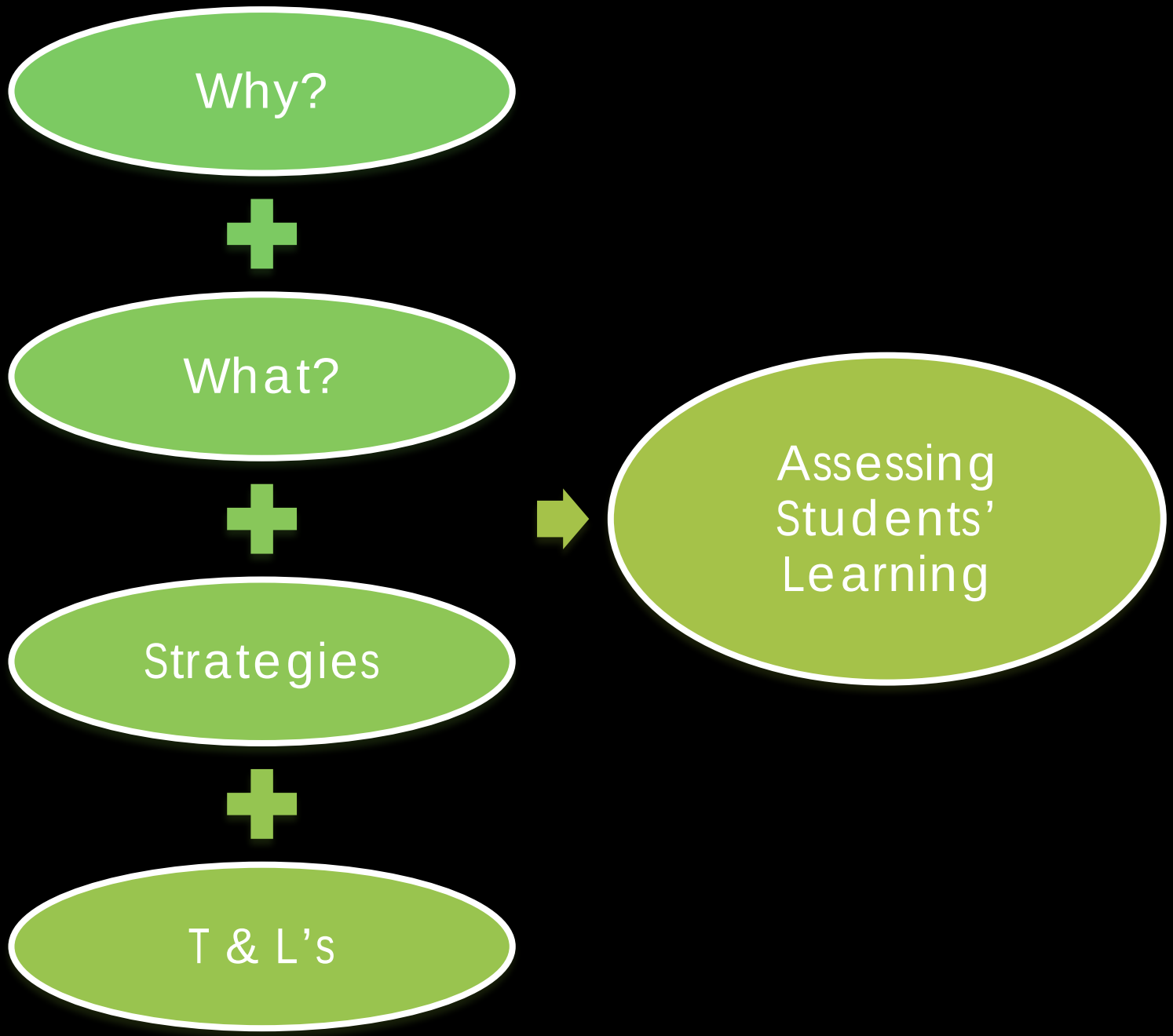
Assessment

Sample Paper 2010

Problem Solving



Syllabus

Junior Certificate

Students learn about:

Properties of lines and line segments including midpoint, slope, distance and the equation of a line in the form....

JCHL parallel and perpendicular lines and the relationships between the slopes.

Learning outcomes:

Students should be able to: explore the properties of points, lines and line segments including the equation of a line

JCHL find the slopes of parallel and perpendicular lines

Syllabus

Leaving Certificate

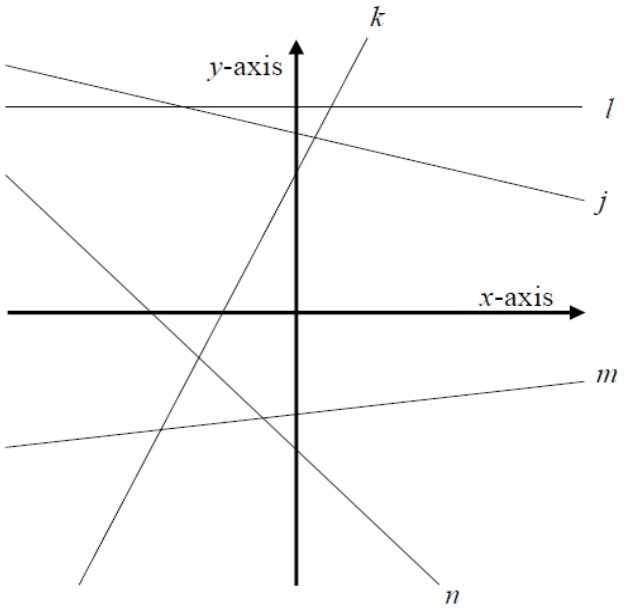
LCFL use slopes to show that two lines are

- parallel
- perpendicular

LCOL solve problems involving slopes of lines

Five lines j, k, l, m, and n in the co-ordinate plane are shown in the diagram.
The slopes of the five lines are in the table below.

slope	
2	
$\frac{1}{8}$	
0	
$-\frac{1}{4}$	
–1	

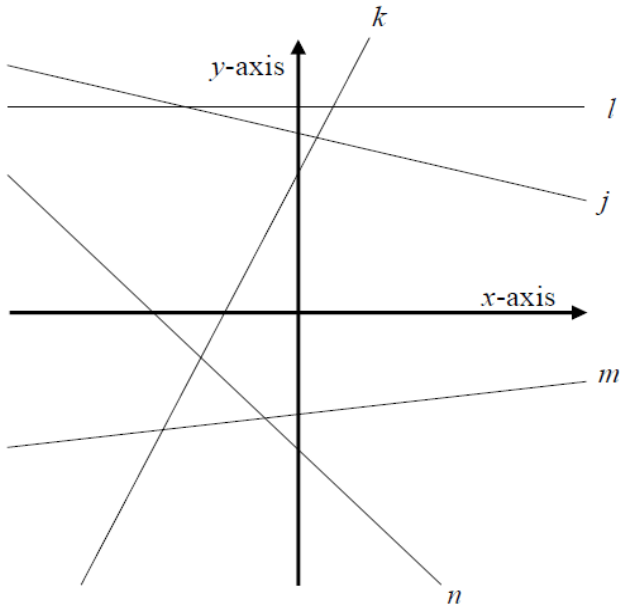


Five lines j, k, l, m, and n in the co-ordinate plane are shown in the diagram.

The slopes of the five lines are in the table below.

Complete the table, matching the lines to their slopes.

slope	line
2	*k*
$\frac{1}{8}$	*m*
0	*l*
$-\frac{1}{4}$	*j*
–1	*n*



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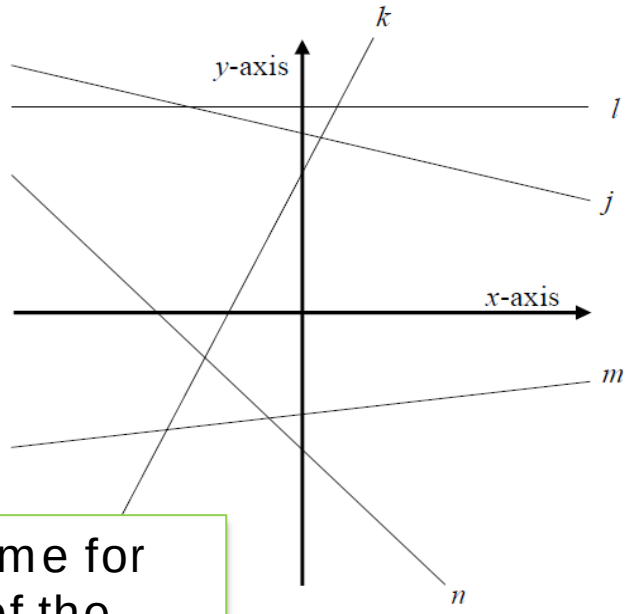


It may be noted that the marking scheme for part (a) was not based on how many of the particular cells were filled correctly. It was instead based on the level of understanding that is evident when the answer as a whole is considered. This minimises the effects of guessing and concentrates on rewarding evidence of achievement of the target skill.

Five lines j, k, l, m, and n in the co-ordinate plane are shown in the diagram.

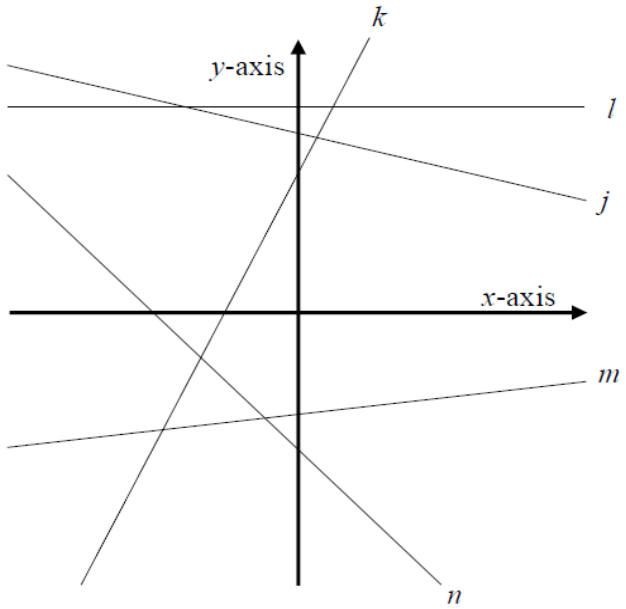
The slopes of the five lines are in the table below.

Complete the table, matching the lines to their slopes.

slope	line
2	*m*
$\frac{1}{8}$	*k*
0	*l*
$-\frac{1}{4}$	*n*
–1	*j*

Correct Answers

slope	line
2	*k*
$\frac{1}{8}$	*m*
0	*l*
$-\frac{1}{4}$	*j*
–1	*n*



Sample Answer A

Five lines j, k, l, m, and n in the co-ordinate plane are shown in the diagram.

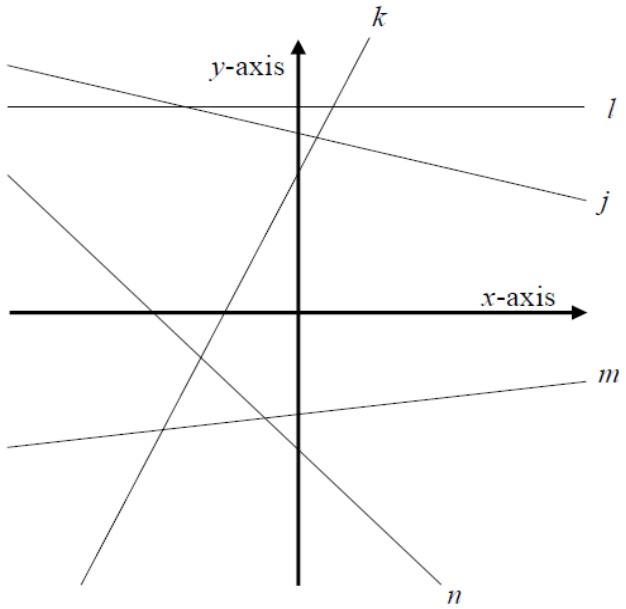
The slopes of the five lines are in the table below.

Complete the table, matching the lines to their slopes.

slope	line
2	*n*
$\frac{1}{8}$	*j*
0	*l*
$-\frac{1}{4}$	*m*
–1	*k*

Correct Answers

slope	line
2	*k*
$\frac{1}{8}$	*m*
0	*l*
$-\frac{1}{4}$	*j*
–1	*n*



Sample Answer B

Five lines j, k, l, m, and n in the co-ordinate plane are shown in the diagram.

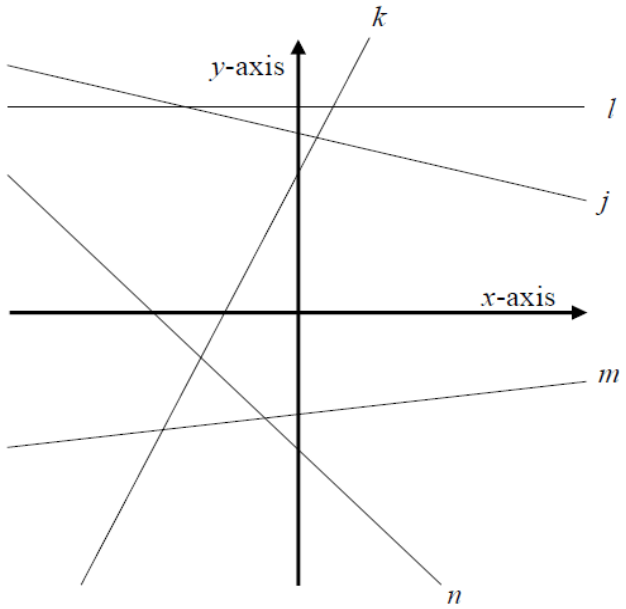
The slopes of the five lines are in the table below.

Complete the table, matching the lines to their slopes.

slope	line
2	*k*
$\frac{1}{8}$	*l*
0	*n*
$-\frac{1}{4}$	*m*
–1	*j*

Correct Answers

slope	line
2	*k*
$\frac{1}{8}$	*m*
0	*l*
$-\frac{1}{4}$	*j*
–1	*n*



Sample Answer C

Extract from Report

"The question should not have posed any difficulty for a candidate with an understanding of the concept of slope. The level of performance may be taken to indicate that concentration has remained on practicing routine procedures rather than on the development of ***conceptual understanding****"*

Extract from Report

"The question should not have posed any difficulty for a candidate with an understanding of the concept of slope. The level of performance may be taken to indicate that concentration has remained on practicing routine procedures rather than on the development of ***conceptual understanding****"*

Q3

Extract from Report

"The question should not have posed any difficulty for a candidate with an understanding of the concept of slope. The level of performance may be taken to indicate that concentration has remained on practicing routine procedures rather than on the development of ***conceptual understanding****"*

Q3

Q7

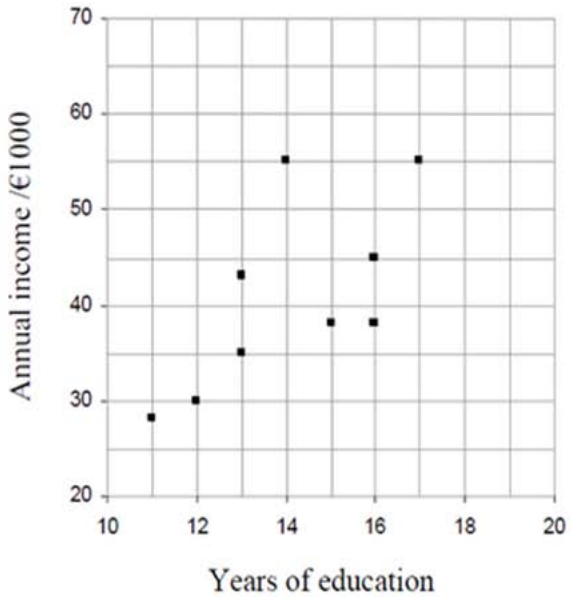
Ordinary level:

An economics student wants to find out whether the length of time people spend in education affects how much the earn. The student carries out a small study. She asks twelve adults to state their annual income and the number of years they spent in full-time education. The data are given in the table below, and a partially completed scatter plot is given.

Higher level:

An economics student is interested in finding out whether the length of time people spend in education affects the income they earn. The student carries out a small study. Twelve adults are asked to state their annual income and the number of years they spent in full-time education. The data are given in the table below, and a partially completed scatter plot is given.

Years of education	Income /€1,000
11	28
12	30
13	35
13	43
14	55
15	38
16	45
16	38
17	55
17	60
17	30
19	58



(i) The last three rows of data have not been included on the scatter plot. Insert them now.

(ii) What can you conclude from the scatter plot?

(iii) The student collected the data using a telephone survey. Numbers were randomly chosen from the Dublin area telephone directory. The calls were made in the evenings, between 7 and 9 pm. If there was no answer, or if the person who answered did not agree to participate, then another number was chosen at random.

Give **one** possible problem that might make the results of the investigation unreliable.

State clearly why the issue you mention could cause a problem.

(i) The last three rows of data have not been included on the scatter plot. Insert them now.

(ii) Calculate the correlation coefficient.

(iii) What can you conclude from the scatter plot and the correlation coefficient?

(iv) Add the line of best fit to the completed plot above.

(v) Use the line of best fit to estimate the annual income of somebody who has spent 14 years in education

(vi) By taking suitable readings from your diagram, or otherwise, calculate the slope of the line of best fit.

(vii) Explain how to interpret this slope in this context?

(viii) Same as **(iii)** over in blue.

List **three** possible problems regarding the sample and how it was collected that might make the results of the investigation unreliable. In each case, state clearly why the issue you mention could cause a problem.

Candidate Exemplars

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Full Credit

"In general, the longer a person stays at school the income they earn will be increased" p.70

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"In general, the longer a person stays at school the income they earn will be increased" p.70

Partial Credit

Not put in proper/original context:

"That it has a strong positive correlation" p.71

Candidate Exemplars

Full Credit

"In general, the longer a person stays at school the income they earn will be increased" p.70

Partial Credit

Not put in proper/original context:

"That it has a strong positive correlation" p.71

Oversimplifying:

"I can conclude that the more years spent in education the higher the annual income" p.71

Extract from Report

B (ii) OL:

Tested the candidates' capacity to interpret the information presented in order to draw a conclusion.

B (iii) OL & (viii) HL:

It is worth noting that this part did not require connections to be made between the mathematics and the context. This may indicate that candidates are relatively comfortable describing and understanding "real world" issues and concepts, but not as yet able to meaningfully relate these to the mathematics they are engaged in.

Leaving Certificate Paper 2 ONLY

for those sitting exam in 2012

Leaving Certificate Paper 2 ONLY

for those sitting exam in 2012

Higher level	All changed	
Section A	Concepts & Skills	150 marks
Section B	Contexts & Applications	150 marks

Leaving Certificate Paper 2 ONLY

for those sitting exam in 2012

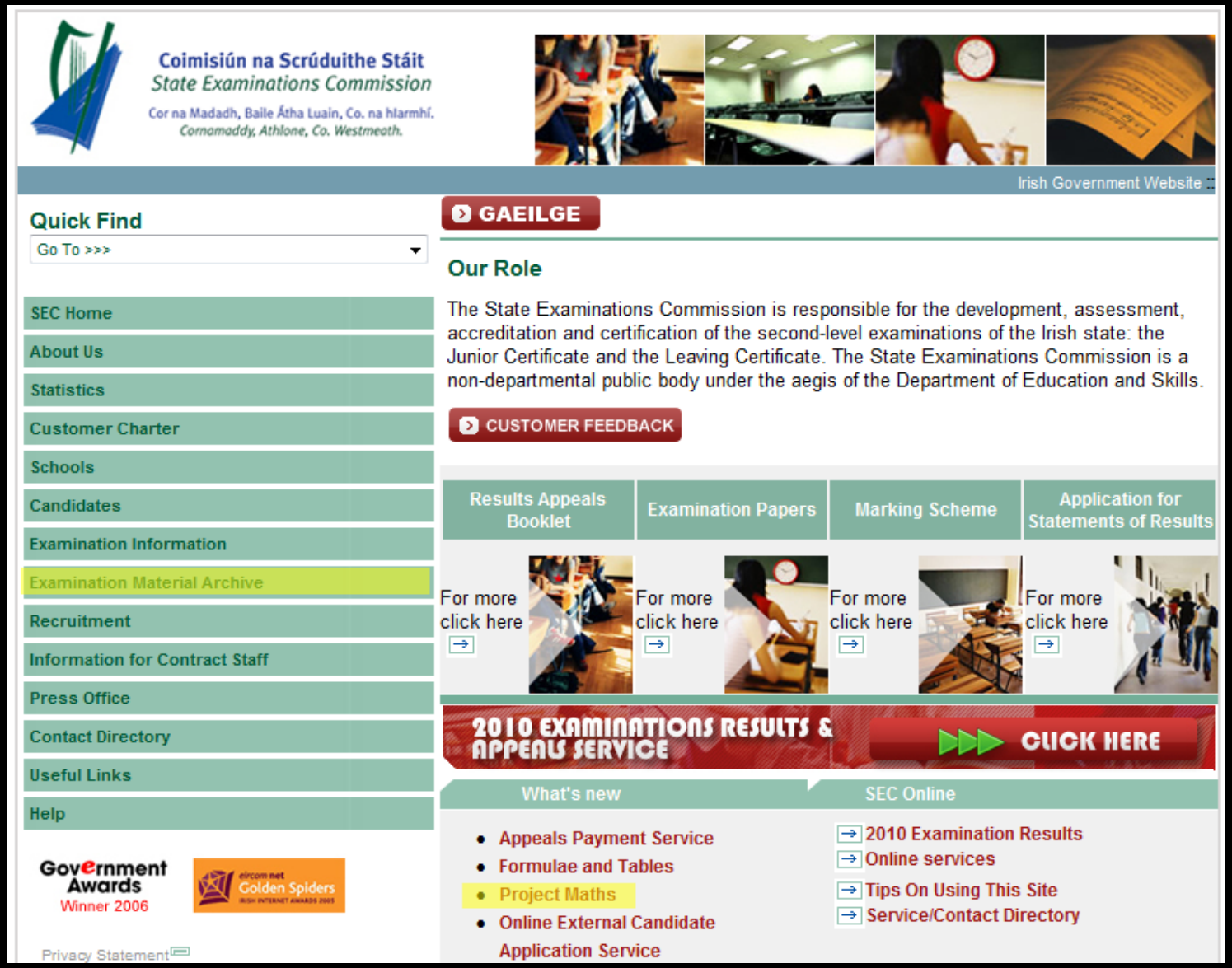
Higher level	All changed	
Section A	Concepts & Skills	150 marks
Section B	Contexts & Applications	150 marks
Ordinary level	Q1 same (A & V), rest changed	
Section O	Area & Volume (old syllabus)	50 marks
Section A	Concepts & Skills	125 marks
Section B	Contexts & Applications	125 marks

Leaving Certificate Paper 2 ONLY

for those sitting exam in 2012

Higher level	All changed	
Section A	Concepts & Skills	150 marks
Section B	Contexts & Applications	150 marks
Ordinary level	Q1 same (A & V), rest changed	
Section O	Area & Volume (old syllabus)	50 marks
Section A	Concepts & Skills	125 marks
Section B	Contexts & Applications	125 marks
Foundation level	Q1 & Q2 same (A & V), rest changed	
Section O	Area & Volume (old syllabus)	100 marks
Section A	Concepts & Skills	100 marks
Section B	Contexts & Applications	100 marks

www.examinations.ie



www.ncca.ie/projectmaths

NCCA

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Project Maths

Project Maths is a curriculum and assessment project in post-primary mathematics that began in 2008, arising from the NCCA Review of Mathematics. The project involves a phased change in the mathematics syllabus at junior cycle and senior cycle, with a corresponding incremental change in the examinations. Altogether, there are five syllabus strands in each of the syllabuses:

1. Statistics and probability
2. Geometry and trigonometry
3. Number
4. Algebra
5. Functions

An initial group of 24 schools introduced the first two revised syllabus strands in September 2008, and these have been refined in light of this experience. The first students from these schools to sit a changed examination paper were the Leaving Certificate class of 2010. In September 2010, these schools take the final step with the introduction of the fifth strand of the revised syllabuses.

National roll-out of the changes begins in September 2010, with the introduction of strands 1 and 2 in all schools. The changes will continue in September 2011 and 2012, until all five strands have been introduced in all schools.

Use the links below to find out more about the project, to look at student resources for strands 1 and 2, or to see what the revised syllabuses contain. There are also links to useful websites that contain other resources for mathematics.

Information

This section contains information about Project Maths for parents and students, as well as background information on the project. It also contains some Frequently Asked Questions.

Syllabuses & Assessment

Syllabuses are being introduced on a phased basis, with corresponding changes to the examinations. This section contains the syllabuses and assessment arrangements for the initial group of schools and also the syllabuses for all other schools.

Relevant Links

There are some useful resources available on Curriculum in Action and other websites. See inside for comments on and links to these sites.

Resources

A selection of resources for students can be accessed through this section. Some of these are multimedia presentations.

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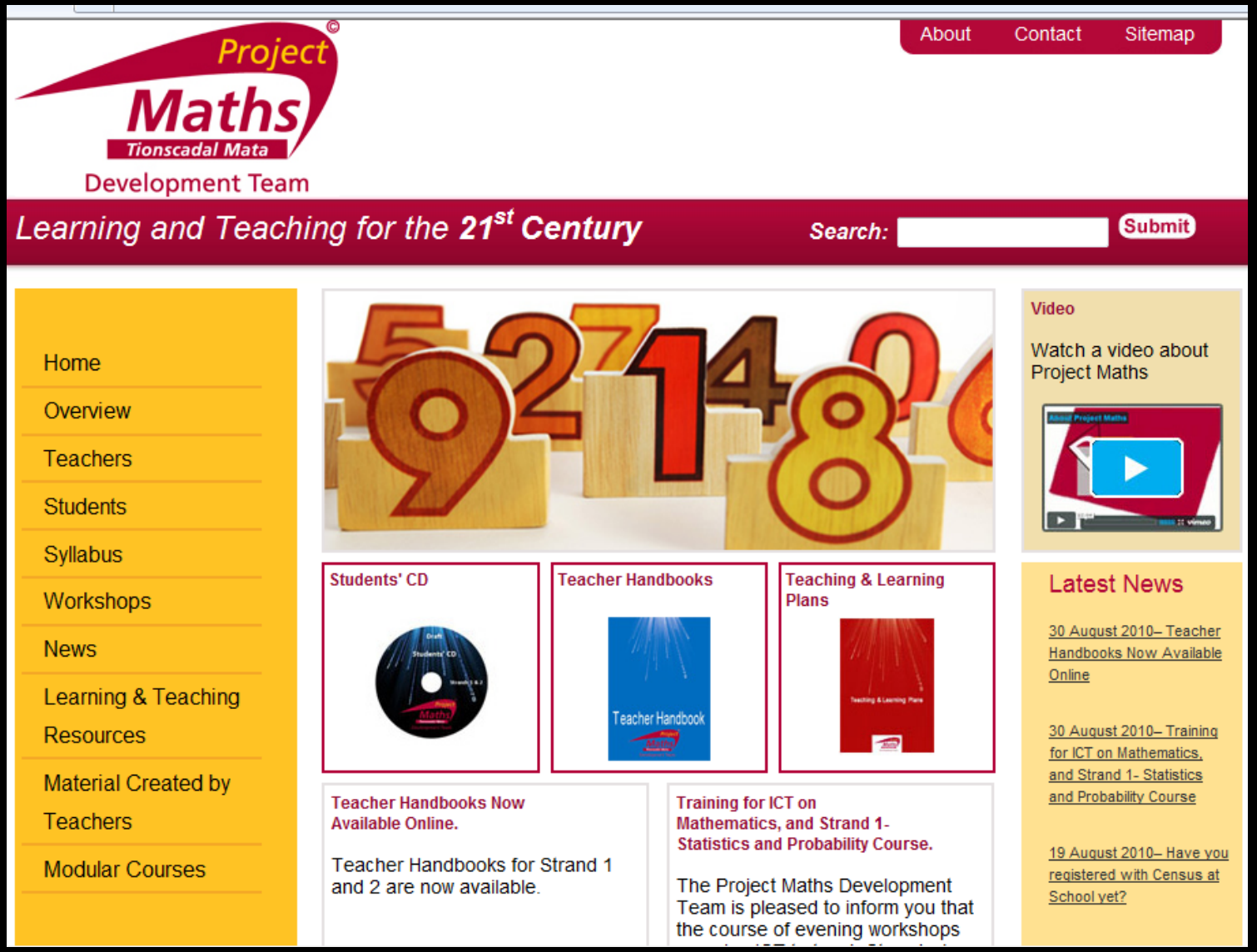
Assessment

- Prior knowledge
- Effective questioning
- Students exploring
- Students discussing
- Students explaining
- Group work
- Differentiation
- Monitor progress
  - Boards (Poster)
  - Self assessment
  - Wrong answers

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