SACE BOARD
SOUTH AUSTRALIA

Summary of subject outline changes for 2023

Introduction

Subject outlines with editorial changes for 2023 have been published online.

Changes are made to the subject outlines on the basis of:

- removing ambiguity and improving consistency
- updating information
- removing potential tripwires for students.

Subject outlines with changes for 2023 are listed below.

- Biology (Stage 2)
- Chemistry (Stage 2)
- Locally assessed languages at continuers level (Stage 1 and Stage 2)
- Media Studies (Stage 1 and Stage 2)
- Nutrition (Stage 2)
- Physical Education (Stage 1)
- Specialist Mathematics (Stage 2)
- Physics (Stage 2)
- Scientific Studies (Stage 2)

Schools should ensure they are using the current published subject outline for 2023 for all teaching, learning, and assessment in all subjects.

Stage 2 Biology

Changes for clarity, currency, and additional context and guidance in some of the 'science understandings' and 'possible contexts' tables.

Topic 1: DNA and proteins

p.14 — third paragraph under 'science understanding' add '(histones)' after 'In eukaryotes, DNA is bound to proteins'.

p.15 — first row, new dot point under 'science understanding' to read, 'Recognise that DNA strands are directional and are read 5' to 3'.'

p.15 — second row, new paragraph under 'possible contexts' to read, 'Consider the types of bonding that contribute to the levels of protein structure, including peptide bonds for primary structure, hydrogen bonding for secondary structure and disulfide bridges for tertiary structure'.

p.16 — second row, minor rewording to first paragraph under 'science understanding' for clarity.

p.16 — second row, reword dot point under 'science understanding' to read, 'Recognise that changes in DNA methylation and histone modification can alter gene expression.

p.18 — second last dot point under 'science understanding' to read, 'Describe how CRISPR such as CRISPR-Cas9 can be used to edit and/or transfer genes.

Topic 2: Cells as the basis for life

p.20 — last row under 'science understanding', minor change to 'vacuole', and 'Golgi body (including vesicles)'

p.20 — last row, last dot point under 'science understanding' to read 'Compare the structures of plant, animal, and fungal cells'.

p.21 — first row, fifth dot point under 'science understanding' remove '(anaerobic respiration)' (as repeated from point above).

p.23 — third row, second dot point under 'science understanding' to read 'Recognise, describe, represent, and name the phases of mitosis in eukaryotic cells'.

p.23 — last row, first dot point under 'science understanding' to read 'Recognise, describe, represent, and name the phases of meiosis in eukaryotic cells'.

Topic 3: Homeostasis

p.27 — first row, fourth dot point under 'science understanding' to read 'Describe the effect of antidiuretic hormone (ADH) on the nephron in osmoregulation'.

Topic 4: Evolution

p.30 — third row, under 'science understanding', reword 'DNA sequencing' to read, 'DNA sequencing, including rRNA gene sequencing in prokaryotes.' Delete 'rRNA gene sequencing'.

p.33 — third row under 'science understanding' dot point 1 amended to read, 'Describe the process of allopatric speciation'. Different selection pressures may lead to divergent evolution or adaptive radiation. Dot point 2 amended to read, 'Recognise and give examples of divergent evolution and adaptive radiation'.

p.34—amend to:

Science understanding	**Possible contexts**	
Succession is the gradual change in the mix of species in an area over time, following a disturbance. • Describe the processes of primary and secondary succession.	Discuss examples of primary succession, such as on lava islands resulting from volcanic action. Discuss examples of secondary succession after a catastrophe such as a bushfire.	

Assessment Type 1: Investigations Folio

Practical Investigations

p.37 — change 'must' to 'should' to read 'A practical report should include'.

Stage 2 Chemistry

Changes for clarity, currency, and additional context and guidance in some of the 'science understandings' and 'possible contexts' tables.

Content

p.5 — Inclusion of a table listing all subtopics for Stage 2.

Subtopic 1.1: Global warming and climate change

p.14 — first row, new fourth paragraph introduces additional contexts under 'possible contexts'. *An Inconvenient Sequel: Truth to Power and the 2021 film https://www.thecarbonmovie.com provide further resource'.*

p.14 — last paragraph under 'science understanding', change 'skeletons' to 'exoskeletons'.

p.15 — new first dot point under 'science understanding', 'Explain, using equilibrium principles, the impact of altering ocean pH on the formation of carbonates'.

p.15 — new third paragraph under 'possible contexts', 'Research one or more recent strategies proposed to reduce ocean acidification'.

Subtopic 1.2: Photochemical smog

p.16 — Reword first dot point under 'science understanding', to read 'Write equations and explain the conditions necessary for the formation of nitrogen oxides NO and NO_2.

Subtopic 1.3: Volumetric analysis

p.17 — last paragraph under 'possible contexts', to read 'Investigate how modern titration techniques improve the efficiency of quality control in industries producing wine, food, pharmaceuticals, cosmetics, or other chemicals'.

Subtopic 1.5: Atomoic spectroscopy

p.19 — remove third paragraph 'View Chemical Analysis 1 from VEA . . . '.

Subtopic 3.4: Carbohydrates

p.29 — move last sentence under 'science understanding' to first dot point 'In aqueous solution, monosaccharides exist in an equilibrium between a ring and a chain form.

p.29 — Remove last dot point under 'science understanding'.

Subtopic 3.8: Amides

p.33 — reword last paragraph under 'possible contexts' to read, 'Investigate current examples where natural fibres have been replaced by synthetic fibres and there have been unexpected consequences for society'.

Subtopic 3.9: Triglycerides

p.34 — reword first dot point at bottom of page to read, 'Explain how the structure of these carboxylate ions allow them to form micelles in solutions'.

Subtopic 3.10: Proteins

p.35 — reword last paragraph under 'possible contexts' to read, 'Explore how the work of scientists from various disciplines contributes to the development of the technique of amino acid sequencing and how this technique contributes to our knowledge of protein function'.

Subtopic 4.1: Energy

p.37 — minor word changes under 'science understanding'.

p.39 — Addition of paragraph under 'science understanding', to read, 'Hydrogen is a fuel that is produced from fossil fuels, biomass, or water.

- Compare the benefits of producing hydrogen from each of these three sources.
- Describe the benefits of using hydrogen rather than fossil fuels as a fuel.

Subtopic 4.2: Water

p.39 — minor addition to second paragraph under 'science understanding'.

Subtopic 4.4: Materials

Science understanding columns.

p.42 — (polymers) minor rewording to last two dot points under 'science understanding', to read, 'Explain how the structure of a polymer relates to its biodegradability', and 'Explain the advantages of polymers that are biodegradable'.

p.43 — (metals) minor rewording to fourth paragraph for clarity, 'The method used in the reduction stage in the production of a metal is related to the reactivity of the metal and the energy requirement for the reaction'.

p.44 — (recycling) minor rewording to second last dot point, to read, 'Explain the uses of composite materials in terms of the advantages offered'.

Assessment Type 1: Investigations Folio

Practical Investigations

p.47 — change 'must' to 'should' to read 'A practical report should include'.

Science as a Human Endeavour

Locally Assessed Languages at Continuers Level (Stage 1 and Stage 2)

Chinese, French, German, Indonesian, Italian, Japanese, Modern Greek, Spanish, Vietnamese

Inclusion of non-binary pronouns

Add a sentence to the overview of each language's grammar section, in Appendix A: Language-specific information (p.40-81) that 'the correct use of recognised non-binary pronouns is acceptable in examination and school assessment responses'.

Stage 1 Media Studies

Changes are editorial in nature and remove references to obsolete technology and terminology.

Content

p.7 — Topic 2: Making of the News — Add new fourth dot point.

'To what extent is the use of 'breaking' and current news accessed through dynamic mediums (such as websites) contributing to the quality of information?

p.9 — Topic 8: Media and Leisure — Rewrite to read: 'Media are major providers of entertainment and leisure opportunities in the community. People engage with the media for a variety of activities including playing games and exploring personal interests'.

p.10 — Topic 9: Media and the Global Community – Rewrite first paragraph to read: 'The use of technology has meant that media messages can be received from anywhere and has broken down traditional national boundaries. As potential creators and users of media products, students have access to the world. The use of technology has meant that media messages can be received from anywhere and has broken down traditional national boundaries. In this topic students examine the ways in which media have an impact on, and respond to, the global community.'

Assessment Type 3: Product

p.14 — reword 'radio productions that include music, sound effects, and spoken dialogue should be a maximum of 20 minutes. Radio productions that exclude music should be a maximum of 5 minutes'.

to read:

'Podcasts and other radio productions that include music, sound effects, and spoken dialogue should be a maximum of 20 minutes. Podcasts or radio productions that exclude music should be a maximum of 5 minutes'.

Stage 2 Media Studies

Changes are editorial in nature, remove references to obsolete technology and terminology, and encompass contemporary trends in media engagement among young people.

Content

p.21 — Media Audiences — replace 'radio station', with 'media sources'.

p.23 — Topic 4: Music and Media — 2nd dot point add 'or streaming services', to read: 'To what extent has internet file-sharing of music or streaming services challenged traditional music producers, publishers, and distributors'.

Assessment Type 2: Product

p.30 — reword 'radio productions that include music, sound effects, and spoken dialogue should be a maximum of 20 minutes. Radio productions that exclude music should be a maximum of 5 minutes'.

to read:

'Podcasts and other radio productions that include music, sound effects, and spoken dialogue should be a maximum of 20 minutes. Podcasts or radio productions that exclude music should be a maximum of 5 minutes'.

Stage 2 Nutrition

Changes are for clarity, currency, and additional context and guidance in some of the 'science understandings' and 'possible contexts' tables.

Science Inquiry Skills

P9 — remove the dot point 'improvements' from left hand column, third row.

Topic 1: Principles of nutrition, physiology, and health

P14 — First row, third dot point under 'Nutrition Understanding', add, '. . with reference to the Australian Macronutrient Distribution Range (AMDR).

P14 — Fifth dot point under 'Nutrient reference values', add the word 'estimated', to read, 'estimated energy requirement (EER)'.

P14 — Remove last dot point, 'EARs for energy throughout the life cycle'.

P14 — Second row, under 'Nutrition Understanding', for clarity and specificity, add, 'Digestion of macronutrients and their resulting building blocks', 'the chemical digestion of macronutrients involving their respective enzymes'. Add 'gastric pepsin', 'pancreatic amylase and lipase', 'intestinal sucrase, maltase and lactase'. Remove 'lipase' as standalone dotpoint.

P15 — First row, add separate points, 'mastication', 'peristalsis', 'emulsification of bile'. Add 'role of large intestine in digestion', and 'the role of prebiotics and probiotics in maintaining and enhancing the diversity of the microbiome'.

P17 — Third row (Vitamins) new dot point, 'Vitamin K and its link to microbiome'. (Minerals) add new dotpoint, 'iodine'.

Topic 2: Health promotion and emerging trends

P21 — Moved two dot points under 'Nutrition Understanding' for better flow from p.24 'Food processing techniques: freezing, canning/bottling and pasteurization', and 'Advantages and disadvantages of metal, plastic, paper, glass, and active packaging'.

P21 — Second last dot point to read, 'nutrition value per 100 grams to compare food products and help consumers make informed decisions'.

P21 — 'Possible contexts', first row, add 'Research the pros and cons of two food-processing techniques, such as preservation (e.g. freezing, canning, pasteurisation and fortification)', and move paragraph from p.24 'Conduct an experiment to measure microbe development on specific foods under varying conditions'.

Topic 3: Sustainable food systems

P25, 26, 27 — Some amendments to the columns 'Nutrition Understanding', and 'Possible Contexts' for clarity, including relocating some examples.

Under 'Production and distribution', expand the dot points for clarity, to include, 'Monoculture', 'livestock farming', organic farming', 'aquaculture', 'commercial fishing', 'natural resources', 'environment and pollution', 'food waste', with examples under each.

Transfer information under 'processing', to 'research and development'.

Assessment Type 1: Investigations Folio (Design practical investigation)

P30 — minor amendments to wording of the specifications for clarity. First dot point to read, 'designing an appropriate method for investigation with justification', and 'The design practical investigation should be up to a maximum of 3 sides of an A4 page. This evidence must be attached to the practical report'.

Assessment Type 3: Examination

P35 — Remove the specific features assessed in the examination (IAE3, KA1, KA2, KA3) and replace with the generic statement 'All specific features of the assessment design criteria may be assessed in the external examination', to be consistent with other science subjects.

Stage 1 Physical Education

The proposed changes align with Stage 2 Physical Education. The digital version of the subject outline will be updated in January 2023.

Learning requirements

LR3 — Apply communication and collaborative skills in physical activity contexts' to read: 'Apply collaborative skills in physical activity contexts'. (Removing 'communication')

LR6 — Communicate using subject-specific terminology in a variety of modes' to read: 'Use subject-specific terminology'. (Removing 'communicate').

Focus Area 2: Through Movement

Addition of a new key idea and consideration to include collaborative skills.

Collaboration for physical activity purposes	• application of collaborative skills to suit the physical activity context, e.g. communication, building shared understanding, collectively contributing, regulating behaviour. • Utilising collaborative strategies to achieve common goals related to physical activity.

Assessment Type 2: Physical Activity Investigation

Adjustment to wording to provide greater clarity of the requirements to read:

'Students participate in one or more physical activities to investigate how personal, social, and cultural factors influence participation.

Assessment design criteria

Removal of 'communication'.

- *Application and Communication* title to read 'Application' only (e.g. change AC1, AC2, AC3 to A1, A2, and A3)
- *AC2 — Application of communication and collaborative skills*, to read: A2 — Application of collaborative skills.
- *AC3 — Communication using subject-specific terminology*, to read: A1 — Use of subject-specific terminology.

Performance standards

The performance standards will be updated to reflect these changes.

	Application	Exploration, Analysis, and Reflection
A	Astute and highly effective application of knowledge and understanding to movement concepts and strategies. Focused and sustained application of collaborative skills. Highly effective use of accurate subject-specific terminology.	No change
B	Effective application of knowledge and understanding to movement concepts and strategies. Mostly thorough and sustained application of collaborative skills. Effective use of accurate subject-specific terminology.	No change
C	Generally effective application of knowledge and understanding to movement concepts and strategies. Competent application of collaborative skills. Generally effective use of subject-specific terminology with some accuracy.	No change
D	Some application of knowledge and understanding to movement concepts and strategies. Some application of collaborative skills. Some use of subject-specific terminology.	No change
E	Attempted application of knowledge and understanding to movement concepts and strategies. Attempted application of collaborative skills. Attempted use of subject-specific terminology.	No change

Stage 2 Physics

Changes are for clarity, currency, and additional context and guidance in some of the 'science understandings' and 'possible contexts' tables.

Science Inquiry Skills

p.8 — add new dot point to last row under 'possible contexts': 'Using proportionality arguments to explore changes to quantities'.

Subtopic 1.1: Projectile motion

p.14 — minor changes to wording and formula in first row under 'science understanding'.

p.15 — minor change to second last dot point, replace ‘range’ with ‘maximum height’.

p.17 — reword second last dot point under ‘science understanding’ to read ‘Draw vector diagrams in one dimension or in two dimensions (with right-angled or equilateral triangles) in which . . .’

p.18 — add new third dot point under ‘science understanding’, to read ‘Use vector addition or subtraction in one dimension or in two dimensions (with right-angled or equilateral triangles) to solve problems using the law of conservation of momentum’.

Subtopic 1.3: Circular motion and gravitation

p.19 — reword first paragraph under ‘science understanding’, to read, ‘Centripetal acceleration occurs when the acceleration of an object is perpendicular to the velocity of an object. . . .

p.20 — remove bullet point ‘Explain that the acceleration of a projectile is always downwards and independent of its mass’.

p.21 — rewording of dot points under ‘Kepler’s Second Law of Planetary Motion’, under ‘science understanding’.

Subtopic 1.4: Relativity

p.23 — remove second paragraph ‘Two events that appear . . . ‘ under ‘science understanding’.

p.23 — minor rewording of paragraph 3, ‘The Theory of Special Relativity is based on two postulates. The first postulate is that the laws of physics are the same in all inertial reference frames. The second postulate is that the speed of light in a vacuum is an absolute constant’.

p.24 — some minor word changes under ‘science understanding’. Remove first dot point, ‘Calculate time dilation factors for subatomic particles’. Minor rewording to second dot point, ‘Calculate and compare lifetimes and therefore distances travelled . . .’. ‘An object moving at relativistic speeds is shorter to an observer. . . ‘.

Subtopic 2.1: Electric fields

p.26 — some minor word changes under ‘Science understanding’. Third dot point, change ‘Explain that’, to read, ‘Describe how’.

p.27 — Last row under ‘Science understanding’, amend to read, ‘. . . for one isolated point charge.’ ‘Use vector addition in one dimension or in two dimensions (with right-angled or equilateral triangles) to determine the magnitude and direction of an electric field due to two point charges).’

p.28 — Last dot point, change ‘Describe’, to ‘Explain’.

Subtopic 2.2: Motion of charge particles in electric fields

p.29 — minor wording change to second dot point under ‘science understanding’, to read, ‘Convert energy values between joules and electronvolts’.

p.30 — minor word changes to dot points under ‘science understanding’. Replace ‘ion’ with ‘charged particle’.

Subtopic 2.3: Magnetic fields

p.32 — minor changes to some wording under ‘science understanding’. ‘Magnetic fields are associated with permanent magnets and moving charges . . . ‘.

p.32 — First row, first dot point, add he words, 'a bar magnet, and', to read, 'Sketch and/or interpret the magnetic field lines produced by a bar magnet, and an electric current . . .'.

p.32 — Last row, amendments to formulae for clarity. Add new dot point, 'Use vector addition in one dimension or in two dimensions (with right-angled or equilateral triangles) to calculate the magnitude and direction of the magnetic field due to two current-carrying conductors.

Subtopic 2.4: Motion of charged particles in magnetic fields

p.33 — some rewording of first two paragraphs, and fourth paragraph under 'science understanding'.

p.34— add sentence to bottom of 'science understanding' to read 'to relate the period to the frequency of the alternating potential difference'.

Subtopic 2.5: Electromagnetic induction

p.36 — minor change to formula and removal of last sentence 'Lenz's Law states that . . . ' under 'science understanding'.

p.36 — include new first dot point under 'science understanding' to read 'Lenz's Law states that the direction of a current created by an induced emf is such that it opposes the change in magnetic flux producing the emf'.

p.37 — Rewording of second paragraph under 'science understanding', and inclusion of new dot point 'Explain how a transformer increases or decreases an alternating potential difference'.

Subtopic 3.1: Wave behaviour of light

p.39 — minor changes to first dot point, replace 'radio or television' with 'electromagnetic' in two places under 'science understanding'.

p.39 — Some rewording to last paragraph under 'science understanding', 'Coherent waves maintain a constant phrase relationship with each other'.

p.40 — Last row, last dot point reword to read, 'Describe how two-slit interference is produced in the laboratory using coherent light'.

p.41 — add the words '*transmission diffraction* grating' throughout 'science understanding'.

Subtopic 3.2: Wave-particle duality

p.43 — replace sentence, 'Calculate the energy and momentum . . .' with 'Solve problems using $E = hf$ and $p = \frac{h}{\lambda}$ under 'science understanding'.

p.43 — reword first two paragraphs under 'science understanding'.

p.45 — minor changes to first dot point and addition of new dot point 'Describe the energy changes that occur during the production of X-rays, including the heat produced', under 'science understanding'.

p.45 — add new dot point to last row to read 'Explain the effect of manipulating the filament current or potential difference across the X-ray tube on an X-ray spectrum'.

pp.46 —whole section under 'science understanding' reworded for clarity:

Subtopic 3.3: Structure of the atom

p.47 — reword first dot point under 'science understanding' to read 'Describe the changes in the spectrum of an incandescent source as the temperature of the incandescent source increases'.

p.47 — add sentence to second row to read 'An atom is an excited state when an electron has been raised to a higher energy level'.

p.47 — add new dot point to read 'Solve problems that require comparing spectra of different elements'.

pp.48 — science understanding column and some dot points reworded for clarity

Subtopic 3.4: Standard model

pp.51-53 — rewording and reformatting of information for clarity under 'science understanding'.

Stage 2 Scientific Studies

Changes are for clarity, currency, and additional context and guidance in some of the 'science understandings' and 'possible contexts' tables.

p.21 — add reference to the ACER Collaboration: Skill Development Framework, to 'possible contexts' column.

Assessment Type 2: Collaborative Inquiry Task

pp.28-29 — Some reordering and rewording of information to allow students to focus on the effectiveness of collaboration.

The collaborative inquiry comprises two parts:

1. Collaborative inquiry design — students produce a 'personal journal'
2. Collaborative inquiry evaluation — students produce a 'recorded presentation'.

The requirements of the two parts of this assessment type have been reconfigured so that the collaborative enquiry evaluation focuses entirely on the evaluation of the collaborative skills demonstrated by the group in their work. The following rearrangement of task requirements have been made:

- Collaborative inquiry design – now includes the analysis of data, the evaluation of procedures and the conclusion
- Collaborative inquiry evaluation – now includes all aspects of the task that require the students to collaborate (identification and deconstruction of the problem, formulating the investigable question/hypothesis, identifying variables and designing and implementing appropriate procedures, collecting data).

Assessment Type 3: Individual Inquiry

pp.30-31 — The individual inquiry task specifications currently indicates there are three parts:

- the design proposal undertaken as part of the school assessed tasks for AT1: Inquiry Folio. (*This is part of the school assessment and is not assessed with the external assessment*).
- the practical investigation

- a practical report of the findings of the investigation, which is submitted for external assessment.

Remove the reference to the design proposal (first dot point) and clarify the sections of the report that are included in the word count, as follows:

> The practical report should be a maximum of 1500 words, if written, or a maximum of 9 minutes for an oral presentation, or the equivalent in multimodal form. It is anticipated that students will submit their report electronically.
>
> Only the following sections of the report are included in the word count:
> - introduction
> - analysis of results
> - evaluation of procedures
> - conclusion and justification

Stage 2 Specialist Mathematics

Minor changes to the key questions, concepts, and considerations for developing teaching and learning strategies.

p.10 — **Subtopic 1.1: Proof by mathematical induction**

after:

for all $n \in Z^+$

add:

- Prove the nth derivative, for example

  When $y = pe^{px}$ then $\frac{\mathrm{d}^n y}{\mathrm{d}x^n} = p^{n+1}e^{px}$

- See 2.1 re De Moivre's theorem

p.12 — **Subtopic 2.1: Cartesian and polar forms**

Calculators can be used~~, both to check calculations and enable students to consider examples that are not feasible by hand.~~

p.21 — **Subtopic 3.3: Sketching graphs**

Key questions and key concepts	**Considerations for developing teaching and learning strategies**
How can available information be put together to deduce the behaviour of various functions that are composite functions? • The definition of the absolute value function $\lvert x\rvert = \begin{cases} x & x \geq 0 \\ -x & x < 0 \end{cases}$	Algebraic treatment of absolute value functions.
• Absolute value function properties	The graphical treatment of $y = \lvert x\rvert$.

Key questions and key concepts	Considerations for developing teaching and learning strategies
• Compositions involving absolute values and reciprocals	If $f(x)$ is some given function, investigate the relationship between the graphs of $y = f(x)$ and the graphs of these compositions: $y = \frac{1}{f(x)}$, $y = \lvert f(x) \rvert$, $y = f(\lvert x \rvert)$. Note: when referring to $\frac{1}{f(x)}$, $f(x)$ is linear, quadratic, or trigonometric.
• Graphs of rational functions	Sketch the graphs of rational functions where the numerator is up to and including degree 3 and denominator is up to and including degree 2. Students may use technology to determine the behaviour of the function near the asymptotes.

p.24 — **Subtopic 4.2: Vector and Cartesian equations**

Remove 'Winplot', from first consideration.

• $\lvert \boldsymbol{a} \times \boldsymbol{b} \rvert$ is the area of the parallelogram with sides represented by vectors $\boldsymbol{a}$ and $\boldsymbol{b}$	The cross-product of two vectors $\boldsymbol{a}$ and $\boldsymbol{b}$ in three dimensions is a vector, mutually perpendicular to $\boldsymbol{a}$ and to $\boldsymbol{b}$, whose length is the area of the parallelogram determined by $\boldsymbol{a}$ and $\boldsymbol{b}$. The components and the vector itself may be expressed using determinants.

p.28 — **Subtopic 5.1: Integration techniques**

Under 'key considerations' remove 'Compare the case' and formula.

Under 'considerations' column, replace with below:

Key questions and key concepts	**Considerations for developing teaching and learning strategies**
• Find and use the derivatives of these functions • Hence integrate expressions of the form $\frac{\pm 1}{\sqrt{a^2 - x^2}}, \frac{a}{a^2 + x^2}$	Use implicit differentiation and trigonometric identities to obtain the results. For example, when $y = \sin x$, then interchanging the x and y terms gives $x = \sin y$. Then $\frac{\mathrm{d}}{\mathrm{d}x}(x) = \frac{\mathrm{d}}{\mathrm{d}x}(\sin y)$ $1 = \cos y \times \frac{\mathrm{d}y}{\mathrm{d}x}$. Hence, using the trigonometric identity, $\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{1}{\pm\sqrt{1 - x^2}}$, but $\frac{\mathrm{d}y}{\mathrm{d}x}$ is positive (seen by the slope of the tangents to the graph of $y = \sin x$), hence $\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{1}{\sqrt{1 - x^2}}$.

p.34 — **Subtopic 6.3: Pairs of varying quantities — polynomials**

In the subheading, and in first paragraph remove 'of degree 1 to 3'.

Remove last paragraph and reword to read, 'A further example of an application' to read 'A further example of an application is Bézier curves.

p.35 — **Subtopic 6.4: Related rates, velocity, and tangents**

Add '2D' to curves

Key questions and key concepts	**Considerations for developing teaching and learning strategies**

p.37 — Add new section below:

Consider a moving point in 3D

- For a moving point $\left(x(t), y(t), z(t)\right)$, the vector of derivatives $\underset{\sim}{v} = \left[x'(t),\ y'(t),\ z'(t)\right]$ is naturally interpreted as its instantaneous velocity and the speed of the moving point is the magnitude of the velocity vector, that is, $\sqrt{\underset{\sim}{v} \bullet \underset{\sim}{v}} = \sqrt{\left(x'(t)\right)^2 + \left(y'(t)\right)^2 + \left(z'(t)\right)^2}$.
- The arc length of the parametric curve is $l = \int_a^b \sqrt{v \bullet v}\,\mathrm{d}t$.

p.38 — **Subtopic 6.5: Trigonometric parameterisations**

Add 'Considerations of trigonometric parametric curves may also be in 3D' as last dot point under 'key questions'.