Technology (2003)

Years 1 to 10
Sourcebook Guidelines
(Part 2 of 7)

Note: The PDF version of this document has been split into sections for easier download. This file is Part 2 of 7.

Learners and learning in Technology

The Technology key learning area promotes learning in, through and about technology through the process of 'working technologically'. This process involves learners in the construction of meaning as they develop products to meet needs, wants or opportunities. The engagement of learners in this process will differ depending on their individual and group circumstances.

Characteristics of learners

The physical, emotional, intellectual and social characteristics described below are included to assist teachers to enhance their understanding of learners during different bands of schooling. These general characteristics provide the framework for the developmental sequence of the learning outcomes in the Technology key learning area.

Teachers should be aware that generalised characteristics are not sufficient to communicate the complex nature of learners and learning. When planning learning experiences and assessment opportunities, teachers' understandings about general characteristics should be supported by:

- information about prior and current learning and life experiences
- understandings about interacting cultural, social, geographic, ethnic and linguistic backgrounds of individual learners
- understandings that learners will communicate their knowledge, practices and dispositions about technology in various ways.

Early primary learners

Young learners are typically interested in the interactions and environments that surround them. They use a variety of strategies that involve them actively in the social construction of meaning and exploration of their surroundings. At school, young learners build on prior knowledge to find out about themselves and the designed world they live in. They are active and competent learners and make meaning in environments where they can work individually as well as with others. Resources such as time and equipment are used flexibly to encourage learners to make choices and develop a sense of control over their learning. They engage in spontaneous and planned activities in open-ended situations or guided approaches to meet particular purposes. Learners in the early primary years have an intense interest in self-chosen tasks where they can explore ideas in purposeful contexts. They are developing fine- and gross-motor control and enjoy the independence they gain as they master various skills and processes.

As learners in early primary participate in Technology activities, they may:

- begin to develop understandings about interactions that take place between technologies and societies and the effects that technology has on people's lives
- identify and reflect on needs and wants important to them based on personal experience and interests
- develop products that are meaningful to them and evaluate how other products may meet their own needs and wants
- consider the functions and characteristics of equipment and resources in structured and unstructured activities
- experiment with a range of ways to communicate ideas and intentions and explore ways in which other people present ideas.

Middle primary learners

These learners are taking tentative steps towards operating in a world of adults, often with less scaffolding than has been previously provided during their earlier years. They are developing deeper understandings about appropriateness, contexts and management as they work cooperatively with peers to make simple, responsible decisions about meeting needs and wants. They can respond to several variables, but may be unable to perceive a relationship between them. Learning may occur as part of direct experience, with thinking processes supported by involvement in real-life and lifelike activities. Learners investigate and discover ideas that may stem from experiences outside their own personal experience. Interest is shown in the perspectives of others and they can express empathy in situations to which they relate. Their physical abilities are continuing to develop and they may be able to accurately and safely use some equipment and tools.

As learners in middle primary participate in Technology activities, they may:
- explore needs and wants beyond their personal experiences and look at the consequences that arise out of meeting design challenges
- judge the feasibility of their ideas and communicate them in various forms — for example, oral, written, graphical or material forms
- use simple plans to convey ideas, intentions and procedures related to meeting needs and wants
- work individually and with others in undertaking design and production tasks and to evaluate and reflect upon technology.

Upper primary learners

These students may be encountering physical and emotional challenges brought on by puberty. Growth rates start to differ between boys and girls. Students may be engaging in, and solving, complex and challenging tasks, which may be theoretical or practical. A willingness to increase independence may become more prominent in social and learning environments and can be nurtured through involvement in decision-making processes. They can evaluate their own and other people's perspectives with the view of identifying possible consequences or impacts. Students use self-reflection to make judgments about practices and processes of technology and the influences it has on diverse communities.

As learners in upper primary participate in Technology activities, they may:
- consult with others to explore needs, wants and opportunities and to judge consequences that may arise from feasible solutions
- develop views about appropriate applications of products and processes of technology and therefore become more discerning when evaluating their own or others' work
- work cooperatively to translate needs, wants or opportunities into achievable goals and develop proposals to carry them out
- decide on the most appropriate techniques to manipulate and process different resources and use these to realise design ideas.

Lower secondary learners

These students are becoming aware of their developing sexuality and growth as they move into adolescence. They enjoy increasing abilities to deal with abstract concepts and challenges and can reason hypothetically. They can recognise the rights and opinions of others and may use their sense of moral awareness and beliefs about social justice to question the role of technology in society. They begin to develop a detailed knowledge of the form and function of a wide range of specialised products and processes of technology. Learners are aware of a wider range of strategies for learning and they are able to reflect

upon their own learning with less guidance. Their insights into their own and others' learning, combined with understandings about their own interpersonal skills, may enable them to work independently or as effective members of teams.

As learners in lower secondary participate in Technology activities, they may:

- broaden their abilities as they seek out knowledge and skills of others with expertise and apply this to their tasks
- draw upon knowledge, practices and dispositions of technology in order to refine products against original intentions
- use the language and symbol systems of technology to apply commercial and industrial standards
- develop their own criteria for judging the appropriateness of their products and use these to evaluate the suitability of products.

Using a learner-centred approach

A learner-centred approach to learning and teaching views learning as the active construction of meaning, and teaching as the act of guiding and facilitating learning. This approach sees knowledge as being ever-changing and deepening, built on prior experience and emerging perspectives and evidence. A learner-centred approach is underpinned by understandings about learners' development, interests, needs, talents and diverse cultural and social backgrounds.

Teachers make learning meaningful to students by:

- encouraging students to be active constructors of meaning
- emphasising the process of metacognition
- involving students in cooperative learning
- adopting inclusive curriculum practices.

Active construction of meaning

Learners have prior knowledge, practices and dispositions that have been influenced by their individual social and cultural backgrounds. When teachers acknowledge, value and accommodate a student's prior knowledge, practices and dispositions, it becomes possible for the student to actively construct meaning in Technology.

Some strategies that teachers can use to scaffold the active construction of meaning in Technology include:

- providing opportunities for learners to collaborate in order to meet design challenges
- scaffolding learning through interactions with more experienced peers or adults
- developing shared understandings about what it is students need to know and do with what they know
- developing a learning environment that is responsive to learners' needs by involving them in real-life or lifelike contexts
- structuring learning so that the technology demand is appropriately challenging
- encouraging learners to develop their own design ideas by adjusting the amount of teacher intervention as appropriate
- encouraging learners to participate as independently as possible in meeting design challenges by considering aspects related to appropriateness, contexts and management.

Metacognition

Metacognition is the process of thinking about thinking. Engaging in metacognition assists learners to develop deep and lasting understandings by internalising concepts that become the basis for further learning.

Metacognition is an ongoing process that can occur at any time — before, during or after learning experiences. This process of internalisation may be assisted through the refinement of ideas and practices through trial or testing; interactions with others using dialogue or group work; reflection on learning and life experiences; and transfer of knowledge from familiar to unfamiliar contexts.

Metacognition can be promoted by teacher modelling of metacognitive strategies — for example, framing questions that lead to self-reflection and self-knowledge.

In Technology, learners may:
- be assisted to reflect on practices and dispositions — for example, their role in teamwork
- identify the processes they are using when 'working technologically' and the effectiveness of their actions in terms of reaching their final goal
- plan and monitor their learning
- explore the consequences of different options
- identify links between choices, actions and results
- reflect on what has been done and learned.

Cooperative learning

Cooperative learning has long been recognised as a powerful learning and teaching strategy in Technology. Cooperative learning in Technology is both a strategy for maximising learning and a means of developing products to meet human needs and wants, capitalise on opportunities and extend human capabilities.

Cooperative learning supports the notion that each member of a group can succeed and that each member has something to offer. When students work cooperatively with peers, they can help each other understand information, support each other in achieving their goals, and give each other ideas and encouragement. When students work cooperatively with parents/carers, teachers, more experienced peers and school and community members, they access the diverse knowledge, skills and expertise, including direct and vicarious experiences, of a range of social and cultural groups.

Some strategies that promote cooperative learning include:
- cultivating a learning environment that supports cooperative attitudes and collaborative practices
- providing opportunities for group problem solving, investigating and decision making
- providing scaffolding for students to work in groups of different sizes and membership characteristics
- promoting self-reflection on cooperative attitudes and practices
- challenging learners to meet design challenges beyond their own personal experiences by providing opportunities for learners to consult with others
- involving people from the broader community in the learning environment
- encouraging peer assessment.

Inclusive curriculum practices

An inclusive curriculum ensures that the learning process is accessible and meaningful to all students. This involves identifying and overcoming barriers that limit participation in, and the benefits from, learning in Technology. These

include, for example, difference in learning styles, understandings, capability or skill levels.

Some students will require flexible pathways of learning and assessment as they demonstrate progress through the continua of learning in the Technology key learning area. Students with special needs or disabilities may need flexibility in the ways they demonstrate learning outcomes. This means that some students may demonstrate learning outcomes from different levels in the same or different strands.

The level statements at Foundation Level and some sample learning outcomes have been developed for learners with disabilities who are not yet demonstrating the core learning outcomes at Level 1. Teachers are encouraged to develop personalised learning outcomes for Foundation Level to suit the needs, interests and abilities of individual students.

Some strategies that promote inclusive curriculum practices include:
- acknowledging and respecting diversity by valuing the perspectives, contributions and experiences of all students and the communities in which they live
- providing learning environments that are supportive of students' involvement by accepting that learning in technology may occur in different ways
- catering for a range of abilities by planning across levels and by developing suitable Foundation Level outcomes that link to individualised curriculum programs
- providing learning experiences that develop students' acceptance of, and respect for, the diversity of people's achievements
- providing opportunities for students to demonstrate learning outcomes in a variety of contexts and through a variety of methods, and by using assessment techniques that take account of students' differences.

Equity in curriculum

The Technology key learning area supports and promotes the principles of equity. The Technology curriculum acknowledges the cumulative and interrelated impact of the social, cultural, geographic and economic circumstances on students' schooling experiences.

Learning experiences in the Technology key learning area can promote students' knowledge, practices and dispositions regarding equity. A focus for learning in the Technology key learning area is the rich and diverse development of technology across cultures and societies. An understanding of this diversity enables students to critically consider and analyse the aesthetic, cultural, economic, environmental, ethical, functional and social impacts and consequences of the processes and products of technology.

Learning about equity issues through Technology involves developing the knowledge, practices and dispositions necessary to:
- critique imbalances in power that arise in societies as a result of the products and processes of technology
- encourage tolerance of, and sensitivity to, individual differences
- encourage a climate of respect, valuing and understanding both within and beyond the school community
- encourage the development of positive self-esteem and gain greater understandings of students' life experiences
- recognise contributions made to technology by a range of cultures throughout history, including the diversity within and across cultures
- explore and critique the historical, social and cultural constructions of knowledge
- explore the impact differing values, morals, ethics and views have on

personal roles and relationships

- question social structures that may implicitly or explicitly disadvantage individuals or groups
- challenge, rather than accept or simply know about, social injustice
- explore contemporary social issues, and critique and challenge stereotypical constructions
- critique and challenge representations of Aboriginal and Torres Strait Islander peoples, including an analysis of misconceptions and stereotypes
- examine and challenge representations of women and men, masculinities and femininities, including the analysis of gender constructions, misconceptions and stereotypes
- challenge injustices of social and economic poverty and understand the power of social and cultural capital
- understand how valued knowledge and power relations affect individuals, groups, communities and societies
- analyse and challenge unequal power relations and knowledge that are valued within and across various groups of people
- question and challenge social contexts that inhibit full participation of particular groups or individuals with disabilities and learning difficulties.