EXPLANATION OF TERMS

Levels of Curriculum

National Curriculum

The national curriculum for technology is the document provided by the Ministry of Education that sets out the direction for learning in technology. It includes the Technology Introductory Learning Area Statement and Achievement Objectives that progress from level 1-8 of *The New Zealand Curriculum* framework.

School Curriculum

The school curriculum for technology will be developed by all staff involved in the leadership and delivery of technology in the school. The school technology curriculum will be recorded by way of technology programmes that guide all staff teaching within it. Technology programmes will be in line with the expectations within the national technology curriculum, but will also take into account the needs and desires of the school community, the strengths of the teaching staff, and the interests and ability of the students.

Classroom Curriculum

The classroom curriculum for technology will be developed by classroom teachers to guide their teaching. The classroom curriculum will be recorded by way of learning experiences. Learning experiences developed will be in line with the school technology programme, but will also take into account the specific interests and abilities of the teacher/s and students within the classroom. The learning experiences may be structured into units where individual lessons are planned to manage the overall learning experience. Assessment (formative and summative), and reporting procedures, will be an integral part of the learning experiences.

INTRODUCTORY LEARNING AREA STATEMENT

The Technology Introductory Learning Area Statement has been developed to communicate the essence of technology as both a discipline and an essential learning area in the compulsory school sector. It therefore defines the concept of technology underpinning this learning area and provides a rationale for why it is important to study technology. The statement also outlines how the learning area has been structured into strands to help teachers develop technology programmes.

TECHNOLOGY CURRICULUM STRANDS

Technology has three strands –Technological Practice, the Nature of Technology, and Technological Knowledge. These strands provide a structure for the key ideas and practices that form the basis of technological literacy . These key ideas and practices have been categorised within each strand as separate but interrelated components.

Components of Technological Practice Strand

Understanding and undertaking technological practice is an important aspect of student learning in technology education in New Zealand. In order to support student learning associated with undertaking their own practice, three interconnected components have been identified. Research findings suggest that if teachers and students can focus on smaller components within technological practice, they are better able to identify learning needs and therefore respond more specifically to enhance formative interactions in the classroom.

The three components of practice, identified from classroom research, and verified in technologist communities, are: Brief Development, Planning for Practice, and Outcome Development and Evaluation. Brief Development focuses on the defining practices of technological development. Planning for Practice focuses on the organising practices. Outcome Development and Evaluation focuses on the trialling and production practices.

While each of these components is described separately, they interact in a highly iterative fashion to support and enhance overall technological practice. It is expected that while some learning experiences in technology education may focus on one or two components specifically, over a technology education programme all components should be comprehensively covered. Links between the components should be stressed in order for students to develop a sound understanding of, and capability in, undertaking technological practice.

Components of the Nature of Technology Strand

Understanding the Nature of Technology has been recognized as important in the development of a broader and more critical technological literacy. In order to support student learning associated with the philosophy of technology, two interconnected components have been identified. These are: the Characteristics of Technology and the Characteristics of Technological Outcomes. Characteristics of Technology focuses on developing a philosophical understanding of technology as a form of human activity. Characteristics of Technological Outcomes focuses on developing a philosophical understanding of the resulting outcomes of technological developments as they exist in the made world.

While these components are described separately, they interact in a highly iterative fashion to support a critical understanding of the nature of technology as a discipline. It is expected that while some learning experiences in technology education may focus on one or other of the components specifically, over a technology education programme both components should be comprehensively covered. Links between the components should be stressed in order for students to develop a sound understanding of the nature of technology.

Components of Technological Knowledge Strand

Developing Technological Knowledge has been recognized as important in the development of a broader and deeper technological literacy. In order to support student learning of technological knowledge, three interconnected components have been identified. These are: Technological Modelling, Technological Products and Technological Systems. Technological Modelling focuses on developing the big ideas underpinning functional and prototype modelling. Technological Products focuses on developing the big ideas underpinning materials use and development. Technological Systems focuses on developing the big ideas underpinning systems use and development.

While each of these components is described separately, they interact in a highly iterative fashion to support and enhance the development of technological knowledge. It is expected that while some learning experiences in technology education may focus on one or two components specifically, over a technology education programme all components should be comprehensively covered. Links between the components should be stressed in order for students to develop a sound understanding of the big ideas involved in technological knowledge.

TECHNOLOGICAL OUTCOMES

Technological outcomes are developed through technological practice for a specific purpose and are defined as material products and/or systems that are fully realised in situ. Technological practice also results in other outcomes that are referred to as intermediate outcomes. These intermediate outcomes are very important in technology and technology education, as they are valuable for developing ideas, exploring, testing and communicating aspects of technological outcomes before they are fully realised in situ. These include such things as feasibility studies, conceptual designs, models, prototypes etc.

See the Explanatory Papers Outcome Development and Evaluation, page 28; Characteristics of Technological Outcomes, page 36; and Characteristics of Technology, page 43.

ACHIEVEMENT OBJECTIVES

The achievement objectives are the outcomes for student learning that have been determined to be key for all students across New Zealand. In technology the achievement objectives have been derived from each component within the strands. They provide a generic description of what student achievement should reflect at level 1 through to level 8.

The achievement objectives provide a picture of progression of learning within each component. Achievement objectives represent large 'chunks' of learning. It is expected that a student's individual progress through the levels of achievement will vary and that achievement is related to the student's ability and experience rather than their chronological age. Achievement objectives require interpretation by teachers into the school curriculum (technology programme), and will require further translation into smaller goals for use in the planning and delivery of learning experiences. These smaller goals are referred to as specific learning intentions.

SPECIFIC LEARNING INTENTIONS

Curriculum driven specific learning intentions are derived from the achievement objectives. They reflect the intended technology learning that students will achieve as they participate in learning experiences.

Teachers should also develop specific learning intentions from the additional knowledge and skills required by the context of the learning experience. These are referred to as context driven specific learning intentions and will reflect key knowledge and skills that students will need to develop. These learning outcomes may be technological in nature (for example, graphical knowledge and skills, knowledge of materials, skill in material manipulation, knowledge of existing technological products and systems), or may be derived from other disciplines (for example, science, mathematics, the arts, social sciences, language, psychology etc).

Specific learning intentions should provide opportunity for all students to progress their learning in technology. Therefore, when developing specific learning intentions, teachers will need to draw from their knowledge of where the students' current level of achievement is in relation to the intended learning, and what the next steps in their learning will be.

The technology Indicators of Progression have been developed to help teachers develop and use specific learning intentions that are in keeping with the achievement objectives.

TECHNOLOGY INDICATORS OF PROGRESSION

Indicators of progression have been developed in technology to help teachers mediate the achievement objectives into specific learning intentions. The indicators can be used to plan learning experiences, aid in diagnostic assessment, and support formative interactions within the classroom to help scaffold student learning. They can also support summative assessment for reporting purposes. The indicators are 'indicative' of the level expected by the achievement objective. They do not provide a checklist.

CONTEXT

'Context' in technology education has been used to refer to the overall focus of a technological development or of a technological learning experience within technology education. In order to ensure that the contexts chosen provide for a range of diverse learning opportunities, programmes should include contexts in both senses as explained above. These contexts should cover a range of transformations associated with technology. That is, the transformation of energy, information and/or materials for the purpose of manipulation, storage, transport and/or control.

When talking about the context of a technological development, the term refers to the wider physical and social environment within which the development occurs. For example:

- The context of Zambesi's work was that of rebranding an airline, with a focus on the manipulation of information
- The context of wind generation is sustainable energy generation, with a focus on the storage and control of energy
- The context of a packaged scallop product is marketable food products, with a focus on the manipulation, transport and storage of material and information – Techlink case study

When talking about the context of a technological learning experience the term refers to all the aspects that must be thought about to situate the learning. For example:

- The context in Meeting Seating was outdoor seating within a school environment, with a focus on the manipulation of materials – see Connected Series 2005 Volume 2
- The context in ICT Programming was programme development in ICT, with a focus on the control and storage of information
- The context in Hairs your Gift was hair care, with a focus on the manipulation and storage of materials

ISSUE

An issue in technology refers to a specific subset of the context that will allow students to identify a need or opportunity. For example:

- the issue in Meeting Seating was designing seating that enhances discussion – see Connected Series 2005 Volume 2
- the issue in ICT Programming was developing educational programmes
- the issue in Hairs your Gift was developing hair products

NEED OR OPPORTUNITY

A need in technology refers to an identified requirement of a person, group or environment. A need is identified from an issue, and sits within a context. Technological practice can be undertaken in an attempt to meet an identified need. For example, the need in Meeting Seating was to develop a seat appropriate for a school garden where students could meet for discussions – see Connected Series 2005 Volume 2.

An opportunity in technology refers to an identified possibility for a person, group or environment. An opportunity is identified from an issue, and sits within a context. Technological practice can be undertaken in an attempt to realise an identified opportunity. For example, the opportunity in Hairs your Gift was to create a gift for a selected recipient.

ATTRIBUTES AND SPECIFICATIONS

Attributes are descriptive aspects of the physical and functional nature of a technological outcome. Specifications define the requirements of the physical and functional nature of the outcome in a way that is measurable.

For example, an attribute may refer to the outcome being small enough to be comfortably held, whereas the specification would give the precise measurement in terms of length, width and depth.

FITNESS FOR PURPOSE IN ITS BROADEST SENSE

The concept of 'fitness for purpose' is commonly used to judge the ability of an outcome to serve its purpose in 'doing the job' within the intended location, where the job to be done is clearly defined by the brief. When 'fitness for purpose' is described as being 'in its broadest sense', the concept is extended to include the determination of the 'fitness' of the practices involved in the development of the outcome, (including such things as the sustainability of resources used, treatment of people involved in manufacture, ethical nature of testing practices, cultural appropriateness of trialling procedures, determination of lifecycle and ultimate disposal etc), as well as the 'fitness' of the outcome itself.

Extending the concept in this way is an attempt to locate both the concept of 'fitness for purpose' and its application within a philosophical understanding of the nature of technology whereby the performance of any outcome is but one of the factors that justifies a positive 'fitness for purpose' judgment.

STAKEHOLDERS

Stakeholders are any individuals or groups who have a vested interest in the technological development or technological outcome.

Key stakeholders are those people that are directly influential or will be directly impacted on by the technological practice itself and/or its resulting outcomes (including the technological outcome and any other by-products).

Wider community stakeholders are those people that are less directly influential for or impacted on by the practice or outcome. They can, nonetheless, be identified as having some level of influence, often through others, and/or they may be affected by the project or its outcome in the future.