3.2 Explain trends in data.

Candidates should be able to:	Guidance
• Suggest possible explanations for trends in a set of data	Including explanations for changes in the trend that occur at a particular point.
• Fit a model to the information available	Given the structure of a model, deduce the values for one or more of the parameters so that the model fits the information that is available. For example, in a situation where the prices for a number of taxi journeys are available this could involve deducing the price charged per kilometer travelled.

4 Consider wider problems

4.1 Identify the impact of a change to a problem.

Candidates should be able to:	Guidance
• Consider the implications of a change to the scenario in which a problem is set	Having solved a problem such as setting the timings at which a series of performances might take place, consider whether changes that could affect attendance such as a road closure increasing travelling times might require an adjustment to the solution found.

4.2 Develop a model.

Candidates should be able to:	Guidance
• Identify features of the situation being modelled which need to be included	Given a model and some information that does not follow the model precisely, identify features that should be included in the model to give a better representation.
• Adjust a model to incorporate additional features	Having identified features that need to be included within a model, consider the different ways in which these features could be incorporated into the model and assess them against the information that is available.

All the information about the course is in our MS Team.

Should you have any other concern, you may reach me at **gcasarreal52@dadeschools.net**