



Victorian Essential Learning Standards

Interdisciplinary Learning Strand

THINKING PROCESSES

REVISED EDITION JANUARY 2008



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Revised Edition January 2008

This edition incorporates minor amendments to the domain introductions and learning focus statements to indicate their relationship with the National Statements of Learning.

Interdisciplinary Learning

The Interdisciplinary Learning strand identifies a range of knowledge, skills and behaviours which cross disciplinary boundaries and are essential to ensuring students are prepared as active learners and problem-solvers for success at school and beyond. This strand focuses on ways of thinking, communicating, conceiving and realising ideas and information. It assists students to develop the capacity to design, create and evaluate processes as a way of developing creativity and innovation.

Within the Interdisciplinary Learning strand the learning domains are:

Communication

Communication helps to construct all learning and is central to the capacity to demonstrate and convey what one has learned in different contexts and to different people. This domain assists students to understand that language and discourse differ in different disciplines and that there is a need to learn the particular literacies involved in each.

Design, Creativity and Technology

Students develop the knowledge, skills and behaviours related to investigating and designing using appropriate planning processes and design briefs; creating and developing ideas, applying information, and seeking and testing innovative alternatives; producing, including the selection and safe use of appropriate tools, equipment, materials and/or processes to meet the requirements of design briefs; analysing and evaluating both processes and products including, where relevant, any broader environmental, social, cultural and economic factors.

Information and Communications Technology

The knowledge, skills and behaviours in this domain enable students to use information and communications technology (ICT) to access, process, manage and present information; model and control events; construct new understandings; and communicate with others. Students use ICT and strategies to monitor learning patterns, to process data to create solutions and information products that demonstrate understanding, and to share their work with others in ethical, legal and respectful ways.

Thinking Processes

This domain encompasses a range of cognitive, affective and metacognitive knowledge, skills and behaviours which are essential for effective functioning in society both within and beyond school. The study of thinking enables students to acquire strategies for thinking related to enquiry, processing information, reasoning, problem solving, evaluation and reflection.

Thinking Processes

Introduction

Our world and the world of the future demand that all students are supported to become effective and skilful thinkers. Thinking validates existing knowledge and enables individuals to create new knowledge and to build ideas and make connections between them. It entails reasoning and inquiry together with processing and evaluating information. It enables the exploration of perceptions and possibilities. It also involves the capacity to plan, monitor and evaluate one's own thinking, and refine and transform ideas and beliefs.

The Thinking Processes domain encompasses a range of cognitive, affective and metacognitive knowledge, skills and behaviours which are essential for students to function effectively in society, both within and beyond school.

An explicit focus on thinking and the teaching of thinking skills aims to develop students' thinking to a qualitatively higher level. Students need to be supported to move beyond the lower-order cognitive skills of recall and comprehension to the development of higher-order processes required for creative problem solving, decision making and conceptualising. In addition, they need to develop the capacity for metacognition – the capacity to reflect on and manage their own thinking. This can only happen if the school and classroom culture values and promotes thinking and if students are provided with sufficient time to think, reflect, and engage in sustained discussion, deliberation and inquiry. Students need challenging tasks which stimulate, encourage and support skilful and effective thinking.

A focus on the development of thinking competencies within specific areas of the curriculum and across it not only serves as a core integrative function, it also has the potential to provide continuity in approaches to learning from Prep to Year 10 and to emphasise the view that such knowledge, skills and behaviours are important to lifelong learning. To emphasise this, teachers model skilful and effective thinking and make their own thinking explicit as part of their everyday practice.

Thinking skills can be defined in a variety of ways. Many different taxonomies and models for teaching thinking have been developed. Each classification scheme has its strengths and weaknesses. However, whatever the system or systems being used, all seek to improve the quality of student thinking.

Structure of the domain

The Thinking Processes domain is organised into six sections, one for each level of achievement from Level 1 to Level 6. Each level includes a learning focus statement and, from Level 3, a set of standards organised by dimension.

Learning focus

Learning focus statements are written for each level. These outline the learning that students need to focus on if they are to progress in the domain and achieve the standards at the levels where they apply. They suggest appropriate learning experiences from which teachers can draw to develop relevant teaching and learning activities.

Standards

Standards define what students should know and be able to do at different levels and are written for each dimension. In Thinking Processes, standards for assessing and reporting on student achievement apply from Level 3.

Dimensions

Standards in the Thinking Processes domain are organised in three dimensions:

- Reasoning, processing and inquiry
- Creativity
- Reflection, evaluation and metacognition.

Reasoning, processing and inquiry

The *Reasoning, processing and inquiry* dimension encompasses the knowledge, skills and behaviours required to enable students to inquire into the world around them, and to use critical thinking to analyse and evaluate information they encounter. Students learn to assemble and question information and develop opinions based on informed judgments. They also develop the capacity to transform information into coherent knowledge structures.

Creativity

The capacity to think creatively is a central component of being able to solve problems and be innovative. In the *Creativity* dimension, students learn to seek innovative alternatives and use their imagination to generate possibilities. They learn to take risks with their thinking and make new connections.

Reflection, evaluation and metacognition

Learning is enhanced when individuals develop the capacity to reflect on, and refine their existing ideas and beliefs. In the *Reflection, evaluation and metacognition* dimension, students learn to reflect on what they know and develop awareness that there is more to know. They learn to question their perspectives and those of others. They evaluate the validity of their own and others' ideas. They also develop their metacognitive skills in planning, monitoring and evaluating their own thinking processes and strategies.

National Statements of Learning

The Victorian Essential Learning Standards (VELS) incorporate the opportunities to learn covered in the national [Statements of Learning](http://www.curriculum.edu.au/mceetya/the_statements_of_learning,11893.html) (www.curriculum.edu.au/mceetya/the_statements_of_learning,11893.html). The Statements of Learning describe essential skills, knowledge, understandings and capacities that all young Australians should have the opportunity to learn by the end of Years 3, 5, 7 and 9 in English, Mathematics, Science, Civics and Citizenship and Information and Communication Technologies (ICT).

The Statements of Learning were developed as a means of achieving greater national consistency in curriculum outcomes across the eight Australian states and territories. It was proposed that they be used by state and territory departments or curriculum authorities (their primary audience) to guide the future development of relevant curriculum documents. They were agreed to by all states and territories in August 2006.

During 2007, the VCAA prepared a detailed map to show how the Statements of Learning are addressed and incorporated in the VELS. In the majority of cases, the VELS learning focus statements incorporate the Statements of Learning. Some Statements of Learning are covered in more than one domain. In some cases, VELS learning focus statements have been elaborated to address elements of the Statements of Learning not previously specified. These elaborations are noted at the end of each learning focus statement.

Level 1

Learning focus

As students work towards the achievement of Level 3 standards in Thinking Processes, they explore a wide variety of familiar contexts. With encouragement and support, they wonder, question and become adventurous in their thinking about these contexts. Students practise using all of their senses to develop skills in making observations which they share and record.

Students begin to look for simple patterns in their observations by classifying familiar items and by looking for similarities and differences. In integrating information from their own observations, information from peers, teachers and other adults, and information from print and non-print texts, they begin to develop simple explanations for the phenomena they observe. These explanations – not necessarily complete – are the starting point for further questions and exploration. When students consider the explanations of others, they begin to ask, 'How do you know?' and 'What makes you think that?' and consider a range of possible responses.

Students use a range of simple thinking tools to gather and process information. They reflect on their thinking (for example, why they think what they think about a text) and take time to consider before responding.

Standards

In Thinking Processes, standards for assessing and reporting on student achievement are introduced at Level 3. The learning focus statements for Levels 1 and 2 provide advice about learning experiences that will assist students to work towards the achievement of the standards at Level 3.

Level 2

Learning focus

As students work towards the achievement of Level 3 standards in Thinking Processes, they explore the community and environment around them, and increasingly consider contexts and information which lie beyond their immediate experience. Questions and wondering are encouraged, recorded and shared, and become the basis for further learning.

Students develop their skills in making accurate observations about people and events, and they begin to use a variety of means to record their observations. They develop their own explanations for the observations they make and learn to question the accuracy of other people's explanations. They begin to understand that people are more likely to believe an explanation if evidence or reasons are provided. They develop their skills in using a range of sources of information when investigating selected questions.

Students practise ordering and sequencing their ideas. They begin to classify concepts, objects and ideas using given criteria and describe, compare and contrast these classifications. They use a variety of thinking tools to assist with recognising patterns in surrounding events and objects.

When presented with simple problems, students work with peers to develop a range of creative solutions and test their effectiveness against given criteria. Prompted by questions, they begin to reflect on their thinking processes.

Standards

In Thinking Processes, standards for assessing and reporting on student achievement are introduced at Level 3. The learning focus statements for Levels 1 and 2 provide advice about learning experiences that will assist students to work towards the achievement of the standards at Level 3.

Level 3

Learning focus

As students work towards the achievement of Level 3 standards in Thinking Processes, they explore aspects of their natural, constructed and social world, wondering and developing questions about it. They use a range of sources of information including observations and findings from their own investigations to answer these questions. Students develop strategies for organising and summarising information and reflecting on their thinking. They begin to categorise knowledge and ideas, identify patterns, and form generalisations. They learn to make connections between both new and established ideas and their own knowledge.

With thinking tools to assist them, students begin to ask more focused and clarifying questions. They develop skills in collecting and organising ideas from a range of sources to construct knowledge. They learn to question the validity of sources, communicate and record their questions, responses and thoughts, and give reasons for conclusions.

Students participate in a variety of investigations and activities involving problem solving that encourage them to experiment with a range of creative solutions. They begin to reflect on the approaches they use to assist them to form their solutions. They explore ideas creatively; for example, by engaging with new ideas and other perspectives.

Students give reasons for changes that may occur in their thinking. They begin to recognise that others may have different opinions and understand that reasoning can be influenced by strong feelings. They begin to question arguments presented to them; for example, those based on the assertion that 'everybody knows' or 'I just know'.

Students develop language to describe specific thinking processes and, with support, use thinking tools to assist them to complete a given task. They continue to reflect regularly on their thinking, learning to describe their thinking processes verbally.

Standards

Reasoning, processing and inquiry

At Level 3, students collect information from a range of sources to answer their own and others' questions. They question the validity of sources when appropriate. They apply thinking strategies to organise information and concepts in a variety of contexts, including problem solving activities. They provide reasons for their conclusions.

Creativity

At Level 3, students apply creative ideas in practical ways and test the possibilities of ideas they generate. They use open-ended questioning and integrate available information to explore ideas.

Reflection, evaluation and metacognition

At Level 3, students identify strategies they use to organise their ideas, and use appropriate language to explain their thinking. They identify and provide reasons for their point of view, and justify changes in their thinking.

Level 4

Learning focus

As students work towards the achievement of Level 4 standards in Thinking Processes, they make observations and pose questions about people and events within and beyond their own experience, and develop a growing awareness of the complexity of the world around them.

Using these questions as a basis, students undertake investigations independently and with others. Their investigations include time for sustained discussion, deliberation and inquiry, with teachers providing appropriate tools and support in this process. Students develop strategies to find suitable sources of information and they learn to distinguish between fact and opinion. They develop an understanding of how our views are socially constructed and not always based on evidence.

Students increase their repertoire of thinking strategies for gathering and processing information. These include identifying simple cause and effect, elaborating and analysing, and developing logical arguments. They begin to consider which strategies may be most appropriate for particular learning contexts. They increasingly focus on tasks that require flexible thinking for decision making, synthesis and creativity.

Students participate in activities in which they identify problems that need to be solved. They use a range of techniques to represent the problem and, working individually and with others, develop a range of creative solutions and explore the advantages of generating unconventional rather than conventional solutions. They begin to develop criteria to select and prioritise possible solutions.

They learn to make links between ideas and use portfolios and/or journals to reflect on how their ideas and beliefs change over time. In structured activities, they practise transferring their knowledge to new contexts.

Standards

Reasoning, processing and inquiry

At Level 4, students develop their own questions for investigation, collect relevant information from a range of sources and make judgments about its worth. They distinguish between fact and opinion. They use the information they collect to develop concepts, solve problems or inform decision making. They develop reasoned arguments using supporting evidence.

Creativity

At Level 4, students use creative thinking strategies to generate imaginative solutions when solving problems. They demonstrate creativity in their thinking in a range of contexts and test the possibilities of concrete and abstract ideas generated by themselves and others.

Reflection, evaluation and metacognition

At Level 4, students use a broad range of thinking processes and tools, and reflect on and evaluate their effectiveness. They articulate their thinking processes. They document changes in their ideas and beliefs over time.

Level 5

Learning focus

As students work towards the achievement of Level 5 standards in Thinking Processes, they participate in increasingly complex investigations and activities in which they seek evidence to support their conclusions, and investigate the validity of other people's ideas; for example, by testing the credibility of differing accounts of the same event, questioning conclusions based on very small or biased samples of data, and identifying and questioning generalisations. From such investigations and activities, students learn to make and justify changes to their thinking and develop awareness that others may have perceptions different from their own.

Students draw on an increasing range of contexts to formulate the questions that drive their investigations. They participate in challenging tasks that stimulate, encourage and support the development of their thinking. They apply a range of discipline-based methodologies to conduct inquiries and gather, analyse and synthesise information. They gather information from a variety of sources and begin to distinguish between different types (for example, quantitative and qualitative) and sources (primary and secondary) of data. They begin to synthesise both self-selected and teacher-directed information to make meaning. They recognise the complexity of many of the ideas and concepts they are exploring and use a range of thinking strategies to develop connections.

Students increasingly focus on tasks that require creative thinking for understanding, synthesis and decision making. They develop creative thinking behaviours and strategies through flexible approaches; for example, considering alternative perspectives, suspending judgment, seeking new information and testing novel ideas. They evaluate alternative conclusions and perspectives using criteria developed individually and in collaboration with their peers.

Students reflect on their own learning, seeking to refine existing ideas and beliefs when provided with contradictory evidence. They develop their capacity to identify, monitor and evaluate the thinking skills and strategies they use. During their investigations and inquiries they use specific language to discuss their thinking and reflect on their thinking processes. They reflect on, modify and evaluate their thinking strategies.

Standards

Reasoning, processing and inquiry

At Level 5, students use a range of question types, and locate and select relevant information from varied sources when undertaking investigations. When identifying and synthesising relevant information, they use a range of appropriate strategies of reasoning and analysis to evaluate evidence and consider their own and others' points of view. They use a range of discipline-based methodologies. They complete activities focusing on problem solving and decision making which involve an increasing number of variables and solutions.

Creativity

At Level 5, students apply creative thinking strategies to explore possibilities and generate multiple options, problem definitions and solutions. They demonstrate creativity, in the ways they engage with and explore ideas in a range of contexts.

Reflection, evaluation and metacognition

At Level 5, students explain the purpose of a range of thinking tools and use them in appropriate contexts. They use specific language to describe their thinking and reflect on their thinking processes during their investigations. They modify and evaluate their thinking strategies. They describe and explain changes that may occur in their ideas and beliefs over time.

Level 6

Learning focus

As students work towards the achievement of Level 6 standards in Thinking Processes, they become discriminating thinkers, capable of making informed decisions about controversial and complex issues. They are supported to put effort into sustained thinking in order to construct deep understanding of key concepts across the curriculum. They continually reflect on their own thinking and identify assumptions that may influence their ideas. They seek to develop coherent knowledge structures and recognise gaps in their understanding. They are challenged to identify, use, reflect on, evaluate and modify a variety of effective thinking strategies to inform future choices.

Students begin to formulate and test hypotheses, contentions and conjectures and to collect evidence to support or reject them. They develop their skills in synthesising complex information and solving problems that include a wide range of variables. Students develop questioning techniques appropriate to the complexity of ideas they investigate, to probe into and elicit information from varying sources. They work with others to modify their initial questions and to develop further their understanding that sources of information may vary in their validity.

Students explore differing perspectives and issues in depth and identify a range of creative possibilities. They are encouraged to examine and acknowledge a range of perspectives on an issue and to accommodate diversity. They engage positively with novelty and difference and are innovative in the ways they define and work through tasks, and find solutions. They practise creative thinking behaviours and strategies to find solutions, synthesise information and understand complex ideas.

In inquiry projects, students select appropriate strategies and connect existing knowledge and new knowledge to process and organise information. They begin to analyse the relationships between ideas, and synthesise these to form coherent knowledge.

Students recognise that different disciplines use different methodologies to create and verify knowledge. They investigate a variety of discipline-based methodologies and reflect on their usefulness in different contexts; for example, the application of the scientific methodology of hypothesis, observation, data collection and conclusion in contexts other than science. They continue to evaluate their solutions using appropriate criteria and identify assumptions that may underpin a particular line of reasoning.

Standards

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.

First published February 2005
Revised Edition published January 2008

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