

CASE STUDY: Global Warming - the forest from the trees

Guidelines for use of the case study within the Stage 6 Advanced Mathematics Draft Syllabus Topic PMA6 - Data Analysis

Case Study		NSW Stage 6 Advanced Mathematics Draft Syllabus	
Page No.	Page title	Page No.	Statement
1-2	"Global Warming -the forest from the trees"	6	<p>2. Rationale Mathematics is deeply embedded in modern society. From the numeracy skills required to manage personal finances, to making sense of data in various forms, to leading-edge technologies in the Sciences and Engineering ...</p> <p>The need to interpret the large volumes of data made available through technology draws on skills in logical thought and in checking claims and assumptions in a systematic way ...The thinking required to enhance further the power and usefulness of technology in real-world applications requires advanced mathematical training. ...</p>
5-6	"4. Different ways of presenting the same data" and supporting Excel® data files	70	PMA6.1: Types of variables, measures of location and spread (variability), graphical and tabular representations of data
7	"5. Long term trends in temperature data from different sites" and supporting appendices 4, 4(a), 4(b) and 4(c)	72-73	<p>PMA6.2: Correlation and regression</p> <ul style="list-style-type: none"> - constructing scatterplots by hand and with suitable technology - describing patterns (if any) in the scatterplot, and what this indicates about the relationship (or lack of relationship) between the variables - technology (spreadsheets, graphing calculators) should be used to create data displays and to calculate correlation coefficients and trendlines.
8-10	"6. A graphical analysis of the long term temperature data for Newcastle" and supporting appendices 5, 6 and 7	72-73	<p>PMA6.2: Correlation and regression</p> <ul style="list-style-type: none"> - constructing scatterplots by hand and with suitable technology - describing patterns (if any) in the scatterplot, and what this indicates about the relationship (or lack of relationship) between the variables - technology (spreadsheets, graphing calculators) should be used to create data displays and to calculate correlation coefficients and trendlines.
11-14	"7. Comparing temperature anomalies" and "8. Calculation of the annual mean temperatures from the maxima and minima" and "9. Comparison of mean temp anomaly trends for selected rural stations"	72-73	<p>PMA6.2: Correlation and regression</p> <ul style="list-style-type: none"> - describing patterns (if any) in the scatterplot, and what this indicates about the relationship (or lack of relationship) between the variables - using a line of best fit to interpolate - Technology (spreadsheets, graphing calculators) should be used to create data displays and to calculate correlation coefficients and trendlines.
15	"10. Averaging temperature anomalies for whole regions" and supporting appendix 8	68	<p>PMA6 Data Analysis Outcomes addressed</p> <p>A student:</p> <p>PA1 provides reasoning to support conclusions appropriate to the context</p> <p>PA2 uses algebraic and graphical concepts in the solution of problems involving functions and coordinate geometry</p> <p>PA8 uses concepts and techniques from descriptive statistics to present and interpret data</p> <p>PA12 interprets and uses mathematical language.</p>
16	"11. Average temperature anomaly trends in Vic, NSW, QLD"	68	<p>PMA6 Data Analysis Outcomes addressed</p> <p>A student:</p> <p>PA1 provides reasoning to support conclusions appropriate to the context</p> <p>PA2 uses algebraic and graphical concepts in the solution of problems involving functions and coordinate geometry</p> <p>PA8 uses concepts and techniques from descriptive statistics to present and interpret data</p> <p>PA12 interprets and uses mathematical language.</p>
17-18	"12. Global Warming?" and "13. Postscript – The Newcastle High Quality Dataset" and supporting appendix 9	13	<p>Objectives Knowledge, understanding and skills</p> <p>Students will develop the ability to:</p> <ul style="list-style-type: none"> • apply deductive reasoning, and use appropriate language, in the construction of proofs and mathematical arguments • interpret solutions to problems and communicate Mathematics in appropriate forms. <p>Values and attitudes</p> <p>Students will develop:</p> <ul style="list-style-type: none"> • appreciation of the scope, usefulness, power and elegance of Mathematics



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Guidelines for use of the case study in other areas of the NSW curriculum; Stage 5 Science, Stage 5 Geography and Stage 6 Earth and Environmental Science.

Case Study		NSW Syllabus connections
Page No.	Page title	Stage 5 Science, Stage 5 Geography, and Stage 6 Earth and Environmental Science
1-2	"Global Warming - the forest from the trees"	Science 5.19: uses critical thinking skills in evaluating information and drawing conclusions Geography Stage 5 Focus Area E1 Physical Geography: climate, weather, climate change, analyse climate data from a variety of sources Earth and Environmental Science Stage 6 P14: draws valid conclusions from gathered data and information
3-4	"Long term Temperature Records"	Geography Stage 5 Focus Area E1 Physical Geography: climate, weather, climate change, analyse climate data from a variety of sources Earth and Environmental Science Stage 6 P12: discusses the validity and reliability of data gathered from first-hand investigations and secondary sources, P13: identifies appropriate terminology and reporting styles to communicate information and understanding
5-6	"4. Different ways of presenting the same data" and supporting Excel® data files	Science 5.17: explains trends, patterns and relationships in data and/or information from a variety of sources Science 5.18: presenting information (e), (f) Geography 5.3: selects and uses appropriate written, oral and graphic forms to communicate geographical information Earth and Environmental Science Stage P13: identifies appropriate terminology and reporting styles to communicate information and understanding
7	"5. Long term trends in temperature data from different sites" and supporting appendices 4, 4(a), 4(b) and 4(c)	Science 5.18: presenting information (e), (f) Earth and Environmental Science Stage P13: identifies appropriate terminology and reporting styles to communicate information and understanding
8-10	"6. A graphical analysis of the long term temperature data for Newcastle" and supporting appendices 5, 6 and 7	Science 5.16 (c): extract information from column graphs, histograms, divided bar and sector graphs, line graphs, composite graphs, flow diagrams, other texts and audio/visual resources Geography 5.3: selects and uses appropriate written, oral and graphic forms to communicate geographical information Earth and Environmental Science Stage 6 P12: discusses the validity and reliability of data gathered from first-hand investigations and secondary sources, P13 identifies appropriate terminology and reporting styles to communicate information and understanding
11-14	"7. Comparing temperature anomalies" and "8. Calculation of the annual mean temperatures from the maxima and minima" and "9. Comparison of mean temp anomaly trends for selected rural stations"	Science 5.17: explains trends, patterns and relationships in data and/or information from a variety of sources Earth and Environmental Science Stage 6 P12: discusses the validity and reliability of data gathered from first-hand investigations and secondary sources, P13: identifies appropriate terminology and reporting styles to communicate information and understanding
15	"10. Averaging temperature anomalies for whole regions" and supporting appendix 8	Earth and Environmental Science Stage 6 P12: discusses the validity and reliability of data gathered from first-hand investigations and secondary sources,
16	"11. Average temperature anomaly trends in Vic, NSW, QLD"	Science 5.19: A student uses critical thinking skills in evaluating information and drawing conclusions. Earth and Environmental Science Stage 6 P14: draws valid conclusions from gathered data and information
17	"12. Global Warming?"	Earth and Environmental Science Stage 6 P14: draws valid conclusions from gathered data and information

