MINISTRY OF EDUCATION GUIDANCE

INTRODUCTION

This paper provides guidance from the Ministry of Education for school managers, Boards of Trustees, and curriculum leaders in relation to technology education.

It outlines how the learning area of technology fits within *The New Zealand Curriculum* and provides overall guidance for teaching and learning, including some specific guidelines for schools to consider when implementing the technology curriculum in *The New Zealand Curriculum* from 2010.

It also provides specific guidance and suggestions for schools offering programmes for students in years 1-6, years 7-8, years 9-10, and for senior secondary courses.

OVERALL GUIDANCE

Technology is one of the eight learning areas included in *The New Zealand Curriculum*. State and State Integrated schools are required to provide all students in years 1-10 with effectively taught programmes of learning in technology as part of a balanced school curriculum. In line with *The New Zealand Curriculum*, this paper provides advice and guidance for the development of learning programmes for years 11 – 13.

The development of all learning programmes in technology should seek to align with the principles, vision, values and key competencies of *The New Zealand Curriculum*. Decision making about knowledge, skills and competencies in all learning programmes in technology, should be based on the achievement objectives of the technology curriculum in *The New Zealand Curriculum*.

The National Educational Goals (NEGs) and the National Administration Guidelines (NAGs), support the importance of technology for a balanced school curriculum. For example, the development of technological literacy is key to the development of the knowledge and skills needed by New Zealanders to compete successfully in the modern ever-changing world (refer to NEG 3).

School programmes in technology should also provide access for students to a nationally and internationally recognised qualifications system to encourage a high level of participation in post-school education in New Zealand (refer to NEG 8). Technology is included in the canon of subjects for university entrance. Senior secondary courses should where possible, provide appropriate and targeted pathways into the tertiary sector for all students with the potential to further their technology education; as well as providing foundational technological literacy for those moving directly into employment.

A new suite of Technology Achievement Standards has recently been developed to align with *The New Zealand Curriculum*. These standards include a mix of generic technology focussed assessment tools, and those developed for specialist knowledge and skills. Technology Teaching and Learning Guides will provide additional guidance for teacher regarding the development and implementation of technology programmes in the senior secondary school curriculum.

Quality teaching and learning in technology classroom curriculum should also seek to be in keeping with *The New Zealand Curriculum* including its curriculum design and pedagogical guidelines, and the NEGs and NAGs. In particular, planned learning experiences should allow for excellence to be achieved in technology through the establishment of clear learning objectives, monitoring of student performance against those objectives, and the development of learning opportunities to meet individual needs (refer to NEG 6, NAG 1).

A range of assessment practices should also be employed to gather information that is sufficiently comprehensive to enable the progress of students in technology to be supported, evaluated and reported; to students, their parents and subsequent teachers (refer to NEG 2, 6, 7, 9 and 10, and NAG 1, 2 and 6). Technology Indicators of Progression for all three strands are available to help teachers with these aspects of assessment and reporting. These Indicators of Progression have been developed from classroom based research and provide *Teacher Guidance* and student *Indicators* for each technology achievement objective in *The New Zealand Curriculum*.

IMPLEMENTATION OF THE TECHNOLOGY CURRICULUM

The Ministry of Education goals for technology education are: to develop seamless quality technology education for all New Zealand students from early childhood, and through years 1-13, as part of students general education; to raise the quality and effectiveness of teaching and learning in technology; and to promote a focus on the technology curriculum introductory learning area statement and achievement objectives, to provide consistent and coherent messages for teaching and learning in technology.

The technology curriculum in *The New Zealand Curriculum* consists of three strands (Technological Practice, the Nature of Technology and Technological Knowledge) and eight achievement objectives, to support the development of student technological literacy. All three strands of the technology curriculum in *The New Zealand Curriculum* work together to provide opportunity for student's to enhance their technological literacy which is the overall aim for learning in technology.

There is no longer a requirement for schools to provide learning experiences that cover four to six of the seven technological areas that were defined in *Technology in the New Zealand Curriculum* (1995). Schools are now expected to develop coherent learning programmes in technology across a broad range of contexts. These should draw from and consider a variety of fields associated with communities of technological practice.

In the senior secondary area, schools may wish to develop courses that begin to differentiate technology to allow for greater specialisation. The generic technology achievement objectives at levels 6, 7 and 8 of *The New Zealand Curriculum,* alongside the Body of Knowledge developed to support specialist knowledge and skills, provide guidance for the development of more specialised courses. Such technology courses should focus on a mix of generic technology achievement objectives, and learning objectives from within or across specialist categories, to offer learning experiences that best meet the needs of students and optimise individual schools' teaching expertise and resources.

To further increase student engagement and gain access to mentoring support networks, schools may also incorporate many of the technology related awards and competitions available into their technology programmes. Examples of these include Realise the Dream, CREST, Bright Sparks, the Transpower Neighbourhood Engineers Award, Young Designer Award.

The support material in The Technology Curriculum Support package is provided to aid the development of understandings of the revised technology curriculum and help teachers and curriculum leaders as they implement the technology curriculum in *The New Zealand Curriculum.* Until 2010, additional resource material available on Technlink to support teachers in developing programmes and pedagogical strategies has been largely focussed on the Technological Practice strand. From 2010 additional resources are being progressively added to the Techlink website to support teachers with the Technological Knowledge and Nature of Technology strands.

RECOMMENDATIONS FOR ALL TEACHERS

When developing implementation plans for technology it is recommended that you consider the following:
- All three strands of technology should be incorporated into comprehensive school technology programmes
- Technology programmes should provide a coherent structure across time. It is expected that within a learning programme individual units of work would be developed to ensure there is adequate opportunity for students to progress their learning across all eight achievement objectives over time and therefore provide students with a comprehensive education in technology
- Teaching and learning experiences should be planned to ensure contexts for learning provide robust multilevel learning opportunities related to the selected achievement objective/s. No single teaching unit is expected to focus on all eight achievement objectives
- The *Teacher Guidance* within the Indicators of Progression for each achievement objective should be used to support the planning and implementation of learning experiences
- The student *Indicators* within the Indicators of Progression for each achievement objective should be used to support diagnostic, formative and summative assessment to support student progression
- Assessing and reporting student achievement should be focussed on the achievement objectives and as

students move from one programme of technology to another, all achievement objectives should be reported on.

To support the vision for seamless quality technology education, it is essential that technology teachers in early childhood centres and primary, intermediate and secondary schools have an understanding of technology education and what progression in technology learning looks like.

Working from the technology curriculum in *The New Zealand Curriculum,* student achievement can be enhanced by effective pedagogical strategies (including formative assessment strategies) and these should be guided by the achievement objectives and their associated teacher guidance and indicators. Data providing evidence of individual student achievement can be recorded and provided to subsequent teachers to ensure 'next step learning' is effectively communicated across different learning sites. This will help remove barriers that often exist at transition points and support seamless technology education. This in turn provides opportunity for all students to develop a fundamental level of technological literacy through their compulsory schooling that will help them participate fully in a technological society. This technological literacy will also support students to continue in senior secondary courses, progressing their understandings of and in technology, and improving their performance in NCEA technology achievement standards.

Years 1- 6 It is recommended that teachers consider:

- Ensuring links are made to entry and destination programmes and develop reporting mechanisms to communicate progress data that supports seamless learning for students
- Planning programmes with the aim of ensuring all students are working at a minimum of level 3 of *The New Zealand Curriculum by the end of year 6*
- Drawing from their existing pedagogical strengths to ensure they provide technology learning experiences that focus on progressing student learning in technology; and seek to increase their pedagogical content knowledge in technology
- Developing their own knowledge and skills related to all eight achievement objectives of the technology curriculum in ways that can support a broad range of contexts
- Working with their local community to access available resources and expertise
- Plan technology learning experiences that provide authentic contexts which allow for the development of key competencies and for supporting values education
- Planning technology learning experiences that enhance student general literacy and numeracy
- Planning to use technology contexts that encourage links to be made with other learning areas.

Years 7- 8 It is recommended that teachers consider:

- Ensuring links are made to entry and destination programmes and develop reporting mechanisms to communicate progress data that supports seamless learning for students
- Planning programmes with the aim of ensuring all students are working at a minimum of level 4 of *The New Zealand Curriculum by the end of year 8*
- Drawing from and expand their existing knowledge and skills to ensure provision of quality learning experiences for students in keeping with all eight achievement objectives and allow for a broad range of contexts
- Developing their pedagogical strategies to ensure effective use is made of specialist equipment, resources and facilities in ways that support progression based learning for students in technology
- Plan technology learning experiences that provide authentic contexts which allow for the development of key competencies and for supporting values education
- Planning technology learning experiences that enhance student general literacy and numeracy
- Increasing links between specialist technology and generalist classroom teachers to enhance programme planning and encourage links to other learning areas
- Making clear links for their students to technology related careers.

Years 9- 10: It is recommended that teachers consider:

- Ensuring links are made to entry and destination programmes and develop reporting mechanisms to communicate progress data that supports seamless learning for students

- Planning programmes with the aim of ensuring all students are working at a minimum of level 5 of *The New Zealand Curriculum by the end of year 10*

- Drawing from and expanding their existing knowledge and skills to ensure they provide quality learning experiences for students that are in keeping with all eight achievement objectives and allowing for a broad range of contexts

- Developing their pedagogical strategies to ensure effective use is made of specialist equipment, resources and facilities to support progression based learning for students in technology

- Working alongside other technology teachers within department or faculty to ensure coherency between learning experiences and coverage of a broad range of contexts as part of year 9 and 10 compulsory technology programmes

- Planning technology learning experiences that provide authentic contexts which allow for the development of key competencies and for supporting values education

- Planning technology learning experiences to enhance student general literacy and numeracy

- Making clear links for students to technology related careers, and support students in their future learning and/ or career pathway planning.

Senior Secondary Courses: It is recommended that teachers consider:

- Planning initial courses in technology that are flexible enough to meet student interest across a range of technologies, develop student capability, and allow students a broad base for a range of choices in the future

- Providing students with the opportunity to progress to Level 6 of *The New Zealand Curriculum and gain Level 1 technology achievement standards*

- *Recognising some students may benefit from initial technology courses running over two years in order to progress to curriculum Level 6 and gain NCEA Level 1 technology achievement standards.*

- Providing students in subsequent courses with the opportunity to progress to Level 7 and/or 8 of *The New Zealand Curriculum and gain NCEA Level 2 and/or 3 technology achievement standards respectively*

- *Considering offering opportunity for students to gain additional technology related national certificates at NQF Level 1, 2 and/or 3 through technology courses from other providers such as ITO's*

- Drawing from and expanding their existing knowledge and skills to ensure they provide quality learning experiences for students that support achievement at levels 6, 7 and 8 of *The New Zealand Curriculum*

- Drawing from and expanding their existing specialist knowledge and skills to ensure they provide quality learning experiences for students to support achievement within or across the four specialist categories of technology

- Working alongside teachers from other learning areas to ensure students' overall programmes are complementary, and that opportunities for cross curricula learning are maximised. For example, a chemistry course could be taken that supports students doing food technology

- Ensuring up to date understanding of requirements/desires of relevant industry and tertiary organizations that optimize future pathways for students

- Making clear links for students to technology related careers and supporting students in exploring future education opportunities and/or career pathways

- Using mentors from communities of technological practice and encouraging students to work with real clients as appropriate.

For further explanation of the ideas presented in this paper, please refer to relevant sections contained in the Technology Curriculum Support package.