

Victorian Essential Learning Standards – Standards – Level 6

Physical, Personal and Social Learning strand

Health and Physical Education

Movement and physical activity

At Level 6, students demonstrate proficiency in the execution of manipulative and movement skills during complex activities. They demonstrate advanced skills in selected physical activities. They use training methods to improve their fitness level, and participate in sports, games, recreational and leisure activities that maintain regular participation in moderate to vigorous physical activity. They employ and devise skills and strategies to counter tactical challenges in games situations. They assume responsibility for conduct of aspects of a sporting competition in which roles are shared and display appropriate sporting behaviour.

Health knowledge and promotion

At Level 6, students identify and describe a range of social and cultural factors that influence the development of personal identity and values. They identify and explain the rights and responsibilities associated with developing greater independence, including those related to sexual matters and sexual relationships. They describe mental health issues relevant to young people. They compare and evaluate perceptions of challenge, risk and safety. They demonstrate understanding of appropriate assertiveness and resilience strategies. They analyse the positive and negative health outcomes of a range of personal behaviours and community actions. They identify the health services and products provided by government and non-government bodies and analyse how these can be used to support the health needs of young people. They identify and describe strategies that address current trends in the nutritional status of Australians. They analyse and evaluate the factors that affect food consumption in Australia.

Interpersonal Development

Building social relationships

At Level 6, students demonstrate awareness of complex social conventions, behaving appropriately when interacting with others. They describe how local and global values and beliefs determine their own and others' social relationships. They evaluate their own behaviour in relationships, identify potential conflict and employ strategies to avoid and/or resolve it.

Working in teams

At Level 6, students work collaboratively, negotiate roles and delegate tasks to complete complex tasks in teams. Working with the strengths of a team they achieve agreed goals within set timeframes. Students describe how they respect and build on the ideas and opinions of team members and clearly articulate or record their reflections on the effectiveness of learning in a team. They develop and implement strategies for improving their contributions to achieving the team goals.

Personal Learning

The individual learner

At Level 6, students work independently to implement a range of strategies, as appropriate, to maximise their learning. They monitor and reflect on and discuss their progress as autonomous learners, identifying areas for improvement in their learning and implementing actions to address them. Students seek and respond to feedback from peers, teachers and other adults to develop and refine their content knowledge and understanding, identifying areas for further investigation. They evaluate the effectiveness of their learning strategies, study techniques and learning habits, and make appropriate modifications. They identify their interests, strengths and weaknesses and use these to determine future learning needs, especially in relation to the post-compulsory pathways.

Students identify the ethical frameworks that underpin their own and others' beliefs and values and describe how the conflicts and dilemmas they identify may affect learning. They determine, monitor and modify learning improvement goals, taking into account current and future learning needs. They determine the factors that contribute to the creation of positive learning environments and establish, follow and monitor protocols for a variety of learning situations.

Managing personal learning

At Level 6, students initiate personal short-term and long-term learning goals and negotiate appropriate courses of action to achieve them. Students allocate appropriate time and identify and utilise appropriate resources to manage competing priorities and complete tasks, including learner-directed projects, within set timeframes. They initiate and negotiate a range of independent activities with their teachers, providing progress and summative reports for teachers and stakeholders. They monitor and evaluate the effectiveness of their task and resource management skills, reflecting on their progress and suggesting and implementing appropriate management strategies for improvement. They take responsibility for their learning environments, both at school and at home, anticipating the consequences of their actions. They demonstrate control of impulses and mood modulation. Students review and modify the criteria they use to check that their work is relevant, accurate and meets task objectives and make appropriate changes to completed tasks using these criteria. They identify and refine the strategies they use to study, organise and revise their work, both at school and at home.

Victorian Essential Learning Standards – Standards – Level 6

Civics and Citizenship

Civic knowledge and understanding

At Level 6, students describe the origins and nature of Australia's federal political system and present a considered point of view on an issue about change in the political system and the law. They explain how the Australian Constitution affects their lives, and human rights issues, both national and international. They explain how citizens influence government policy through participation in political parties, elections and membership of interest groups. They explain the development of a multicultural society and the values necessary to sustain it. They describe the election processes in Australia and how to vote. They explain the roles and responsibilities of courts at state and federal levels and evaluate a change in the law. They analyse how well democratic values are reflected in aspects of the Australian political system. They take a global perspective when analysing an issue, and describe the role of global organisations in responding to international issues.

Community engagement

At Level 6, students draw on a range of resources, including the mass media to articulate and defend their own opinions about political, social and environmental issues in national and global contexts. They contest, where appropriate, the opinions of others. They develop an action plan which demonstrates their knowledge of a social or environmental issue and suggest strategies to raise community awareness of it. They participate in a range of citizenship activities including those with a national or global perspective, at school and in the local community.

Discipline-based Learning strand

The Arts

Creating and making

At Level 6, within and across areas of specialisation, students apply decision making skills to find the most effective way to implement ideas, design, create and make arts works devised from a range of stimuli, demonstrating development of a personal style. They evaluate, reflect on, refine and justify their work's content, design, development and their aesthetic choices. Students realise their ideas, represent observations and communicate their interpretations by effectively combining and manipulating selected arts elements, principles and/or conventions to create the desired aesthetic qualities. Independently and collaboratively, they apply their knowledge and understanding to design, create and produce arts works influenced by the style of particular artists or cultures. They vary the content, structure and form of their arts works to suit a range of purposes, contexts, audiences and/or the conventions of a specific style, and demonstrate technical competence in the use of skills, techniques and processes. They effectively use a range of traditional and contemporary media, materials, equipment and technologies. They maintain a record of how ideas develop in the creating, making and presenting of their arts works.

Exploring and responding

At Level 6, students observe, research and critically discuss a range of contemporary, traditional, stylistic, historical and cultural examples of arts works in the disciplines and forms in which they are working. They analyse, interpret, compare and evaluate the stylistic, technical, expressive and aesthetic features of arts works created by a range of artists and made in particular times and cultural contexts. They describe and discuss ways that their own and others' arts works communicate and challenge ideas and meaning. They use appropriate arts language and, in the arts works they are exploring and responding to, refer to specific examples. They comment on the impact of arts works, forms and practices on other arts works and society in general.

The Humanities - Geography

Geographic knowledge and understanding

At Level 6, students explain the operation of a major natural system and its interaction with human activities. They evaluate the consequences of the interaction and develop a policy to address an issue related to it. Students describe global patterns of development from a range of perspectives and identify and describe the factors that determine these patterns. They analyse development issues and formulate and evaluate comprehensive policies, including those for sustainable use and management of resources, to alter development patterns at a range of scales. They use evidence based on their inquiries and geographical language and concepts.

Geospatial skills

At Level 6, students accurately interpret information on different types of maps and photographs at a range of scales, and use map evidence to support explanations, draw inferences and predict associated outcomes. They collect and collate information gathered from fieldwork observations and present their findings observing geographical presentation conventions.

Languages Other Than English

Different standards apply depending on the chosen language category and pathway. See the *Standards for LOTE domain* document for details.

Victorian Essential Learning Standards – Standards – Level 6

English

Reading

At Level 6, students read, view, analyse, critique, reflect on and discuss contemporary and classical imaginative texts that explore personal, social, cultural and political issues of significance to their own lives. They also read, view, analyse and discuss a wide range of informative and persuasive texts and identify the multiple purposes for which texts are created. They explain how texts are shaped by the time, place and cultural setting in which they are created. They compare and contrast the typical features of particular texts and synthesise information from different texts to draw conclusions.

Writing

At Level 6, students write sustained and cohesive narratives that experiment with different techniques and show attention to chronology, characterisation, consistent point of view and development of a resolution. They write persuasive texts dealing with complex ideas and issues and control the linguistic structures and features that support the presentation of different perspectives on complex themes and issues. They select subject matter and begin to use a range of language techniques to try to position readers to accept particular views of people, characters, events, ideas and information. They compose a range of other texts, such as feature articles, webpages and workplace texts. They plan and deliver presentations, sequencing and organising complex ideas. They write accurately punctuated, grammatically sound and complex sentences with embedded clauses and phrases. They are able to maximise the effects of rhythm and tone, and write with developing fluency. They proofread and edit their own writing for accuracy, consistency and clarity.

Speaking and listening

At Level 6, students analyse critically the relationship between texts, contexts, speakers and listeners in a range of situations. When engaged in discussion, they compare ideas, build on others' ideas, provide and justify other points of view, and reach conclusions that take account of aspects of an issue. In their presentations, they make effective use of the structures and features of spoken language to deal with complex subject matter in a range of situations.

They draw on a range of strategies to listen to and present spoken texts, including note-taking, combining spoken and visual texts, and presenting complex issues or information imaginatively to interest an audience.

The Humanities - Economics

Economics knowledge and understanding

At Level 6, students describe how markets, government policies, enterprise and innovation affect the economy, society and environment in terms of employment, economic growth, the use of resources, exports and imports, and ecological sustainability.

They analyse how goods and services are produced and how markets work. They predict how prices will change when there is either a surplus or shortage, and explain how this might influence the behaviour of consumers and producers. They analyse the role and significance of exchange, trade and globalisation in influencing Australia's standard of living. They discuss and explain what it means to be an ethical consumer and producer and identify examples of ways values can affect the economic decision making of consumers, producers and governments.

Students analyse the role that governments and other institutions such as banks, the Australian Council of Trade Unions (ACTU) play in the economy, and evaluate their performance in achieving appropriate economic outcomes for individuals and for society. They explain the role and significance of savings and investment for individuals and for the economy, and demonstrate the skills required to successfully plan and manage personal finances.

Students predict the economic consequences of proposed government policies and make informed choices among alternative public policy proposals. Students explain the impact of macroeconomic and microeconomic policies on themselves and others, including businesses.

Students analyse vocational pathways and education and training requirements and identify possible career paths and opportunities. They demonstrate skills required for moving from school to employment or further education.

Economic reasoning and interpretation

At Level 6, students use economic reasoning, including cost-benefit analysis, to research and propose solutions to economic issues and problems of global significance, and to clarify and justify values and attitudes. They plan and conduct investigations in order to research an economic problem and/or argue the validity or otherwise of their own hypotheses. They use relevant economic concepts and relationships to evaluate economic propositions, proposals and policies, and debate the costs and benefits of contentious economics-related issues of local, national or international concern.

Students interpret reports about current economic conditions, both national and global, and explain how these conditions can influence decisions made by consumers, producers and government policymakers. Students demonstrate an awareness of the impact of values and beliefs on economic issues, and how differences may be identified, negotiated, explained and possibly resolved.

Victorian Essential Learning Standards – Standards – Level 6

The Humanities - History

Historical knowledge and understanding

At Level 6, students analyse events which contributed to Australia’s social, political and cultural development. These events could include: European colonisation, the growth of the colonies, self-government, the gold rushes, the development of trade unions, the events leading to Federation, Federation, World War I, World War II, immigration, and the Gulf Wars. Students evaluate the contribution of significant Australians to Australia’s development.

Students evaluate the impact of colonisation on Aboriginal and Torres Strait Islander communities and the fight for civil and political rights and land rights. They analyse significant events and movements which have resulted in improvements in civil and political rights for other groups of Australians such as the eight-hour day and the right to vote for women, and evaluate the contributions of key participants and leaders in these events. They compare different perspectives about a significant event and make links between historical and contemporary issues.

Students analyse the impact of some key wars and conflicts in the twentieth and twenty-first centuries. These could include the world wars, revolutions, the Cold War and post Cold War conflicts. They explain aspects of increasing global interconnections in the twentieth and twenty-first centuries. They demonstrate understanding of key ideologies and explain their influence on people’s lives, national events and international relations. They explain why significant social and cultural movements have developed and evaluate their influence on societies. They analyse changes in technology, medicine and communication.

Historical reasoning and interpretation

At Level 6, students frame research questions and locate relevant resources, including contemporary media and online resources. They identify, comprehend and evaluate a range of primary and secondary sources, including visual sources and use historical conventions such as footnotes and bibliographies to document sources. They critically evaluate sources of evidence for context, information, reliability, completeness, objectivity and bias. They recognise that in history there are multiple perspectives and partial explanations. They use appropriate historical language and concepts in historical explanations. They use evidence to support arguments and select and use appropriate written and oral forms to communicate develop historical explanations in a variety of oral, written and electronic forms.

Mathematics

Number

At Level 6, students comprehend the set of real numbers containing natural, integer, rational and irrational numbers. They represent rational numbers in both fractional and decimal (terminating and infinite recurring) forms (for example, $14/25 = 1.16$, $0.47 = 47/99$). They comprehend that irrational numbers have an infinite non-terminating decimal form. They specify decimal rational approximations for square roots of primes, rational numbers that are not perfect squares, the golden ratio φ , and simple fractions of π correct to a required decimal place

Space

At Level 6, students represent two- and three-dimensional shapes using lines, curves, polygons and circles. They make representations using perspective, isometric drawings, nets and computer-generated images. They recognise and describe boundaries, surfaces and interiors of common plane and three-dimensional shapes, including cylinders, spheres, cones, prisms and polyhedra. They recognise the features of circles (centre, radius, diameter, chord, arc, semi-circle, circumference, segment,

Measurement, chance and data

At Level 6, students estimate and measure length, area, surface area, mass, volume, capacity and angle. They select and use appropriate units, converting between units as required. They calculate constant rates such as the density of substances (that is, mass in relation to volume), concentration of fluids, average speed and pollution levels in the atmosphere. Students decide on acceptable or tolerable levels of error in a given situation. They interpret and use mensuration formulas for calculating the perimeter, surface area and volume of familiar two- and three-dimensional shapes and simple composites of these shapes. Students use pythagoras’ theorem and trigonometric ratios (sine,

Structure

At Level 6, students classify and describe the properties of the real number system and the subsets of rational and irrational numbers. They identify subsets of these as discrete or continuous, finite or infinite and provide examples of their elements and apply these to functions and relations and the solution of related equations.

Student express relations between sets using membership, \square , complement, $'$, intersection, \cap , union, \square , and subset, \square , for up to three sets. They represent a universal set as the disjoint union of intersections of up to three sets and their complements, and illustrate this using a tree diagram, venn diagram or karnaugh map.

Students form and test mathematical conjectures; for example, ‘What relationship holds between the lengths of the three sides of a triangle?’

Working mathematically

At Level 6, students formulate and test conjectures, generalisations and arguments in natural language and symbolic form (for example, ‘if m^2 is even then m is even, and if m^2 is odd then m is odd’). They follow formal mathematical arguments for the truth of propositions (for example, ‘the sum of three consecutive natural numbers is divisible by 3’).

Students choose, use and develop

Victorian Essential Learning Standards – Standards – Level 6

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| <p>accuracy.</p> <p>Students use the Euclidean division algorithm to find the greatest common divisor (highest common factor) of two natural numbers (for example, the greatest common divisor of 1071 and 1029 is 21 since $1071 = 1029 \times 1 + 42$, $1029 = 42 \times 24 + 21$ and $42 = 21 \times 2 + 0$).</p> <p>Students carry out arithmetic computations involving natural numbers, integers and finite decimals using mental and/or written algorithms (one- or two-digit divisors in the case of division). They perform computations involving very large or very small numbers in scientific notation (for example, $0.0045 \times 0.000028 = 4.5 \times 10^{-3} \times 2.8 \times 10^{-5} = 1.26 \times 10^{-7}$).</p> <p>They carry out exact arithmetic computations involving fractions and irrational numbers such as square roots (for example, $\sqrt{18} = 3\sqrt{2}$, $\sqrt{(3/2)} = (\sqrt{6})/2$) and multiples and fractions of π (for example $\pi + \pi/4 = 5/4$). They use appropriate estimates to evaluate the reasonableness of the results of calculations involving rational and irrational numbers, and the decimal approximations for them. They carry out computations to a required accuracy in terms of decimal places and/or significant figures.</p> | <p>sector and tangent) and use associated angle properties.</p> <p>Students explore the properties of spheres.</p> <p>Students use the conditions for shapes to be congruent or similar. They apply isometric and similarity transformations of geometric shapes in the plane. They identify points that are invariant under a given transformation (for example, the point (2, 0) is invariant under reflection in the x-axis, so the x axis intercept of the graph of $y = 2x - 4$ is also invariant under this transformation). They determine the effect of changing the scale of one characteristic of two- and three-dimensional shapes (for example, side length, area, volume and angle measure) on related characteristics.</p> <p>They use latitude and longitude to locate places on the Earth's surface and measure distances between places using great circles.</p> <p>Students describe and use the connections between objects/location/events according to defined relationships (networks).</p> | <p>cosine and tangent) to obtain lengths of sides, angles and the area of right-angled triangles.</p> <p>They use degrees and radians as units of measurement for angles and convert between units of measurement as appropriate.</p> <p>Students estimate probabilities based on data (experiments, surveys, samples, simulations) and assign and justify subjective probabilities in familiar situations. They list event spaces (for combinations of up to three events) by lists, grids, tree diagrams, venn diagrams and karnaugh maps (two-way tables). They calculate probabilities for complementary, mutually exclusive, and compound events (defined using <i>and</i>, <i>or</i> and <i>not</i>). They classify events as dependent or independent.</p> <p>Students comprehend the difference between a population and a sample. They generate data using surveys, experiments and sampling procedures. They calculate summary statistics for centrality (mode, median and mean), spread (box plot, inter-quartile range, outliers) and association (by-eye estimation of the line of best fit from a scatter plot). They distinguish informally between association and causal relationship in bi-variate data, and make predictions based on an estimated line of best fit for scatter-plot data with strong association between two variables.</p> | <p>They use irrational numbers such as, π, φ and common surds in calculations in both exact and approximate form.</p> <p>Students apply the algebraic properties (closure, associative, commutative, identity, inverse and distributive) to computation with number, to rearrange formulas, rearrange and simplify algebraic expressions involving real variables. They verify the equivalence or otherwise of algebraic expressions (linear, square, cube, exponent, and reciprocal, (for example, $4x - 8 = 2(2x - 4) = 4(x - 2)$; $(2a - 3)^2 = 4a^2 - 12a + 9$; $(3w)^3 = 27w^3$; $(x3y/xy2 = x^2y^{-1}$; $4/xy = 2/x \times 2/y$).</p> <p>Students identify and represent linear, quadratic and exponential functions by table, rule and graph (all four quadrants of the Cartesian coordinate system) with consideration of independent and dependent variables, domain and range. They distinguish between these types of functions by testing for constant first difference, constant second difference or constant ratio between consecutive terms (for example, to distinguish between the functions described by the sets of ordered pairs $\{(1, 2), (2, 4), (3, 6), (4, 8) \dots\}$; $\{(1, 2), (2, 4), (3, 8), (4, 14) \dots\}$; and $\{(1, 2), (2, 4), (3, 8), (4, 16) \dots\}$). They use and interpret the functions in modelling a range of contexts.</p> <p>They recognise and explain the roles of the relevant constants in the relationships $f(x) = ax + c$, with reference to gradient and y axis intercept, $f(x) = a(x + b)^2 + c$ and $f(x) = ca^x$.</p> <p>They solve equations of the form $f(x) = k$, where k is a real constant (for example, $x(x + 5) = 100$) and simultaneous linear equations in two variables (for example, $\{2x - 3y = -4$ and $5x + 6y = 27\}$ using algebraic, numerical (systematic guess, check and refine or bisection) and graphical methods.</p> | <p>mathematical models and procedures to investigate and solve problems set in a wide range of practical, theoretical and historical contexts (for example, exact and approximate measurement formulas for the volumes of various three dimensional objects such as truncated pyramids). They generalise from one situation to another, and investigate it further by changing the initial constraints or other boundary conditions. They judge the reasonableness of their results based on the context under consideration.</p> <p>They select and use technology in various combinations to assist in mathematical inquiry, to manipulate and represent data, to analyse functions and carry out symbolic manipulation. They use geometry software or graphics calculators to create geometric objects and transform them, taking into account invariance under transformation.</p> |
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Victorian Essential Learning Standards – Standards – Level 6

Science

Science knowledge and understanding

At Level 6, students explain the behaviour and properties of materials in terms of their constituent particles and the forces holding them together. They explain how similarities in the chemical behaviour of elements and their compounds and their atomic structures are represented in the way the periodic table has been constructed. They use the periodic table to write electronic configurations for a range of elements representative of the major groups and periods in the periodic table. They use atomic symbols and balanced chemical equations to summarise chemical reactions, including neutralisation, precipitation and combustion. They identify and classify the sources of wastes generated, and describe their management, within the community and in industry. They use a specific example to explain the sustainable management of a resource.

Students explain change in terms of energy in a range of biological, chemical and physical contexts. They demonstrate the link between natural selection and evolution. They explain the role of DNA and genes in cell division and genetic inheritance. They explain how the coordination and regulatory functions within plants and animals assist them to survive in their environments. They explain how the action of micro-organisms can be both beneficial and detrimental to society. Students apply concepts of geological time to elaborate their explanations of both natural selection and evolution, and the origin and evolution of the Universe. They give both qualitative and quantitative explanations of the relationships between force, mass and movement.

Science at work

At Level 6, students describe the science base of science-related occupations in their local community. They use the relevant science concepts and relationships as one dimension of debating contentious and/or ethically based science-related issues of broad community concern. They demonstrate an awareness of the ways in which scientific vocabulary is used incorrectly in the mass media, distinguishing between the intended meaning of such terms and their meaning in non-scientific contexts. They provide two examples of the work of scientists that demonstrate different approaches to developing scientific knowledge or solving a scientific problem.

Students formulate their own hypotheses and plan and conduct investigations in order to prove or disprove them. They use chemicals (including biomaterials), equipment, electronic components and instruments responsibly and safely. They select appropriate equipment and measurement procedures that will ensure a high degree of reliability in data collected and enable valid conclusions to be drawn. They construct working models and visual aids that demonstrate scientific ideas. They present experimental results using appropriate data presentation formats, and comment on the nature of experimental errors. They use Material Safety Data Sheets (MSDS) and risk assessment to evaluate the safety of their investigations. They evaluate the appropriateness of the experimental design and methodology used to investigate their predictions.

Interdisciplinary Learning strand

Information and Communications Technology

ICT for visual thinking

At Level 6, students use a range of ICT tools and data types to visualise their thinking strategies when solving problems and developing new understanding. They use visualising thinking tools and apply ICT techniques to support causal reasoning and to model and describe the dynamic relationship between variable and constant data values to test hypotheses.

Students are efficient and effective in their use of appropriate ICT tools and editing techniques for assisting in visualising thinking. When solving problems, students discriminate between such tools and strategies based on their suitability for problem solving in new situations.

ICT for creating

At Level 6, students appraise different strategies for organising and managing resources involved in problem solving and creating information products.

They use ICT to devise detailed plans that sequence tasks to be done, resources needed, and timelines for completion. They annotate their plans to explain changes made during the project.

Individually, and as team members, students apply a range of techniques, equipment and procedures that minimise the cost, effort and time of processing ICT solutions and maximise the accuracy, clarity and completeness of the information. They apply strategies that protect their files from being corrupted, stolen or accidentally lost. Their products demonstrate a clear sense of purpose and respect for the audience. Students apply processing practices that take into account their legal obligations and ethical considerations. They compare their own solutions with others and justify suggestions to improve quality.

ICT for communicating

At Level 6, students exchange ideas and considered opinions with others through online forums and websites. Students apply techniques to locate more precise information from websites, including searching general and specialised directories, and applying proximity operators. They use accepted protocols to communicate regularly online with peers, experts, and others, expressing their messages in language appropriate to the selected form of communication, and demonstrating respect for cultural differences.

Victorian Essential Learning Standards – Standards – Level 6

Communication

Listening, viewing and responding

At Level 6, students identify the ways in which complex messages are effectively conveyed and apply this knowledge to their communication. When listening, viewing and responding, they consider alternative views, recognise multiple possible interpretations and respond with insight. They use complex verbal and non-verbal cues, subject-specific language, and a wide range of communication forms. Students use pertinent questions to explore, clarify and elaborate complex meaning.

Presenting

At Level 6, students demonstrate their understanding of the relationship between form, content and mode, and select suitable resources and technologies to effectively communicate. They use subject-specific language and conventions in accordance with the purpose of their presentation to communicate complex information. They provide constructive feedback to others and use feedback and reflection in order to inform their future presentations.

Design, Creativity and Technology

Investigating and designing

At Level 6, students identify considerations and constraints within a design brief. They undertake research relevant to the design brief. They locate and use relevant information to help their design thinking and identify the needs of a variety of client/user groups. When designing, they generate a range of alternative possibilities, use appropriate technical language, and justify their preferred option, explaining how it provides a solution to the problem, need or opportunity. They make critical decisions on materials/ingredients, systems components and techniques based on their understanding of the properties and characteristics of materials/ingredients and/or of the relationship between inputs, processes and outputs. They effectively use information and communications technology equipment, techniques and procedures to support the development of their design and planning. Students take account of function and performance, energy requirements, aesthetics, costs, and ethical and legal considerations that address the requirements of design briefs. They identify a range of criteria for evaluating their products and/or technological systems. Students plan a realistic and logical sequence of the production stages, incorporating time, cost and resources needed for production.

Producing

At Level 6, students implement a range of production processes accurately, consistently, safely/hygienically and responsibly, and select and use personal protective clothing and equipment when necessary. They produce products/systems using complex tools, equipment, machines, materials/ingredients and/or systems components with precision. They clearly explain decisions about the suitability of materials/ingredients, systems components, energy requirements and production techniques based on their understanding of the properties and characteristics of materials/ingredients, and the inputs, processes and outputs of systems.

In response to changing circumstances, they adapt their methods of production and provide a sound explanation for deviation from the design proposal. They make products/systems that meet the quality, aesthetic, functionality and performance requirements outlined in the design brief.

Analysing and evaluating

At Level 6, students use evaluation criteria they have previously developed, and critically analyse processes, materials/ingredients, systems components and equipment used, and make appropriate suggestions for changes to these that would lead to an improved outcome. They use a range of suitable safe testing methods in this analysis. They relate their findings to the purpose for which the product and/or system was designed and the appropriate and ethical use of resources.

They synthesise data, analyse trends and draw conclusions about the social, cultural, legal and environmental impacts of their own and others' designs and the products/systems, and evaluate innovative new technology in the manufacturing industry.

Thinking Processes

Reasoning, processing and inquiry

At Level 6, students discriminate in the way they use a variety of sources. They generate questions that explore perspectives. They process and synthesise complex information and complete activities focusing on problem solving and decision making which involve a wide range and complexity of variables and solutions. They employ appropriate methodologies for creating and verifying knowledge in different disciplines. They make informed decisions based on their analysis of various perspectives and, sometimes contradictory, information.

Creativity

At Level 6, students experiment with innovative possibilities within the parameters of a task. They take calculated risks when defining tasks and generating solutions. They apply selectively a range of creative thinking strategies to broaden their knowledge and engage with contentious, ambiguous, novel and complex ideas.

Reflection, evaluation and metacognition

At Level 6, when reviewing information and refining ideas and beliefs, students explain conscious changes that may occur in their own and others' thinking and analyse alternative perspectives and perceptions. They explain the different methodologies used by different disciplines to create and verify knowledge. They use specific terms to discuss their thinking, select and use thinking processes and tools appropriate to particular tasks, and evaluate their effectiveness.