VCE General Mathematics Unit 2

There are three components to mathematical investigation:

Formulation

Overview of the context or scenario, and related background, including historical or contemporary background as applicable, and the mathematisation of questions, conjectures, hypotheses, issues or problems of interest.

Exploration

Investigation and analysis of the context or scenario with respect to the questions of interest, conjectures or hypotheses, using mathematical concepts, skills and processes, including the use of technology and application of computational thinking.

Communication

Summary, presentation and interpretation of the findings from the mathematical investigation and related applications.

Sample Mathematical Investigation: globalisation, education and wealth

(adapted and reworked VCAA 2002 Further Mathematics task)

Formulation

The task uses data linked to globalisation and the wealth of countries compared with their educational level. Suitable data sets can be extracted from sites like [Our world in data](https://ourworldindata.org/charts): It focuses on the investigation of whether a relationship exists between literacy rate and wealth and OECD membership.

Exploration

Part 1

Locate and select a random sample of data from 50 countries associated with the variables of literacy rate, GDP and OECD status.

1. Construct a scatterplot showing literacy rates and GDP for the 50 countries.
2. Describe the association between the two variables linked to direction, form and strength.
3. Include a ‘line of good fit’ by eye and find its equation.
4. Describe the features of the ‘line of good fit’ in terms of the context of the investigation.
5. Use variation techniques to transform the GDP data and reconstruct the scatterplot.
6. Include a ‘line of good fit’ and construct its equation.

Part 2

Separate the random selection of data into OECD and non-OECD countries.

1. Construct separate scatterplots for the OECD and non-OECD countries showing the literacy rates against GDP. Include a ‘line of good fit’ by eye for each scatterplot.
2. Discuss the features of each line and describe any differences or similarities linked to the context of the investigation.
3. Redraw the scatterplots to show the relationship between literacy rates and the transformed set of data that best linearises the scatterplot information.

Communication

Analyse and discuss any findings, justifying any conclusions that are drawn and present your information in a structured report.

Areas of study

The following content from the areas of study is addressed through this learning activity.

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| **Unit 2** | | |
| **Area of study** | **Topics** | **Content dot points** |
| Data analysis, probability and statistics | Investigation relationships between two numerical variables | 1, 2, 4, 5 |
| Functions, relations and graphs | Variation | 2, 3 |

Outcomes

The following outcomes, key knowledge and key skills are addressed through this task.

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| **Unit 2** | | |
| **Outcome** | **Key knowledge dot point** | **Key skills dot point** |
| 1 (AOS: Data analysis, probability and statistics) | 1, 2, 4 | 1, 2, 3, 4 |
| 1 (AOS: Functions, relations and graphs) | 2, 3 | 2, 3 |
| 2 | 1, 2, 3, 4 | 1, 2, 3, 4 |
| 3 | 1, 2, 3, 4, 5 | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 |