



# LITERACY AND NUMERACY TEST FOR INITIAL TEACHER EDUCATION STUDENTS

Assessment framework



Australian Government  
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aitsl

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Limited

ACER

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## **PREAMBLE**

The Australian Council for Educational Research (ACER) was contracted by the Australian Institute of Teaching and School Leadership (AITSL) to develop the assessment framework and the pools of assessment items for the first two years of implementation of an assessment of aspects of literacy and numeracy for students enrolled in initial teacher education courses. The program is known as the literacy and numeracy test of initial teacher education students, hereafter referred to as the Test.

In order to ensure high quality and fitness for purpose of the assessments, ACER convened an expert advisory group for each of literacy and numeracy, consisting of members bringing expertise in literacy or numeracy assessment, or teacher education, or both. One of the main tasks of the expert groups was to advise on the development of the assessment framework.

The assessment framework document underwent several iterations: first as a discussion paper presented to the initial literacy and numeracy expert group meeting in September 2013; then as a version revised in light of the expert groups' discussion to incorporate its recommendations; and subsequently for consideration by a Literacy and Numeracy Steering Committee convened by AITSL, which met in October 2013.

The draft assessment framework that emerged from these reviews underpinned the development of the assessment instruments for literacy and numeracy over the ensuing months. Instrument development was also overseen by the expert groups at regular intervals, and the assessment items reviewed in light of their adherence to the framework. A field trial of the literacy and numeracy items was conducted in universities across Australia in the second half of 2014 and early 2015.

This version of the assessment framework has been revised in light of the results of the field trial and reflects the process of development of the assessment construct to date. As a work in progress, the framework may undergo further reviews and revisions as the Test program matures.

The assessment framework has been prepared by members of the ACER project team, in consultation with AITSL. ACER and AITSL gratefully acknowledge and thank the expert groups who have contributed to the conceptual development of the assessment framework.

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The framework begins by giving some background and context to the development of a literacy and numeracy test for students enrolled in initial teacher education courses. Following this are separate sections on literacy and numeracy, outlining content specific to each domain. The body of the framework concludes with notes on aspects of the Test that are common to literacy and numeracy. Appendices provide sample literacy and numeracy items, and a brief review of comparable assessment programs from around the world that were reviewed as background to the development of the framework.

## INTRODUCTION

### Overview

The literacy and numeracy tests for initial teacher education students (hereafter referred to as ‘the Test’) aims to assess aspects of the literacy and numeracy proficiency of students in initial teacher education programs in Australia, to support the goal that graduates of initial teacher education programs demonstrate literacy and numeracy skills as per the National Program Standards. This outcome is associated with an expectation that the personal literacy and numeracy skills of students graduating from initial teacher education courses be in the top 30% of the Australian population.

The purpose of this assessment framework is to define the aspects of literacy and numeracy relevant to the context of the Test and to provide details of how these aspects of literacy and numeracy are measured so that the necessary judgements of student proficiency can be made. It is important to acknowledge that the aspects of literacy and numeracy measured in the Test do not span the full range of literacy and numeracy capabilities required of practising teachers. The aspects in this framework are those that can be validly measured under the practical constraints of a point-in-time computer-based assessment delivered to a large number of candidates. One key component of the expert review and iterative development of this assessment framework was to consider the degree to which the aspects of literacy and numeracy included in the framework and consequently the Test can be regarded as core rather than peripheral to the broader personal literacy and numeracy of potential Test candidates.

For the sake of simplicity, henceforth in this document the terms *literacy* and *numeracy* are used to refer to the two domains included in the Test.

This framework begins with a description of the background to the program. Following this are separate sections on literacy and numeracy, outlining content specific to each domain. The framework concludes with notes on aspects of the Test that are common to literacy and numeracy. Sample literacy and numeracy items are provided in Appendix 1 and, together with information showing how they reflect the framework content.

### Background

In 2011 all Education ministers agreed to a national approach to the accreditation of initial teacher education programs. Standards 3.1 and 3.2 of the National Program Standards in the *Accreditation of Initial Teacher Education Programs in Australia* describe the levels of literacy and numeracy required by new teachers:

- 3.1 All entrants to initial teacher education will successfully demonstrate their capacity to engage effectively with a rigorous higher education program and to carry out the intellectual demands of teaching itself. To achieve this, it is expected that *applicants’ levels of personal literacy and numeracy should be broadly equivalent to those of the top 30 per cent of the population* (our italics); and
- 3.2 Providers who select students who do not meet the requirements in 3.1 above must establish satisfactory additional arrangements to ensure that all students are supported to achieve the required standard before graduation.

The Australian Institute for Teaching and School Leadership (AITSL) commissioned the development of an online test to assess the personal literacy and numeracy of initial teacher education students prior to graduation. The test assesses whether students meet the level of personal literacy and numeracy required by the *Accreditation of Initial Teacher Education Programs in Australia: Standards and Procedures*; that is, that all applicants' levels of personal literacy and numeracy should be broadly equivalent to those of the top 30 per cent of the adult population.

Development of the assessment began with drafting of the framework, with reference to relevant international and national programs and assessment literature. Australia is not alone in having an interest in assessing the personal numeracy and literacy of prospective teachers. Approaches used in England, the United States and Chile have some parallels with the approach taken in Australia, and there are also some relevant programs and aspects of programs in other countries. Appendix 3 provides a brief survey of teacher-focused assessment programs being implemented in other countries that provided useful reference points for the development of the Test.

Two programs concerned with general adult literacy and numeracy in Australia are immediately relevant to the development of the Test: namely, the Australian Core Skills Framework (ACSF) and the Programme for International Assessment of Adult Competencies (PIAAC). Both were drawn on extensively to underpin the concepts and constructs to be assessed by the Test.

### ***The Australian Core Skills Framework***

The pre-eminent description of generic adult literacy and numeracy in Australia is the Australian Core Skills Framework (ACSF) (Commonwealth of Australia, 2012).<sup>1</sup> The ACSF evolved from the Australian National Reporting System (NRS), which had been in use in Australia since 1995. The Australian Government released the ACSF in 2008 as a multi-purpose framework that is used to support teaching and learning, as well as benchmarking adult learners against levels. Because of its status and visibility in Australian adult education (and in this case with reference to adult literacy and numeracy) the ACSF was chosen to be the starting point for the development of the literacy and numeracy frameworks for the Test. The described levels in the ACSF also provide the reference framework against which the item development plan for the Test was established.

The ACSF was neither intended nor designed to be an assessment framework for the purposes of developing assessments of initial teacher education students, and its content is too broad to serve this purpose. However, the ACSF definitions relating to literacy (reading and writing) and numeracy were used to inform the relevant definitions in this framework, and the descriptions of the levels of the ACSF were used to help elaborate the kinds of skills that the assessment items should address within each domain.

The ACSF does not specify, to the level of detail required in an assessment framework for a program such as the Test, the measurable content and skills (such as reading processes or numeracy content) that underpin the definitions of literacy and numeracy. Accordingly, it was necessary to look beyond the ACSF to support development of the frameworks for the Test.

### ***The Programme for International Assessment of Adult Competencies***

The Programme for International Assessment of Adult Competencies (PIAAC), commissioned by the OECD, was administered in 24 countries between 2011 and 2012 and a further nine countries

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<sup>1</sup> Full text and supporting documentation for the ACSF can be found at:  
<http://www.innovation.gov.au/skills/LiteracyAndNumeracy/AustralianCoreSkillsFramework/Pages/default.aspx>

between 2012 and 2016. PIAAC evolved from two earlier international adult skills surveys, the International Adult Literacy Survey (IALS), administered in 21 countries between 1994 and 1998, and the Assessment of Adult Literacy and Life Skills (ALLS), administered in 11 countries between 2004 and 2007. Australia has participated in all three surveys (Australian Bureau of Statistics, 2007, 2013; McLennan, 1997; Skinner, 1997). The adult literacy surveys have been built on internationally developed and endorsed assessment frameworks (Murray, Clermont, & Binkley, 2005; OECD, 2010a; OECD & STATCAN, 1995). As the most recent iteration, and with its frameworks for adult literacy and numeracy, PIAAC provides useful content to inform development of this framework.

## LITERACY FRAMEWORK

The literacy framework defines and explicates literacy as assessed in the Test.

The literacy test comprises reading and technical skills of writing. The literacy test does not include extended written communication, oral or aural modes of literacy. While it is acknowledged that these skills are essential attributes of literacy, it is not possible to assess the full scope of literacy within the constraints of the Test. As indicated in the previous section, the definition and explication of literacy developed for use in the Test program draws on those described in the ACSF and PIAAC.

### Definition of literacy

The ACSF provides separate definitional descriptions of reading and writing.

The ACSF defines reading as follows:

*The core skill of Reading describes a reader's performance in making meaning from different text types, including their awareness of an author's purpose and intended audiences, of their own purposes for reading, and of the role they themselves play in the construction of meaning. (Commonwealth of Australia, 2012, p. 41)*

Some parts of this definition – such as the focus on ‘making meaning’ as the key skill and including different text types – can be reflected in the literacy assessment framework for the Test. Other parts of this definition apply to more general teaching and learning contexts and cannot be used here. Assessing students’ own purposes for reading or the role they play in the construction of meaning is outside the scope of the Test.

The ACSF defines writing as follows:

*The Writing core skill identifies a set of skills, knowledge and strategies concerned with the ability to shape written language according to purpose, audience and context. Effective writers employ a combination of strategies, including 'big picture' strategies (eg. audience and purpose) and strategies around the 'mechanics' of writing (eg. spelling and punctuation). The writer needs to consider the appropriate text type to convey the message in each context.*

*The Writing skill includes traditional pen and paper modes of writing. In different contexts it can also include other forms of writing such as computer literacy (eg. word processing, chat or emailing), and other technologies such as mobile phone SMS. (Commonwealth of Australia, 2012, p. 72)*

Several elements of this description are relevant to the Test. The elements of writing referred to as ‘mechanics’ in the ACSF are key and explicit elements of the technical skills of writing. Moreover, since understanding of audience and purpose are integrated into the structure, register and vocabulary choices of written text, the ‘big picture’ elements referred to in the ACSF are also components of technical skills of writing that can be assessed in the Test.

PIAAC defines literacy as:

*understanding, evaluating, using and engaging with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential. (OECD, 2012, p. 3)*

Although the PIAAC construct is called ‘literacy’, the assessment is confined to reading literacy and does not include any elements of writing. The processes of ‘understanding’, ‘evaluating’ and ‘using’ in the PIAAC definition provide clear guidance about the kinds of reading processes that need to be assessed. The reference to ‘written texts’ frames the range of text types for inclusion in the assessment. The PIAAC definition also provides guidance about the purpose of the reading tasks that should be included in the assessment: the texts included in the assessment should be the kinds of texts that could assist readers to participate in society, achieve goals and develop their own knowledge and potential.

The PIAAC literacy definition refers to ‘engagement’ as part of literacy and assesses engagement through a questionnaire about reading habits and enjoyment of reading. Because the Test does not propose to measure or survey this aspect of literacy its definition of literacy does not include any reference to engagement. It is noted, however, that engagement in literacy is an essential attribute of the literate individual.

The PIAAC definition was selected ahead of the ACSF definition as the starting point for the literacy definition applicable to the Test because of its greater focus on the measureable literacy skills that are relevant in an assessment context. Because the Test includes some focus on technical skills of writing (as an indicator of writing ability), it is necessarily broader than the PIAAC definition, which focuses on reading literacy alone.

Furthermore, given the specific purpose of the assessment – to measure the personal literacy of prospective teachers – the definition of literacy for the Test includes specific contextual focus on teaching and education.

**Personal literacy, for the purpose of the Test, is defined as:**

*understanding, evaluating, using and shaping written texts to participate in an education community, to achieve one’s goals, and to develop one’s knowledge and potential as a teacher.*

***Balance between reading and technical skills of writing***

The assessments of reading and the technical skills of writing are administered in a single literacy test. It is recognised that writing can only be partially assessed in this instrument; therefore, the proportion of the literacy assessment dedicated to writing skills is smaller than that dedicated to reading, which can be more comprehensively measured. Two-thirds of the literacy test assesses reading and one-third technical skills of writing.

While the overarching definition of literacy underpins both reading and the technical skills of writing, they are dealt with separately in the following discussion.

**Reading**

This section begins with details of different aspects of the reading texts (and their relevant test items) used in the Test, followed by an explanation of the reading processes measured in the assessment.

***Text medium***

The medium for the texts used as stimulus in this assessment is digital in the sense that the assessments are computer delivered. The texts are print-style texts that are to be read on-screen and do not include interactive multi-layered digital texts.

### ***Text format***

The Test draws on descriptions of text formats used in the ACSF and PIAAC. Both the ACSF and PIAAC identify continuous and non-continuous text as the major text formats. The ACSF definition is taken from the same source as that for PIAAC: the reading framework for the Programme for International Student Assessment (PISA) (OECD, 1999).

*Continuous texts* are defined as those in which sentences are organised into paragraphs, pages, sections and chapters.

*Non-continuous texts* organise information in graphic or diagrammatic forms such as lists, tables, graphs, maps or forms.

The 2009 PISA reading framework and the PIAAC literacy framework introduce the hybrid text format, *mixed texts* (OECD, 2010a, 2012). Few texts are purely non-continuous. There is usually at least a brief introduction or some explanatory notes that are in continuous text format. *Mixed texts* include sections of continuous and non-continuous text. It is useful to differentiate predominantly non-continuous texts, in which clearly more than half the content is in a non-continuous format, from mixed texts that have half or less of the content in a non-continuous format.

The reading assessment in the Test uses these three categories of text format.

Test items are classified according to the text formats to which they refer. Where stimulus is in *mixed text* format, items that address a continuous section of the text are classified as *continuous* and items that address a non-continuous section are classified as *non-continuous*. Only items that require the reader to draw on both continuous and non-continuous parts of the stimulus are classified as *mixed text* format. It follows that the proportion of items that are classified as *mixed* in terms of text format may be smaller than the proportion of texts that would be classified in this way. Table 1 shows the target proportions of test items for each of the text format categories.

**Table 1: Target proportions of reading items in each text format category**

<b>Text format</b>	<b>Proportion of reading items</b>
Continuous	Approximately 45–55%
Non-Continuous	Approximately 20–30%
Mixed	Approximately 10–20%

### ***Text type***

While *text format* refers to the structure of the text, *text type* refers to the purpose or orientation of the text – sometimes called ‘genre’. The ACSF identifies seven text types. The PIAAC framework refers to six text types that are more or less equivalent to the ACSF’s. The Test includes seven text types largely modelled on those described in the ACSF and PIAAC, since teachers may reasonably be expected to encounter all of these text types as part of their professional life. Table 2 shows the text types included in the ACSF, PIAAC and the Test.

**Table 2: Text type in the ACSEF, PIAAC and the Test**

ACSEF	PIAAC	The Test
Creative	Narration	Narrative
Descriptive	Description	Descriptive
Informative	Exposition	Informative
Persuasive	Argumentation	Persuasive
Procedural	Instruction	Procedural
Regulatory	–	Regulatory
Technical	Records	Technical

For the Test, the term *narrative* has been used rather than *creative* because it is more easily recognised and more clearly defined in the literature as a text type. The narrative texts selected for the reading assessment may include realistic and imaginative scenarios from fiction and drama, as well as biographies and autobiographies, but are unlikely to include poetry or such genres as fantasy. It is considered important to include narrative texts in the literacy assessment because they typically present language structures and features that are not commonly found in other text types, and also because they often reflect human affect and relationships – areas of strong concern to prospective teachers.

The ACSEF provides examples of each of the other text types (Commonwealth of Australia, 2012, p. 9). Adaptations of these are presented here by way of elaboration of the text-type categories.

*Descriptive:* recount of a school excursion; essay comparing two pedagogical approaches.

*Informative:* school newsletter; research paper on main developments in school buildings in the last 20 years.

*Persuasive:* report to principal presenting argument and recommendations for new equipment.

*Procedural:* standard operating procedures for use of digital whiteboards; fire drill instructions.

*Regulatory:* professional development course completion requirements; education department directive.

*Technical:* tabular information on features of a new computer system in a school library.

While it is possible to ensure that there is a range of text types across the item pool, it is not possible to ensure that each test form (that is, each individual test that could be administered to an individual student) includes the full complement of text types. Consequently, the text types have been grouped into three categories, with the aim that all three text-type categories are represented in each test form. The first category comprises the *descriptive*, *informative* and *persuasive* text types; the second category comprises the *procedural*, *regulatory* and *technical* text types; and the *narrative* text type remains distinct in this arrangement. These classifications will be used for the purpose of assembling test forms, but the seven text types identified in the reading framework for the Test are used during test item development to ensure balance of text types across the full item pool.

The target proportions of test items for each of the broad text-type categories of reading texts are shown in Table 3.

**Table 3: Target proportions of reading items in each text-type category**

<b>Text type</b>	<b>Proportion of reading items</b>
Descriptive, informative and persuasive	45–55%
Procedural, regulatory and technical	25–35%
Narrative	15–25%

These targets apply at test form level, as well as across the full item pool.

### ***Text length and number of texts***

Texts in the reading assessment for the Test range from around 100 words (for some non-continuous texts) to around 900 words.

Using a range of shorter texts in the reading item pool allows for the inclusion of a diversity of text types, contexts and topics. Moreover shorter texts are well suited to reading on a computer screen with minimal scrolling. On the other hand, longer texts are an essential part of real-world reading, and can be used to assess a wider range of reading processes than shorter texts, as readers need to deal with more information and to track ideas within and across the text. It is important to include some longer texts in the Test to allow for the full range of requisite reading skills to be assessed.

Each reading test completed by a student will include a variety of shorter and longer texts. The aim is to balance the reading load across the individual test forms. In the assessment, longer texts are typically associated with larger numbers of items than shorter texts. This means that the amount of reading time per test item is relatively consistent.

### ***Topics***

Material is selected that is likely to have broad appeal. The set of texts encompasses diverse topics, points of view and life experiences. Some texts are unavoidably of more interest to particular students than others, but each test form contains a variety of topics, with the intention that the overall content of each test form is of a similar level of interest to all students.

Texts are selected deliberately to include material that is unlikely to be familiar to the students – in the form of new ideas, structure or language, or a combination of all three. One of the main purposes of reading is to gain new information and understanding – we read to learn – and therefore an assessment of reading literacy legitimately measures, in part, whether learning from a text is occurring.

### ***Complexity***

There is not always a simple match between text complexity and question difficulty. Complex questions can be based on simple texts and, conversely, simple questions can be based on complex texts. Most complex texts are themselves a mix of complex and simple aspects. For example, a linguistically simple and clear text is more complex when based on unfamiliar content than on familiar content. The reading items for the Test are constructed taking into account the interplay between task difficulty and text complexity. The different levels of complexity among the texts in the reading test allow for targeting of test items at varying levels of difficulty.

The introduction to the ACSF includes a summary definition of the complexity of contexts and texts across all of the skills areas of the ACSF, at each of Levels 1 to 5 (Commonwealth of Australia, 2012, p. 7). The definitions for Levels 2 to 5 – those relevant to the Test – are shown in Table 4.

**Table 4: ACSF definitions of context and text complexity, Levels 2 to 5**

<b>Level</b>	<b>Context</b>	<b>Text Complexity</b>
2	Familiar and predictable contexts Limited range of contexts	Single familiar texts with clear purpose Familiar vocabulary
3	Range of familiar contexts Some less familiar contexts Some specialisation in familiar/known contexts	Routine texts May include some unfamiliar elements, embedded information and abstraction Includes some specialised vocabulary
4	Range of contexts including some that are unfamiliar and unpredictable Some specialisation in less familiar/known contexts	Complex texts Embedded information Includes specialised vocabulary Includes abstraction and symbolism
5	Broad range of contexts Adaptability within and across contexts Specialisation in one or more contexts	Highly complex texts Highly embedded information Highly specialised language and symbolism

These descriptions of complexity are used as a guide in selecting the reading texts for the Test.

### ***Reading Processes***

Reading processes are the skills or cognitive processes that readers deploy to make meaning from texts. Both the ACSF and PIAAC frameworks refer to reading processes.

The descriptions of task complexity from Level 1 to Level 5 of the ACSF reflect the hierarchy in Bloom’s Taxonomy (Bloom, 1956), with locating and recognising skills in Level 1, advancing to simple interpreting and sequencing at Level 2, then sequencing, integrating, interpreting, simple extrapolating, simple inferencing and simple abstracting at Level 3. At Level 4 this becomes extracting, extrapolating, inferencing, reflecting and abstracting and by Level 5 the processes become synthesising, critically reflecting, evaluating and recommending (Commonwealth of Australia, 2012, pp. 50-67).

This hierarchy is not so clearly evident in reading assessment frameworks or empirical data from reading assessments. Typically, readers at every stage of development engage in all of the above activities to some extent. Even very young readers reflect on what they are reading, relating it to their own lives. Highly proficient readers continue to locate and identify information. In practice, task difficulty and text complexity are strongly associated. Tasks that require a reader to identify information can range in difficulty from low to high because the task is easy when it is applied to a simple text and hard when it is applied to a complex text. Similarly, making inferences or

synthesising information is not inevitably difficult. Given a simple text and a familiar idea with prominent clues, inferencing will be a simple task. Increasing the complexity of the text, the unfamiliarity of the idea and the subtlety of the clues makes it a complex task.

In contrast to the ACSF, PIAAC takes an approach that identifies three broad processes of reading that are demonstrable through all reading levels. These processes were first defined in PISA (there they are called ‘aspects’); a similar set of variables is used in the Progress in International Reading Literacy Study (PIRLS) (see for example Mullis, Martin, Kennedy, & Foy, 2007). The PIAAC and parallel PISA terms are shown in Table 5.

**Table 5: Reading processes in PIAAC and PISA**

<b>PIAAC processes</b>	<b>PISA aspects</b>
Access and identify	Access and retrieve
Integrate and interpret	Integrate and interpret
Evaluate and reflect	Reflect and evaluate

Extracts from the PISA reading literacy aspect subscales, shown in Figure 1, illustrate the increasing complexity of the three reading processes over the levels of the PISA scale (OECD, 2010b, pp. 59, 63, 66). The descriptions of Levels 2 to 6, shown here, provide some guidance to test developers about the level of complexity of the tasks that are required for this assessment.<sup>2</sup>

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<sup>2</sup> The PISA descriptions are used here because PIAAC has not provided reporting on the development of reading processes across levels at the same level of detail.

Level	Access and retrieve	Integrate and interpret	Reflect and evaluate
6	Combine multiple pieces of independent information, from different parts of a mixed text, in an accurate and precise sequence, working in an unfamiliar context.	Make multiple inferences, comparisons and contrasts that are both detailed and precise. Demonstrate a full and detailed understanding of the whole text or specific sections. May involve integrating information from more than one text. Deal with unfamiliar abstract ideas, in the presence of prominent competing information. Generate abstract categories for interpretations.	Hypothesise about or critically evaluate a complex text on an unfamiliar topic, taking into account multiple criteria or perspectives, and applying sophisticated understandings from beyond the text. Generate categories for evaluating text features in terms of appropriateness for an audience.
5	Locate and possibly combine multiple pieces of deeply embedded information, some of which may be outside the main body of the text. Deal with strongly distracting competing information.	Demonstrate a full and detailed understanding of a text. Construe the meaning of nuanced language. Apply criteria to examples scattered through a text, using high level inference. Generate categories to describe relationships between parts of a text. Deal with ideas that are contrary to expectations.	Hypothesise about a text, drawing on specialised knowledge, and on deep understanding of long or complex texts that contain ideas contrary to expectations. Critically analyse and evaluate potential or real inconsistencies, either within the text or between the text and ideas outside the text.
4	Locate several pieces of embedded information, each of which may need to meet multiple criteria, in a text with unfamiliar context or form. Possibly combine verbal and graphical information. Deal with extensive and/or prominent competing information.	Use text-based inferences to understand and apply categories in an unfamiliar context, and to construe the meaning of a section of text by taking into account the text as a whole. Deal with ambiguities and ideas that are negatively worded.	Use formal or public knowledge to hypothesise about or critically evaluate a text. Show accurate understanding of long or complex texts.
3	Locate several pieces of information, each of which may need to meet multiple criteria. Combine pieces of information within a text. Deal with competing information.	Integrate several parts of a text in order to identify the main idea, understand a relationship or construe the meaning of a word or phrase. Compare, contrast or categorise taking many criteria into account. Deal with competing information.	Make connections or comparisons, give explanations, or evaluate a feature of a text. Demonstrate a detailed understanding of the text in relation to familiar, everyday knowledge, or draw on less common knowledge.
2	Locate one or more pieces of information, each of which may need to meet multiple criteria. Deal with some competing information.	Identify the main idea in a text, understand relationships, form or apply simple categories, or construe meaning within a limited part of the text when the information is not prominent and low-level inferences are required.	Make a comparison or connections between the text and outside knowledge, or explain a feature of the text by drawing on personal experience or attitudes.

**Figure 1: PISA Reading Literacy described scale, by process**

The PISA described process subscales are based on the assessment of 15-year-olds, but it is likely that adults demonstrate a similar progression in the development of these reading processes. The *PIAAC Reader's Companion* refers to the processes described in PISA and PIAAC as 'the same' (OECD, 2013b, p. 88).

There is some psychometric evidence to support the distinction between these three aspects from PISA data (Kirsch et al., 2002; OECD, 2010b). Although the PISA aspects are more fully developed at this stage, the PIAAC terms are used for this reading framework because of the adult focus of the assessment.

*Access and identify* is about locating one or more pieces of information in the text.

*Integrate and interpret* is about relating parts of the text to each other, construing implied meanings within the text, and coming to an understanding of the text as a whole.

*Evaluate and reflect* is about relating the text to knowledge, ideas or values that are external to the text.

Evaluate and reflect questions most commonly require students to respond in writing and consequently require human scoring (or machine scoring that is beyond the current scope of the Test). However, it is possible to write some evaluate and reflect questions in machine-scorable formats and up to 20% of the reading questions for the Test assess the evaluate and reflect process.

The target proportions of test items for each of the reading process categories are shown in Table 6.

**Table 6: Target proportions of reading items in each process category**

<b>Process category</b>	<b>Proportion of reading items</b>
Access and identify	35–45%
Integrate and interpret	40–50%
Evaluate and reflect	10–20%

While the whole item pool reflects these proportions of items, there may be some variation in the proportions within each test form.

## **Technical skills of writing**

The Test does not include an assessment of writing in continuous prose, and it is acknowledged that testing the technical skills of writing will only provide a partial measure of prospective teachers’ global writing proficiency. It is assumed that other aspects of writing proficiency, such as the ability to communicate complex information, argument and exposition, are thoroughly and regularly assessed in students’ initial teacher education courses. The assessment of the technical skills of writing should thus be viewed as a measure of some important but constrained aspects of writing literacy.

### ***Content***

The ACSF includes 10 focus areas for writing, which have been used to guide the development of the technical skills of writing in the framework for the Test (as indicated previously, PIAAC does not assess writing.) These ACSF focus areas for writing are shown in Table 7.

**Table 7: ACSF focus areas for writing**

<b>Audience, purpose and meaning-making</b>	<b>The mechanics of writing</b>
<ul style="list-style-type: none"> <li>• Range</li> <li>• Audience and purpose</li> <li>• Structure and cohesion</li> <li>• Register</li> <li>• Plan, draft, proof and review</li> </ul>	<ul style="list-style-type: none"> <li>• Vocabulary</li> <li>• Grammar</li> <li>• Punctuation</li> <li>• Spelling</li> <li>• Legibility</li> </ul>

The assessment of writing in the Test is limited by the decision to deliver it as entirely computer-based and automatically scored. Nevertheless, a subset of the ACSF focus areas of writing is both relevant to and able to be assessed as part of the assessment of the technical skills of writing. Assessable elements include all of those listed in Table 7 in the column headed ‘The mechanics of writing’ with the exception of *legibility* (which is not relevant in the computer-based format). Assessable elements are also found in the column headed ‘Audience, purpose and meaning-making’: *structure and cohesion*, and *plan, draft, proof and review* (not including *draft*). The skills of planning, proofing and reviewing are required in items that, for example, require students to locate errors (such as mistakes in spelling or punctuation) or to suggest the best order of presentation of ideas in a text. In addition, an understanding of audience, purpose and register is implicit in appropriate word usage and syntax.

The technical skills of writing assessed in the Test, together with their relevant ACSF writing focus areas, are shown in Table 8 and followed by brief notes on how each skill may be assessed in the Test.

**Table 8: The technical skills of writing assessed in the Test and their corresponding ACSF focus areas**

Technical skill of writing in the Test	ACSF focus area
Syntax and grammar (including punctuation)	Grammar, punctuation
Spelling	Spelling
Word usage	Vocabulary, audience and purpose, register
Text organisation	Structure and cohesion

The *syntax and grammar* content area includes the use of appropriate verb forms, subject/verb agreement, and correct use of pronouns (including relative pronouns). Punctuation performs both syntactic and grammatical functions in written language, so it is treated as part of this content area. Elements of punctuation assessed in the Test include the use of commas and apostrophes, and the punctuation of speech. Students may be asked to identify errors or to generate a correct or appropriate form in a given short text.

*Spelling* in the assessment focuses on words that are frequently misspelled and that are likely to be part of a teacher’s personal or professional vocabulary. There is a focus on the spelling of words with regular patterns or those that are common but have irregular forms. Like *syntax and grammar*, *spelling* is assessed through the identification of errors and generation or identification of the correct form in short texts.

In the *word usage* category, vocabulary is assessed by students identifying the word that is closest in meaning to a given word. At a minimum the given word is placed in a sentence, but the sentence may give little clue as to the meaning of the word. Writing involves not just knowledge of words but also an understanding of how they can be used in specific contexts. Good writers are able to draw on a wide vocabulary to present ideas precisely and concisely. They choose words that are appropriate to the purpose, audience and context. Understanding and use of register, including a sense of audience and purpose, may be measured in single items with specifically created stimulus, or in the context of a longer text.

*Text organisation* is about structuring texts so that they are logical and coherent. This occurs at the level of a whole text, through a logical progression of ideas (for example, coherence across

paragraphs); and also more locally with the use of syntactic features such as reference, and lexical features such as discourse markers and connectives (cohesion within sentences and paragraphs). In the assessment of this content area, students may be asked to nominate the appropriate location in a text for a designated phrase, paragraph or idea; to reorder the sentences in a given text; or to identify an ambiguity caused by poor cohesion.

The target proportions of test items for each of the categories of the technical skills of writing content areas are shown in Table 9.

**Table 9: Target proportions of items in each technical skill of writing category**

<b>Writing skills</b>	<b>Proportion of TSW items</b>
Syntax and grammar (including punctuation)	20–30%
Spelling	20–30%
Word usage	20–30%
Text organisation	20–30%

***Stimulus and prompts***

Items assessing technical skills of writing are based on short, custom-prepared stimulus texts or brief item-specific prompts.

Custom-prepared stimulus texts may be presented as documents including errors that need to be edited. Such texts are used as the basis for identifying and correcting one or more mistakes in spelling, grammar or syntax (addressing the *spelling* and *syntax and grammar* skill categories, respectively). Short texts are used as the basis for tasks that require reorganising sentences or paragraphs into a more coherent or logical sequence (*text organisation* category), or substituting a more appropriately formal word for an informal word (*word usage* category).

The assessment of technical skills of writing also includes some item-specific prompts. As far as possible, these ‘stand-alone’ items are grouped together under a common topic or theme to provide a context for the tasks. Item-specific prompts are usually in the form of one or two sentences. Because of their brevity, these kinds of prompts allow efficient assessment of technical skills of writing, with minimum time-on-task. Such items also allow flexibility in constructing test forms with the appropriate distribution of items across framework variables.

## NUMERACY FRAMEWORK

The numeracy framework defines and explicates numeracy as assessed in the Test.

It is widely accepted that, in order to be numerate and function effectively in society, adults need a broad understanding encompassing not just number but also measurement, space, data, chance and algebra (See for example Forman & Steen, 1999). In addition to knowing facts, numerate members of society need to be able to *apply* their skills and *reason and solve* problems. They also need to be able to *read and interpret* mathematical information and *communicate* accordingly.

Numerate adults should also be able to estimate and use tools such as measurement aids (rulers, tape measures, scales etc.), calculators and in some instances computers (e.g. spreadsheets). Any definition of numeracy should also recognise that numeracy changes over time along with social change and technological development (Lindenskov & Wedege, 2001).

### Definition of numeracy

Numeracy was a component of the OECD ALLS and PIAAC surveys (Australian Bureau of Statistics, 2006; OECD, 2013a; OECD and Statistics Canada, 2000), in both of which Australia participated.

The definition of numeracy used in the ALLS survey was:

*Numeracy is the knowledge and skills required to effectively manage and respond to the mathematical demands of diverse situations.*

The definition of numeracy used in the PIACC survey is:

*Numeracy is the ability to access, use, interpret, and communicate mathematical information and ideas, in order to engage in and manage the mathematical demands of a range of situations in adult life.*

The ACSF draws on these understandings to define numeracy as ‘active’ and with a functional role in society:

*Numeracy in the ACSF is about using mathematics to make sense of the world and applying mathematics in a context for a social purpose. Numeracy gives meaning to mathematics and mathematics is the tool (the knowledge and skills) to be used efficiently and critically.*

*Numeracy involves understanding and applying mathematical skills. It also involves drawing on knowledge of the context in deciding when to use mathematics, extracting the mathematical information from the context and choosing the appropriate mathematics to use.*

*Numeracy requires reflecting on and evaluating the use of the mathematics, and being able to represent and communicate the mathematical results. (Commonwealth of Australia, 2012, p. 124)*

While the ACSF definition is most appropriate for this assessment, it is a description of numeracy for the wider adult community and not a definition of personal numeracy as it relates to teaching. The

definition of numeracy for the Test was developed to represent the numeracy content, contexts, processes and applications that are relevant to teachers.

**Personal numeracy, for the purpose of the Test, is defined as:**

*interpreting and communicating important non-technical mathematical information, and using such information to solve relevant real-world problems to participate in an education community, to achieve one's goals, and to develop one's knowledge and potential as a teacher.*

Personal numeracy for teaching is about using important, everyday mathematics to make sense of the world, and applying this mathematics in a meaningful context for a social purpose related to education. It involves drawing on an understanding of the context in deciding how to use mathematics, extracting the mathematical information from the context, and choosing the appropriate mathematics in order to solve real-world problems that teachers are likely to come across in their daily and professional lives. It includes knowing how to use every-day technologies such as calculators, but also includes performing some basic calculations unaided by technology.

Given the computer-based medium of the Test, it is not possible to assess the behavioural or functional aspect of numeracy in its purest sense (Drake, Wake, & Noyes, 2012). For example, students are not able to manually use tape measures or scales to measure and weigh as they would in the real world. However, in order to maintain a real-world focus, the assessment of numeracy in the Test should include a selection of real-world numeracy contexts and make use of real-world data and information wherever possible. A focus on the active aspect of numeracy can be achieved somewhat by giving most weight to items that require students to *use* their numeracy skills; that is, to apply mathematics to solve appropriate real-world problems.

## **Numeracy content**

PIACC numeracy comprises the following four content areas:

1. Quantity and number
2. Dimension and space
3. Patterns, relationships and change
4. Data and chance.

Both the ACSF and the *Australian Curriculum: Mathematics* have three content areas:

1. Number and algebra
2. Measurement and geometry
3. Statistics and probability.

These three content areas have been adopted for use in the Test.

The definition of numeracy for the Test refers to 'non-technical' mathematics. This term has been used to distinguish between the common, typical real-world uses of mathematics that are represented under the notion of *numeracy* and those mathematical operations and procedures that are typically reserved for the specific study of mathematics. For example, being able to read given Cartesian points on a parabola representing a real-world value (such as representing average maximum daily temperatures over a period of a year) would be seen as non-technical content, but suggesting an equation that could represent the parabola (such as a quadratic equation) would represent technical

content and be out-of-scope of the Test. Similarly, substituting values into a given equation to calculate the area of a simple shape would be seen as non-technical, but using the Pythagorean Theorem to solve the side length of a triangle would be seen as technical content. Table 10 shows the mathematical content areas regarded as in-scope of the numeracy assessment in the Test according to the three content areas. While the list is not exhaustive, it aims to give a useful impression of the content that is considered appropriate for the assessment.

**Table 10: Selected relevant topic content by ACSF numeracy content area**

<b>Numeracy area</b>	<b>Example content</b>
Number and algebra	Proportional reasoning; ratio; fractions (including score conversions); percentages (including weighted percentages across assignments); decimals; scientific notation; money; budgeting; interest calculations; basic operations; simple formulae; calculation of GST
Measurement and geometry	Time; timetabling and scheduling (e.g. parent–teacher interviews, timetables across multiple campuses); knowledge about space and shape, symmetry and similarity relevant to common 2D and 3D shapes; quantities, including areas and volumes; use of given relevant routine formulae; conversion of metric units; use of maps and plans, scales, bearings
Statistics and probability	Interpreting mathematical information such as graphs; statistics and data (including NAPLAN data); comparing data sets or statistics; statistics and sampling, including bias; distributions; data and interpretation validity; reliability; box plots – matching data to displays; actual against predicted scores; assigning a grade based on a raw score; interpreting/calculating an ATAR; drawing conclusions about student achievement based on data

As a guiding principle, the Test focuses on important fundamental numeracy content assessing ‘big ideas’ and key concepts that are common in the real-world and defensible in that they are important for all teachers to know in order to effectively carry out their role.

Table 11 shows the target percentages of test items in each of the numeracy content areas in the Test.

**Table 11: Target proportions of numeracy items in each content category**

<b>Content area</b>	<b>Proportion</b>
Number and algebra	40–50%
Measurement and geometry	20–30%
Statistics and probability	25–35%

## Numeracy processes

Both PIAAC and the ACSF describe three numeracy processes (referred to as ‘responses’ in PIAAC and ‘[performance] indicators’ in the ACSF) that can, for the purposes of this framework, be regarded as roughly equivalent. Table 12 shows a mapping of the three ACSF indicators against the PIAAC responses.

**Table 12: Numeracy processes in the ACSF and PIAAC**

<b>ACSF indicator</b>	<b>PIAAC response</b>
Identifying mathematical information and meaning in activities and texts	Identify, locate, or access
Using and applying mathematical knowledge and problem solving processes	Act upon or use
Communicating and representing mathematics	Interpret, evaluate/analyse, communicate

The first two ACSF indicators above have been adopted as the numeracy processes for the Test. The third numeracy process in the Test comprises combined elements of the third ACSF and PIAAC processes.

The ACSF does not recommend relative proportions of the numeracy processes. In the PIAAC test instrument, the three numeracy responses that are comparable to the processes used in the Test are not equally weighted. PIAAC uses the following weightings for the three responses: *identify, locate, or access* (10%); *act upon or use* (50%); and *interpret, evaluate/analyse, communicate* (40%). This unequal weighting reflects an assumption about the relative need to apply the responses in real-world contexts, an assumption that appears to be similarly relevant when considering the numeracy processes used in the Test. Accordingly, the target proportions of items in each numeracy process category for the Test have been derived from those used in PIAAC, as shown in Table 13.

**Table 13: Target proportions of numeracy items in each process category**

<b>Process</b>	<b>Proportion</b>
Identifying mathematical information and meaning in activities and texts	15–25%
Using and applying mathematical knowledge and problem solving processes	50–60%
Interpreting, evaluating, communicating and representing mathematics	20–30%

*Identifying mathematical information and meaning in activities and texts* relates to a person’s ability to identify and extract the mathematics embedded in a contextualised task. The explicitness and complexity of the mathematical information embedded in the text determine the complexity of this process.

*Using and applying mathematical knowledge and problem solving processes* relates explicitly to doing the mathematics and includes estimating, and using a range of mathematical skills, methods, strategies and tools.

*Interpreting, evaluating, communicating and representing mathematics* relates to the ability to interpret, evaluate, communicate and represent the mathematics embedded in a situation. This includes use of common mathematical symbolism, notation and conventions, and representations such as graphs and tables that are evident in real-world contexts.

## Use of calculators and other mathematical tools

Mathematical tools in today's society include calculators, computers and related software such as spreadsheets. The appropriate use of these tools is a key aspect of numeracy.

In PIACC, the view on calculators is:

*hand-held calculators are tools which are part of the fabric of numeracy life in many cultures. Increasingly, respondents in large scale tests are allowed, sometimes even expected, to use calculators. ... It follows that adults should be given access to a calculator as part of an assessment of numeracy skills, and they can then choose if and how to use it. (OECD, 2009)*

It is noted, however, that there are considerable differences between countries and even between Australian jurisdictions and tertiary institutions with regard to policy on calculator use in schools and examinations. There is also an expectation in the community that educated adults (such as teachers) should be able to perform basic calculations without access to a calculator. The numeracy assessment in the Test has two sections. In one section, comprising 75–85% of the test items, an on-screen calculator is available for use by students. In a second section, comprising 15–25% of the test items, students are **not** allowed to use a calculator.

## LEVEL OF DIFFICULTY OF THE TEST'S LITERACY AND NUMERACY ITEMS

### Establishing the target difficulty range of the test items

Standards 3.1 and 3.2 of the National Program Standards in the *Accreditation of Initial Teacher Education Programs in Australia* give an indication of levels of literacy and numeracy required by new teachers:

- 3.1 All entrants to initial teacher education will successfully demonstrate their capacity to engage effectively with a rigorous higher education program and to carry out the intellectual demands of teaching itself. To achieve this, it is expected that applicants' levels of personal literacy and numeracy should be broadly equivalent to those of the top 30 per cent of the population; and
- 3.2 Providers who select students who do not meet the requirements in 3.1 above must establish satisfactory additional arrangements to ensure that all students are supported to achieve the required standard before graduation.

In efforts to interpret the meaning of the 'top 30 per cent of the population' referred to in Standard 3.1, a number of approaches have been implemented.

These parallel approaches considered the essential questions of how a student could be deemed to be in the top 30 per cent of the population and how this normative judgement of student proficiency could be married with criterion-based descriptions of the necessary literacy and numeracy proficiency of aspiring teachers.

One approach was to research empirical data on the literacy and numeracy achievement of Australian adults, and to consider this in the context of the ACSF.

A second approach was to establish expert judgements of the necessary literacy and numeracy proficiency of people entering the teaching profession against the contents of the ACSF. This second approach was conducted in May 2013 as a two-day workshop with expert groups in teacher education and literacy and numeracy, aimed at determining indicative levels of personal literacy and numeracy commensurate with the description in Standard 3.1. As part of this exercise, careful consideration was given to elaborating a notional standard of personal literacy and numeracy for teachers entering the profession.

The aspiration for new teachers to have standards of literacy and numeracy that enable them to be effective teachers and positive role models, regardless of which subject or year group they teach, was used as the starting point for considering the standard.

Elaborations to this definition were derived from work by the Queensland College of Teachers (QCT) in 2011 and 2012, to establish benchmark literacy and numeracy standards for aspiring primary school teachers. The elaborations provided operational descriptions of the standard when applied to literacy and numeracy, as well as describing three contexts in which the standard could be demonstrated:

1. in everyday life and the workplace
2. when modelling literacy and numeracy as a professional
3. as a graduate of a four-year tertiary education program.

Adapted versions of the QCT elaborated standards were used for discussion in the two-day workshop conducted in May 2013. These elaborations are presented as Figure 2.

### ***Defining standards of personal literacy and numeracy for new teachers***

Standards of literacy and numeracy expected of new teachers should enable them to be effective teachers and positive role models, regardless of which subject or year group they teach.

Aspiring teachers should therefore demonstrate:

- applications of their personal literacy and numeracy across a range of relevant everyday and workplace contexts that are typical of the experience of teachers entering the profession, such as:
  - reading and implementing school-related policy and procedure documents; and
  - applying mathematical reasoning and numeracy skills to everyday school-related organisational contexts, such as budgeting and resource allocation.
- the capacity to model the application of personal literacy and numeracy in their everyday work, such as:
  - confidently using accurate Standard Australian English to communicate with students, peers, parents and the broader community; and
  - confidently applying mathematical reasoning and numeracy skills (as required) in the classroom and when communicating with students, peers, parents and the broader community.
- levels of literacy and numeracy equivalent to those specified in adult frameworks relevant to graduates of a four-year professional tertiary education program, such as:
  - reading professional educational literature (discipline content- and pedagogical content-related) in relevant areas of teaching and learning;
  - interpreting data from a range of sources relevant to educational, school and teaching practices; and
  - communicating relevant aspects of educational theory, teaching programs and student learning outcomes to students, parents and peers.

#### **Figure 2: Definition and elaboration of benchmark standards for beginning teachers**

The elaborated standards were then considered with reference to the contents of the ACSF and in light of test items from an existing adult literacy and numeracy test mapped against the ACSF. As a result of the workshop, initial indicative standards of personal literacy and numeracy (expressed as ranges on the ACSF) were established for students graduating from initial teacher education courses and entering the profession.

The range for personal literacy agreed to by the literacy panel corresponded to an indicative ACSF range defined by the upper end of ACSF Level 4 and lower end of Level 5.

The range for personal numeracy agreed to by the numeracy panel corresponded to an indicative ACSF range defined by the middle and upper ends of Level 4.

Subsequently, these indicative standards were used as a starting-point to guide the development of the pools of the literacy and numeracy items in the Test. How this has been operationalised in the pools of items in the Test is discussed in the following section.

### Range of difficulty of test items

An accurate judgement as to whether a student’s skills fall above or below the benchmark standard is the primary goal of the Test. It is important therefore to obtain as precise a measure as possible of students’ skills around the benchmark standard to ensure students’ proficiencies are accurately identified as meeting or falling below the standard. One efficient way of achieving this is to maximise the number of items in each assessment at a level of difficulty located around the benchmark standard.

A secondary goal is to provide useful feedback to students who do not meet the standard. It is recognised that higher education institutions as well as students are likely to be interested in receiving some form of report that can point to areas of specific need of any student who does not meet the benchmark standard. The best way to achieve this ancillary purpose is to include items in each assessment that are below the benchmark standard, so that a description can be generated of what such students know and can do, as a basis for improving personal literacy and/or numeracy.

To support the primary goal of the Test, for each of literacy and numeracy, there is a concentration of test items in each pool developed to target the anticipated initial benchmark standard. To support the ancillary goal of providing information to those who do not meet the benchmark standard, a larger proportion of items is developed to target below, rather than above, each anticipated standard. Table 14 shows the target proportions of the literacy and numeracy items in the Test against the levels of the ACSF.

**Table 14: Target proportions of items addressing levels of the ACSF**

ACSF	Literacy % items	Numeracy % items
Level 5	10–20%	5–15%
Level 4	40–50%	35–45%
Level 3	30–40%	35–45%
Level 2	0–10%	5–15%
Level 1	0	0

The variation between literacy and numeracy in the target proportions of items at each level is related to the different locations of the anticipated literacy and numeracy benchmark standards; that is, in relation to the ACSF, the anticipated numeracy benchmark for this assessment has been set slightly lower than the literacy benchmark. Consequently there is a larger proportion of numeracy than literacy items in ACSF Level 2, and a smaller proportion in ACSF Level 5.

## LITERACY AND NUMERACY TEST ITEM CONTEXTS

The ACSF and PIAAC recognise that adults need to use literacy and numeracy across a variety of contexts. There is generally common agreement about the range of contexts in which literacy and numeracy need to be exercised, with some variation in the way the contexts are grouped. Table 15 shows the literacy and numeracy contexts described in the elaborated standards (see Figure 2 above), the ACSF and PIAAC.

**Table 15: Contexts in which literacy and numeracy are demonstrated**

<b>Elaborated standard adopted for May 2013 workshop</b>	<b>ACSF</b>	<b>PIAAC</b>
Everyday life and the workplace	Personal and community	Personal uses
Modelling literacy and numeracy as a professional	Workplace and employment	Work and occupation
As a graduate/graduand of a four-year tertiary education program	Education and training	Education and training
		Community and citizenship

The May 2013 elaborations were developed with consideration of the contexts listed in the ACSF and PIAAC. However, while both the ACSF and PIAAC contexts are concerned with general adult populations, the elaborated standards were developed to reflect the literacy and numeracy demands specific to aspiring teachers.

Accordingly, the assessment contexts used in the Test have been adapted from the three ACSF contexts to reflect the personal literacy and numeracy contexts of aspiring teachers, namely:

- Personal and community
- Schools and teaching
- Further education and professional learning.

The *personal and community* context is concerned with everyday, domestic and local scenarios that are related to education, childhood and adolescence. For literacy, the texts that fit this context are written for a broad, general audience, but focus on content likely to be of interest to teachers such as that relating to children and youth. Narrative texts, for example, might be biographical or fictional accounts of education and growing up. Numeracy contexts in this category are situations where it is required to interpret mathematical information and representations written for a broad, general audience but which are relevant to education. They include situations that teachers are likely to come across as part of their everyday life that require the application of important mathematical skills to solve relevant real-world problems.

The *schools and teaching* context is concerned with the day-to-day professional working life of a teacher in a school. This context is focused on the individual school and concerns general teaching work rather than specialist subject skills. The literacy texts that fit this context are written for or used by teachers, and cover any general texts that teachers might reasonably be expected to read or use as part of their everyday work, whether in the classroom, as part of the staff team or as a member of the school community. Contexts for numeracy in this category are any general, school-based situations where teachers might reasonably need to interpret mathematical information or representations about schools, teachers or students, or apply important mathematical skills in order to operate effectively and professionally as a teacher in a school community. In this sense, the concept of ‘numeracy across the curriculum’ is relevant.

The *further education and professional learning* context is concerned with broadly-focused educational issues beyond the immediate school workplace. Issues might be considered at a regional, state, national or international level, and from a wide range of perspectives. This context is concerned with overarching issues about education. The texts used for the literacy assessment that fit this context are written for an audience of teachers and educational professionals – though they might also be of interest to the general reader, and as such would not require a specialist vocabulary or professional knowledge unique to teachers. Texts might include theoretical, socio-cultural, political, historical and scientific perspectives on teaching and learning that teachers might be expected to read as part of their training and on-going professional development. Contexts for numeracy are education-related, with a broader focus than an individual school, including the interpretation and use of comparative data, statistics and graphical representations about education and schooling.

While the same three context categories are defined for literacy and numeracy, the weighting varies slightly. The target proportions of items representing each of the context categories for literacy are shown in Table 16 and for numeracy in Table 17.

**Table 16: Target proportions of items in each context category for literacy**

<b>Context</b>	<b>Proportion of test</b>
Personal and community	20–40%
Schools and teaching	30–50%
Further education and professional learning	20–40%

**Table 17: Target proportions of items in each context category for numeracy**

<b>Context</b>	<b>Proportion of test</b>
Personal and community	45–55%
Schools and teaching	30–40%
Further education and professional learning	10–20%

The differing proportions for literacy and numeracy acknowledge that personal literacy is likely to be called upon more frequently in the context of further education and professional learning than is personal numeracy.

While the word ‘personal’ appears in the first of the contexts, it should be noted that the term ‘personal literacy and numeracy’ that is used in Standard 3 of the National Program Standards applies to all of the contexts. *Personal* in Standard 3 is interpreted as marking a distinction from *pedagogically-focused* literacy and numeracy, which are the skills, knowledge and understanding that a teacher of literacy and numeracy would deploy in teaching subjects such as English and mathematics. The description of the professional skills test for teachers administered by the UK Department for Education usefully makes this distinction, in explaining that their test is designed to ‘cover the core skills that teachers need to fulfil their professional role in schools, rather than the subject knowledge required for teaching. This is to ensure all teachers are competent in numeracy and literacy, regardless of their specialism.’ (National College for Teaching & Leadership, 2013). Further, while the term ‘personal literacy and numeracy’ could be interpreted as applying to any context in the life of an individual, the emphasis in constructing the test will be on setting tasks in contexts that are transparently related to the professional role and interests of prospective teachers.

## TEST DESIGN

### Assessment design considerations

#### *Number of tests and items*

Fourteen statistically equated test forms for each of literacy and numeracy have been constructed for the initial administrations of the Test. These forms are constructed from 108 field-tested items for numeracy and 108 field-tested items for literacy. The 108 items used have been selected from a larger set of field-tested items. The test item pools will be replenished with a similar number of items, once further trial testing has been conducted.

Each literacy test will comprise 60 items: 40 reading items and 20 technical skills of writing items.

Each numeracy test will comprise 60 items: 48 items for which an online calculator is available and 12 items for which the online calculator is not available.

An additional five items will be included in each of the literacy and numeracy tests. These items are being trial tested for possible inclusion in future tests. The students' responses to these items do not contribute to their scores. This kind of trial testing is standard practice for high-stakes testing, where maintaining security of the test is essential.

The time allowed for each test (including the trial test items) will be two hours. Additional time will be allowed for a short orientation to the test screen and the various response formats.

All testing will be administered in a secure computer-based testing environment.

#### *Response formats*

The items are either in selected-response formats or constructed-response formats that can be automatically scored.

Selected response items are of two types: *simple multiple-choice* items are standard multiple choice, usually with four response options from which students are required to select the best answer; *complex multiple-choice* items present several statements for each of which students are required to choose one of two (or more) possible responses (for example, yes/no, true/false, or correct/incorrect).

Constructed response items include such tasks as keying in the correct spelling of a misspelt word (for literacy) or entering a numeric response (for numeracy).

Other response formats capable of automated scoring may be used in future.

## REPORTING

Provisional benchmark standards were established in consultation with expert groups convened for the purpose in mid-February 2015. Subsequently, in the first several months of live testing, students undertaking the test will receive results that state, at minimum, whether they have met the provisional benchmark standard for literacy and/or for numeracy.

Given the length of the test (60 items for each of literacy and numeracy) and the fact that the test questions need to be kept secure, it will not be possible to report detailed diagnostic information on individual students' test performance. However, some additional information will be provided, indicating broad areas of strength and weakness, as evidenced by students' performance on the test(s). The literacy report will provide an indication of performance on reading and on technical skills of writing. The numeracy report will report an individual's performance on each of the three content areas and on the 'calculator available' and 'calculator not available' parts of the test.

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## **APPENDIX 1**

### **Literacy Sample Questions**

#### **LITERACY SAMPLE QUESTIONS 1 TO 6**

Questions 1 to 6 relate to the passage *Change in Schools*.

#### **CHANGE IN SCHOOLS**

*This text is taken from the introduction to Dancing on a Shifting Carpet: Reinventing traditional schooling for the 21<sup>st</sup> century (2010).*

The contemporary context for schools is often referred to as ‘the knowledge era’ or ‘the knowledge society’, characterised by the constant creation and recreation of knowledge; the speed, complexity and interactivity of innovation; and the need for openness to new learning and new ways of thinking about and doing things.

The level of change brought about by the knowledge era, and the pressures of other global and technological changes mentioned earlier, inevitably have an impact on schools. These pressures originate from both external and internal sources. There are external pressures on schools to fix the many social problems caused by rapid change, and to prepare students to live and work in the knowledge society. There are also internal pressures within schools because their clientele – students and families – have changing expectations and needs.

Within the wider external context, schools are seen as instruments of social change and are frequently expected to cure or avert many societal ills by, for example, providing sex and drug education; increasing students’ environmental awareness; educating young people in matters of health and engaging them in physical and emotional activities to improve their wellbeing and reduce obesity; and enhancing students’ commitment to social justice.

Within schools, the formal academic curriculum has been expanded to meet the social and psychological needs of students. In increasingly fragmented societies, schools are expected to be havens of peace, safety and stability, while still meeting the academic standards set by governments and the social and psychological expectations of families and communities. Teachers and other school leaders are expected to be constantly available and responsive to parents and their concerns,

and schools are often held accountable for matters occurring outside regular school hours, which were traditionally the domain of parents and families. When mistakes happen at school, there is a tendency for parents to blame teachers and other school personnel, and to seek legal redress.

All these factors have numerous implications for schools, not the least of which is that they need to change their forms of educational delivery to meet the needs of, and be relevant to, 21<sup>st</sup> century young people. Back in the late 1980s, Papert and Freire (n.d.) clearly foresaw the need for schools to change rapidly, even radically, if they were to remain vital to society:

... it is inconceivable that school as we've known it will continue. Inconceivable. And the reason why it's inconceivable is that little glimmer with my grandson who is used to finding knowledge when he wants to and can get it when he needs it, and can get in touch with other people and teachers, not because they are appointed by the state, but because he can contact them in some network somewhere. These children will not sit quietly in school and listen to a teacher give them pre-digested knowledge. I think that they will revolt. (Part 2)

The revolt may not have happened as yet, but the Australian Government is now talking about the need for a revolution in education and schools (Department of Education, Employment and Workplace Relations, 2008). The core of this 'revolution' focuses on the quality of teaching, the quality of learning and the quality of student outcomes. Conventional teaching and learning modalities are under widespread critique.

Source: Leoni Degenhardt & Patrick Duignan, *Dancing on a Shifting Carpet: Reinventing traditional schooling for the 21<sup>st</sup> century*. ACER Press, 2010.

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### ***Literacy Sample Question 1***

The changes in schools recommended in the text can best be summarised as

- A increasing academic rigour.
- B responding to a range of competing demands.
- C prioritising community wishes over government directives.
- D using technology to achieve traditional goals more successfully.

**Answer:** B

### **ASSESSMENT FRAMEWORK VARIABLES**

<i>Literacy Strand</i>	Reading
<i>Content: Text Format</i>	Continuous
<i>Content: Text Type</i>	Persuasive
<i>Process</i>	Integrate and interpret
<i>Context</i>	Further education and professional learning
<i>Indicative ACSF Level</i>	4

### ***Literacy Sample Question 2***

According to the text, how do parents tend to respond to problems at school?

- A by blaming societal ills
- B by blaming someone in the school
- C by calling for increased resourcing
- D by calling for the curriculum to be expanded

**Answer:** B

### **ASSESSMENT FRAMEWORK VARIABLES**

<i>Literacy Strand</i>	Reading
<i>Content: Text Format</i>	Continuous
<i>Content: Text Type</i>	Persuasive
<i>Process</i>	Access and identify
<i>Context</i>	Further education and professional learning
<i>Indicative ACSF Level</i>	3

### ***Literacy Sample Question 3***

*... schools are expected to be havens of peace, safety and stability ...* (paragraph 4)

According to the text, why is this more expected of schools today than in the past?

- A because society no longer gives this kind of support
- B because these qualities have been shown to enhance learning
- C because authorities are committed to avoiding student revolts
- D because parents have given up on trying to control their children

**Answer:** A

### **ASSESSMENT FRAMEWORK VARIABLES**

<i>Literacy Strand</i>	Reading
<i>Content: Text Format</i>	Continuous
<i>Content: Text Type</i>	Persuasive
<i>Process</i>	Integrate and interpret
<i>Context</i>	Further education and professional learning
<i>Indicative ACSF Level</i>	4

**Literacy Sample Question 4**

*Back in the late 1980s, Papert and Freire (n.d.) clearly foresaw the need for schools to change rapidly, even radically, if they were to remain vital to society. (paragraph 5)*

Which word in this sentence indicates that the writers endorse the position of Papert and Freire?

- A clearly
- B rapidly
- C radically
- D vital

**Answer: A**

**ASSESSMENT FRAMEWORK VARIABLES**

<i>Literacy Strand</i>	Reading
<i>Content: Text Format</i>	Continuous
<i>Content: Text Type</i>	Persuasive
<i>Process</i>	Evaluate and reflect
<i>Context</i>	Further education and professional learning
<i>Indicative ACSF Level</i>	4

### ***Literacy Sample Question 5***

How does the quotation from Papert and Freire relate to the rest of the text?

- A It summarises the text’s main position.
- B It documents the origin of the text’s main idea.
- C It suggests a solution to a problem raised in the text.
- D It provides a more extreme point of view than the text.

**Answer:** D

### **ASSESSMENT FRAMEWORK VARIABLES**

<i>Literacy Strand</i>	Reading
<i>Content: Text Format</i>	Continuous
<i>Content: Text Type</i>	Persuasive
<i>Process</i>	Integrate and interpret
<i>Context</i>	Further education and professional learning
<i>Indicative ACSF Level</i>	5

### **Literacy Sample Question 6**

Papert and Freire refer to the learning experience of a contemporary child (*my grandson*).

Do Papert and Freire identify the features listed below as part of this child's learning experience?

Click on 'Yes' or 'No' for each feature.

<b>Feature</b>	<b>Yes</b>	<b>No</b>
immediacy	<input type="radio"/>	<input type="radio"/>
diverse sources of information	<input type="radio"/>	<input type="radio"/>
respect for authority	<input type="radio"/>	<input type="radio"/>

**Answer:** Yes, Yes, No in that order

### **ASSESSMENT FRAMEWORK VARIABLES**

<i>Literacy Strand</i>	Reading
<i>Content: Text Format</i>	Continuous
<i>Content: Text Type</i>	Persuasive
<i>Process</i>	Integrate and interpret
<i>Context</i>	Further education and professional learning
<i>Indicative ACSF Level</i>	4

## LITERACY SAMPLE QUESTIONS 7 TO 10

Questions 7 to 10 relate to a school history excursion, described in the following passage.

### HISTORY EXCURSION

Our Year 9 students will be spending two weeks in a rural community to learn more about life there. Students will focus on issues that have affected these settlements over time. They will be given opportunities to meet and talk with local residents. Students will work on assignments designed to help explain their history. All students have been given explicit instructions about how to record their findings during the excursion.

#### *Literacy Sample Question 7*

Which underlined reference in the text is ambiguous?

- A life there
- B these settlements
- C They
- D their history

**Answer:** D

### ASSESSMENT FRAMEWORK VARIABLES

<i>Literacy Strand</i>	Technical skills of writing
<i>Content</i>	Text Organisation
<i>Context</i>	Schools and teaching
<i>Indicative ACSF Level</i>	5

**Literacy Sample Question 8**

All students have been given explicit instructions about how to record their findings during the excursion.

Which of the following is closest in meaning to *explicit*?

- A extensive
- B simple
- C hands-on
- D clearly stated

**Answer:** D

**ASSESSMENT FRAMEWORK VARIABLES**

<i>Literacy Strand</i>	Technical skills of writing
<i>Content</i>	Word usage
<i>Context</i>	Schools and teaching
<i>Indicative ACSF Level</i>	4

### ***Literacy Sample Question 9***

Below are four versions of a sentence from a student’s assignment about the history excursion.

Which version has acceptable punctuation?

- A ‘Our community, is not static,’ she said. ‘It is constantly changing.’
- B ‘Our community is not static’ she said ‘it is constantly changing.’
- C ‘Our community is not static,’ she said. ‘It is constantly changing.’
- D ‘Our community is not static, she said, it is constantly changing.’

**Answer: C**

### **ASSESSMENT FRAMEWORK VARIABLES**

<i>Literacy Strand</i>	Technical skills of writing
<i>Content</i>	Syntax and grammar (including punctuation)
<i>Context</i>	Schools and teaching
<i>Indicative ACSF Level</i>	4

**Literacy Sample Question 10**

If the sentence below contains a spelling error, correct the error by typing the word as it should appear; if there is no error, type N.

*It is no exaggeration to say that the students' insights into historical processes and social conditions were impressive.*

\_\_\_\_\_

**Answer:** exaggeration

**ASSESSMENT FRAMEWORK VARIABLES**

<i>Literacy Strand</i>	Technical skills of writing
<i>Content</i>	Spelling
<i>Context</i>	Schools and teaching
<i>Indicative ACSF Level</i>	3

## APPENDIX 2

### Numeracy Sample Questions

#### *Section 1: Calculator available questions*

#### *Numeracy Sample Question 1*

#### **EDUCATION EXPENDITURE**

Government operating expenditure on education refers mainly to money spent on schools and tertiary education.

Of the total operating expenditure on education in 2011–2012, 51% was spent on primary and secondary education and 36% on tertiary education (universities and TAFEs).

What percentage of the total operating expenditure on education in 2011–2012 was spent on the remaining aspects of the education budget?

\_\_\_\_\_ %

**Answer:** 13

#### **ASSESSMENT FRAMEWORK VARIABLES**

<i>Content</i>	Number and algebra
<i>Process</i>	Using and applying mathematical knowledge and problem solving processes
<i>Context</i>	Personal and community
<i>Availability of Calculator</i>	Available
<i>Indicative ACSF Level</i>	3

## Numeracy Sample Question 2

### GYM COSTS

Here is the schedule of costs for Gym and Swim membership at a sports facility.

	<b>Gym only (\$)</b>	<b>Swim only (\$)</b>	<b>Gym and Swim (\$)</b>
<b>12 Months (upfront)</b>	596	461	773
<b>12 Months (monthly debit)</b>	51	33	66
<b>6 Months (upfront)</b>	330	295	502
<b>Casual (per visit)</b>	12	5	15

For a 12-month ‘Gym and Swim’ membership, how much **more** does it cost to pay by monthly debit rather than upfront?

\$\_\_\_\_\_

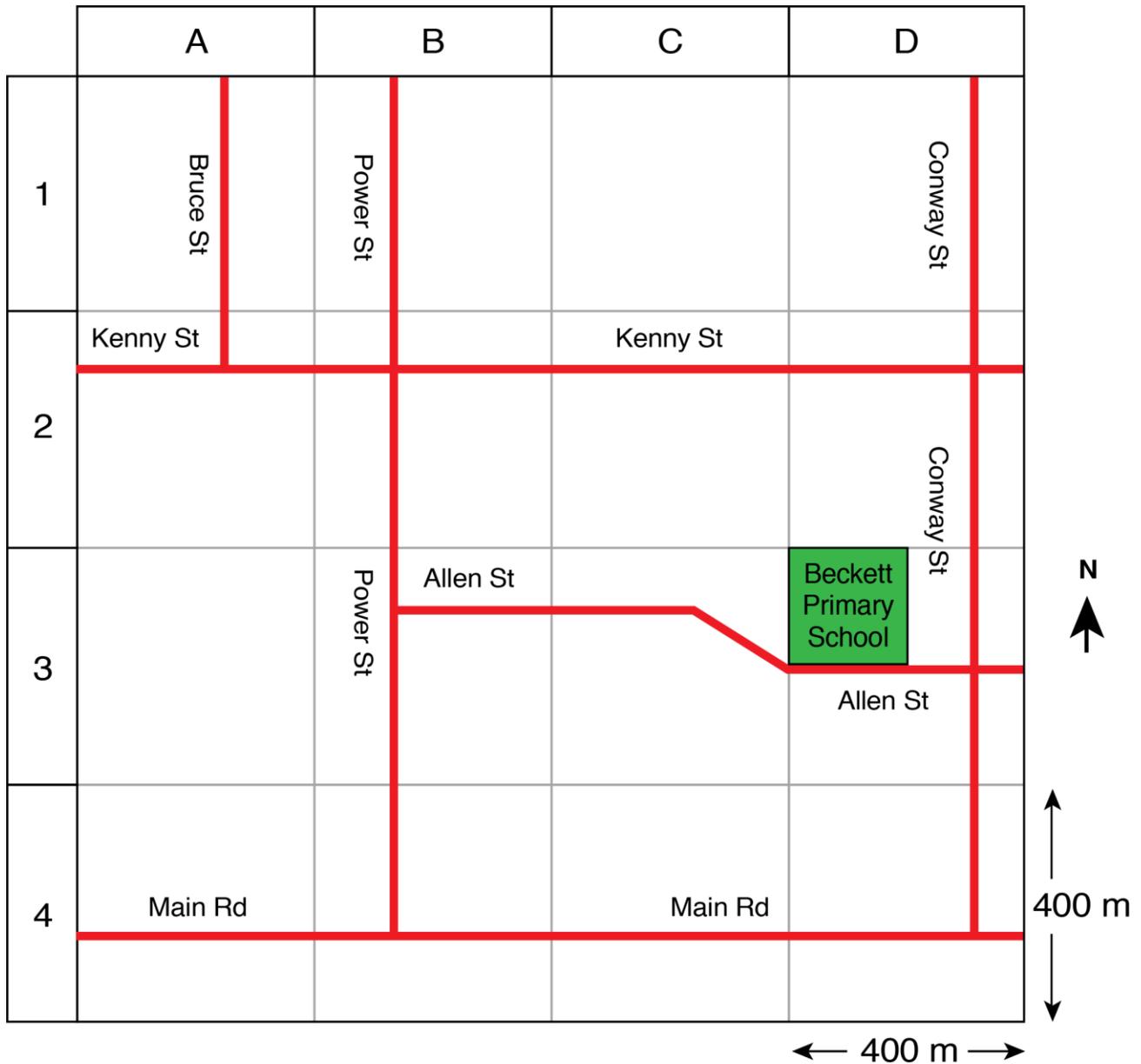
**Answer:** 19

### ASSESSMENT FRAMEWORK VARIABLES

<i>Content</i>	Number and algebra
<i>Process</i>	Using and applying mathematical knowledge and problem solving processes
<i>Context</i>	Personal and community
<i>Availability of Calculator</i>	Available
<i>Indicative ACSF Level</i>	3

**NUMERACY SAMPLE QUESTIONS 3 AND 4**  
**SCHOOL DIRECTIONS**

Beckett Primary School is located at grid reference D3 of this street map.



### ***Numeracy Sample Question 3***

Angela is driving south along Bruce St (reference A1).

Which of these directions would lead Angela to Beckett Primary School?

Click on 'Yes' or 'No' for each set of directions.

<b>Directions</b>	<b>Yes</b>	<b>No</b>
Go right into Kenny St, right into Power St, right into Allen St.	<input type="radio"/>	<input type="radio"/>
Go east into Kenny St, south into Power St, east into Allen St.	<input type="radio"/>	<input type="radio"/>
Go east into Kenny St, across Power St, south into Conway St, right into Allen St.	<input type="radio"/>	<input type="radio"/>

**Answer:** No, Yes, Yes in that order

### **ASSESSMENT FRAMEWORK VARIABLES**

<i>Content</i>	Measurement and geometry
<i>Process</i>	Interpreting, evaluating, communicating and representing mathematics
<i>Context</i>	Personal and community
<i>Availability of Calculator</i>	Available
<i>Indicative ACSF Level</i>	3

### ***Numeracy Sample Question 4***

The side-length of each grid square is 400 metres.

Which of these values is closest to the area of Beckett Primary School in square metres?

- A 1 000
- B 4 000
- C 10 000
- D 40 000
- E 80 000

**Answer:** D

### **ASSESSMENT FRAMEWORK VARIABLES**

<i>Content</i>	Measurement and geometry
<i>Process</i>	Using and applying mathematical knowledge and problem solving processes
<i>Context</i>	Personal and community
<i>Availability of Calculator</i>	Available
<i>Indicative ACSF Level</i>	4

### ***Numeracy Sample Question 5***

#### **SCIENCE RESULT**

This table shows the overall achievement required for different awards in a tertiary science subject.

<b>Award</b>	<b>Achievement</b>
High Distinction	80% and over
Distinction	70–79%
Credit	60–69%
Satisfactory	50–59%
Unsatisfactory	below 50%

The science subject has three assessment tasks. Each task is weighted as follows:

Assessment Task 1: weight 60%

Assessment Task 2: weight 30%

Assessment Task 3: weight 10%

Alex's result for each task was:

Assessment Task 1: 70%

Assessment Task 2: 80%

Assessment Task 3: 90%

What is Alex's award for science?

- A High Distinction
- B Distinction
- C Credit
- D Satisfactory

**Answer: B**

## **ASSESSMENT FRAMEWORK VARIABLES**

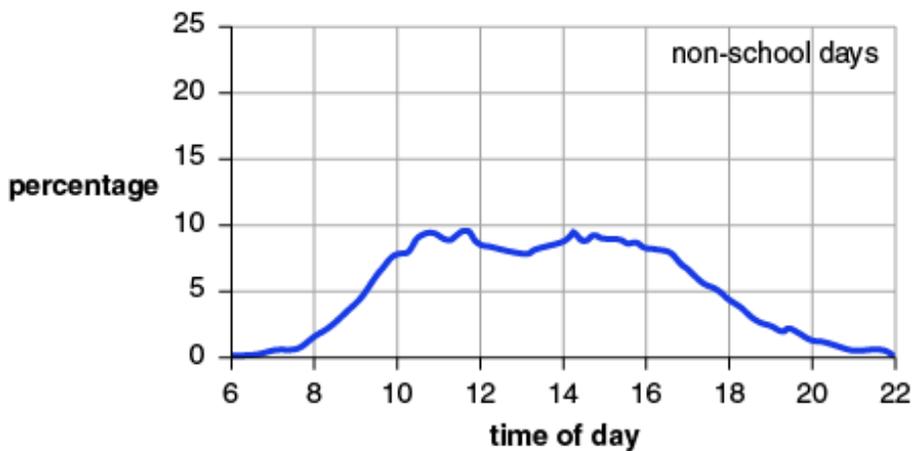
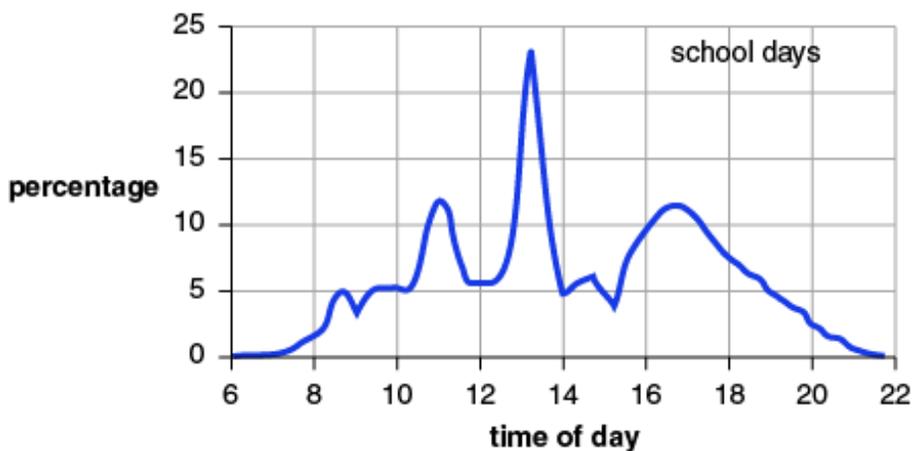
<i>Content</i>	Statistics and probability
<i>Process</i>	Using and applying mathematical knowledge and problem solving processes
<i>Context</i>	Schools and teaching
<i>Availability of Calculator</i>	Available
<i>Indicative ACSF Level</i>	4

**Numeracy Sample Question 6**

**PLAYING SPORT**

These graphs show the percentage of children (11–13 years) playing sport at different times during school days and during non-school days.

**Percentage of Children Playing Sport**



Source: University of South Australia (2004), *Children in Sport*

The table below contains statements about the graphs.

Click on 'True' or 'False' for each statement.

Statement	True	False
On school days, the highest percentage of children playing sport at any one time is less than 25%.	<input type="radio"/>	<input type="radio"/>
At any given time on a non-school day, approximately 90% or more of children were <b>not</b> playing sport.	<input type="radio"/>	<input type="radio"/>
At 5 pm, fewer children were playing sport on school days than on non-school days.	<input type="radio"/>	<input type="radio"/>

**Answer:** True, True, False in that order

#### **ASSESSMENT FRAMEWORK VARIABLES**

<i>Content</i>	Statistics and probability
<i>Process</i>	Interpreting, evaluating, communicating and representing mathematics
<i>Context</i>	Further education and professional learning
<i>Availability of Calculator</i>	Available
<i>Indicative ACSF Level</i>	4

### ***Numeracy Sample Question 7***

#### **VET COURSES**

A secondary school offers one-year Vocational Education and Training (VET) courses.

Courses may be taken at one of three levels: Certificate I, II or III.

Students may enrol for only one certificate within each school year.

This table compares the number of students enrolled in one of the courses with the number of students who completed a qualification in that course.

	<b>Certificate I</b>	<b>Certificate II</b>	<b>Certificate III</b>	<b>Total</b>
<b>Number of students enrolled in January 2011</b>	97	18	5	<b>120</b>
<b>Number of students completed in December 2011</b>	50	13	3	<b>66</b>

What percentage of the total enrolments completed VET Certificates at the school in December 2011?

\_\_\_\_\_ %

**Answer:** 55

#### **ASSESSMENT FRAMEWORK VARIABLES**

<i>Content</i>	Number and algebra
<i>Process</i>	Using and applying mathematical knowledge and problem solving processes
<i>Context</i>	Schools and teaching
<i>Availability of Calculator</i>	Available
<i>Indicative ACSF Level</i>	4

**Numeracy Sample Question 8**

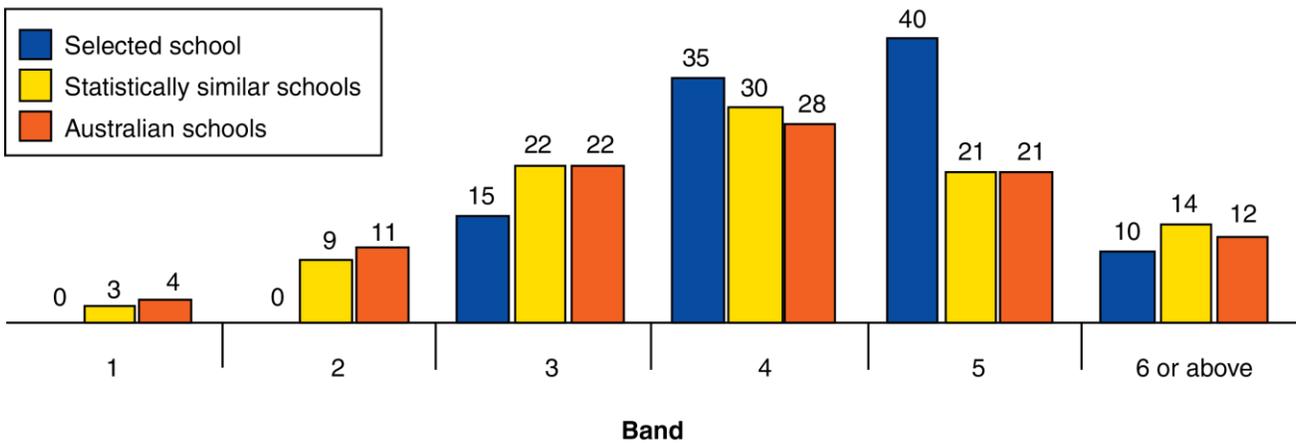
**BAND ACHIEVEMENT**

This graph shows the percentage of Year 3 students in six achievement bands for reading, for a selected school.

It also shows comparable percentages for statistically similar schools and for all Australian schools.

**Year 3 Reading**

Percentage of students in each band



The table below contains some statements about the graph.

Click on ‘True’ or ‘False’ for each statement.

Statement	True	False
A higher percentage of Year 3 students at the selected school achieved at Band 4 compared to students at statistically similar schools.	<input type="radio"/>	<input type="radio"/>
At the selected school, more Year 3 students achieved at Band 4 than at any other band.	<input type="radio"/>	<input type="radio"/>
A greater percentage of the Year 3 students at the selected school achieved above Band 3 compared to Year 3 students at statistically similar schools.	<input type="radio"/>	<input type="radio"/>

**Answer:** True, False, True in that order

## **ASSESSMENT FRAMEWORK VARIABLES**

<i>Content</i>	Statistics and probability
<i>Process</i>	Interpreting, evaluating, communicating and representing mathematics
<i>Context</i>	Schools and teaching
<i>Availability of Calculator</i>	Available
<i>Indicative ACSF Level</i>	4

**Section 2: Calculator not-available questions**

**Numeracy Sample Question 9**

**ONE HUNDRED BOXES**

The weight of a box of stationery is 3.2 kilograms.

What is the weight of 100 such boxes?

\_\_\_\_\_ kilograms

**Answer:** 320

**ASSESSMENT FRAMEWORK VARIABLES**

<i>Content</i>	Number and algebra
<i>Process</i>	Using and applying mathematical knowledge and problem solving processes
<i>Context</i>	Personal and community
<i>Availability of Calculator</i>	Not available
<i>Indicative ACSF Level</i>	3

**Numeracy Sample Question 10**

**GEOGRAPHICAL DISTRIBUTION OF AUSTRALIANS**

The Australian Bureau of Statistics conducts a census every five years.

In 2011, the population of Australia was 22 million.

About 2% of these people lived in remote or very remote areas.

About how many people lived in remote or very remote areas in Australia in 2011?

- A 11 000
- B 44 000
- C 110 000
- D 440 000

**Answer:** D

**ASSESSMENT FRAMEWORK VARIABLES**

<i>Content</i>	Number and algebra
<i>Process</i>	Using and applying mathematical knowledge and problem solving processes
<i>Context</i>	Personal and community
<i>Availability of Calculator</i>	Not available
<i>Indicative ACSF Level</i>	4

## APPENDIX 3

### **Assessing prospective teachers' personal numeracy and literacy – an international perspective**

A desk review of teacher assessment programs implemented in other countries was undertaken in late 2013. The purpose of the review was to provide useful reference points for the development of the Test in Australia. The following presents notes on a selection of the programs that were included in the review. It does not claim to be an exhaustive list of approaches to teacher assessment worldwide.

#### ***England***

Since the 2000/2001 academic year in England, it has been a requirement for all pre-service teachers to sit the Professional Skills Test for Trainee Teachers. This test must be passed in order to gain full Qualified Teacher Status (QTS), which is the English certification for teaching. When the program was first introduced the test had to be passed before QTS was granted, but from the 2013/2014 academic year, it will be necessary for entry into an initial teacher training course. While QTS will be unattainable without a pass in the tests, re-sits are permitted. Teachers seeking alternative entry into the teaching profession (e.g. the 'Assessment Only' entrance pathway) will also need to pass the skills tests (Department for Education, 2013a). The tests are a Department for Education initiative and are currently developed and administered by Pearson VUE.

The aim of the tests is to 'cover the core skills that teachers need to fulfil their professional role in schools, rather than the subject knowledge required for teaching. This is to ensure all teachers are competent in numeracy and literacy, regardless of their specialism.' (Department for Education, 2013b). Initially, there were three components that needed to be passed: literacy, numeracy and an IT test. The last of these was dropped in the 2013 reforms. The literacy skills tested are spelling, punctuation, grammar and comprehension, and are based around non-technical, professional use. In numeracy, the ability to do mental arithmetic, to interpret and use written data, and to solve written arithmetic problems is tested. In all but the first numeracy area, use of a calculator is allowed. The tests are computer delivered, with all questions available on-screen except spelling and mental arithmetic, which are audio delivered. Knowledge of the national curriculum is not tested in either of the components. While there are no explicit English-language requirements, the tests are designed to show sufficient proficiency in Standard English. Prospective teachers from a non-English speaking background are allowed additional time to complete the tests.

#### ***USA***

The United States tests present a much more complex picture. While England has implemented a nation-wide program and has a national teacher registration authority, each of the US states has its own licensing board and state-based requirements both for licensure and to enter initial teacher training programs. Not all states require that a test be passed other than those required for general university entrance or graduation from the teacher-training program, but most require some combination of literacy and numeracy tests, discipline-specific content knowledge tests, or pedagogical skills tests for entrance to programs and/or licensure. The following is a selection of those programs most similar to the one being applied in the Australian context.

**The Praxis Series™:** These tests, developed by the Educational Testing Service (ETS), provide testing materials that can be used by the various states to assess entry to initial teacher training or into the teaching profession. The Praxis™ website states that they are ‘used by most state education agencies in the United States to make decisions regarding the licensing of new educators’, and the largely computer-based tests have very quick reporting functionalities that are available to the test taker and are able to be delivered directly to the institution or licensing board. There are three branches in the series: the Praxis™ Core Academic Skills for Educators; the Praxis I® Pre-Professional Skills Tests (PPST®); and the Praxis II® Subject Assessments (which also covers Principals of Learning and Teaching) (ETS, 2013a).

The Subject Assessments are content knowledge tests specific to each subject area, and are usually used for registration as a beginning teacher or for gaining licensure in additional subject areas.<sup>3</sup> Praxis tests are also available for career advancement or additional certification.

Both the Core Academic Skills for Educators and the Pre-Professional Skills tests are often set as entry requirements for initial teacher training programs, and thus are usually taken before beginning or early in the college program. Some states also use results from the Core Academic Skills for Educators as part of their licensing or registration process. In those states that use the Praxis™ tests, successful completion is mandatory, but as with the English tests it is possible to re-sit failed components.

In the Praxis™ Core Academic Skills for Educators test, reading, writing and mathematics are assessed using a combination of multiple-choice and constructed-response items in a computer-based testing environment. Students have to show, amongst other things, the ability to integrate and analyse multiple documents; research strategies and the ability to re-work texts; the ability to write both informative/explanatory and argumentative pieces; and good mathematical reasoning (calculators are allowed as the tests are not purely assessing arithmetic proficiency) (ETS, 2013b, p. 6). Pass rates for the tests, along with the specific components that must be successfully completed, are determined by each state’s institutions, licensing boards and departments of education.

**NES® (National Evaluation Series™):** This is a Pearson test that is used in a similar way to the Praxis Series™, especially in Oregon and Arizona. Tests are available for Essential Academic Skills in Reading, Writing, Mathematics and Technology Literacy (as well as for other content areas) and are taken by students for entry-level teaching certification. They are computer-delivered tests, and all items are multiple choice except for one written assignment.

**Other USA state-based assessments:** Georgia, Minnesota, Ohio, California and Washington have all developed their own pre-teacher training and/or pre-registration tests, usually in conjunction with either ETS or Pearson. All of these tests can be delivered digitally, although some also have a paper-based alternative. The tests developed for Minnesota, Ohio and Washington include skills-based tests in reading, writing and mathematics, and use a combination of multiple-choice questions and extended writing tasks. In addition to these programs, some states use ACT WorkKeys as a licensing requirement, which is not a teaching specific set of tests but assesses ‘foundational and soft skills and offers specialized assessments to target institutional needs’ (ACT Inc., 2013).

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<sup>3</sup> Another prominent program in the USA that assesses not only subject-matter content knowledge, but the ability to teach it, is the Pearson test ‘edTPA’, which was developed with Stanford University and the American Association of Colleges for Teacher Education (Stanford University & the American Association of Colleges for Teacher Education/Pearson, 2013).

### ***Chile***

In 2008, the Chilean Ministry of Education introduced a voluntary skills test to be taken by prospective teachers at or soon after graduation from an initial teacher training program. Since 2012, this test has been for aspiring pre-school, primary and secondary teachers. It is a paper-and-pencil assessment that covers Disciplinary Knowledge (including both pedagogical content knowledge and content knowledge), Pedagogical Knowledge, Writing Skills and ICT Skills. Although voluntary, around 80% of institutions with educator training programs currently participate (Meckes, Taut, Bascope, Valencia, & Manzi, 2012; Ministerio de Educacion Gobierno de Chile, 2013). The results are published at institution level without reporting on individuals' scores, and at the moment seem focused on assessing and developing those institutions' programs, policies and curricula. There is, however, discussion in government to pass laws that would make success in the tests a requirement for teaching in state-subsidised schools.

### ***Other national approaches***

A number of other systems around the world have pre-course or pre-teacher service requirements for language proficiency. In Singapore, it is mandatory to pass an Entrance Proficiency Test (EPT) in the relevant area(s) before being admitted to the initial teacher training program at the National Institute of Education, and, from 2013, before being 'deployed to schools as untrained teachers' (Ministry of Education Singapore, 2013). The areas currently tested are English Language, Chinese Language, Malay Language, Tamil Language and Physical Proficiency (for prospective Physical Education teachers). The English Language Proficiency Test (EL EPT) is required for all teachers of subjects in the English language, and comprises a speaking and a writing test. In Hong Kong, it is a requirement for all primary and secondary English teachers to pass the Language Proficiency Assessment for Teachers of English before teacher service. Administered by the Hong Kong Examinations and Assessment Authority and Hong Kong Government since 2001, the assessment was initially designed to provide a benchmark for English proficiency, but quickly became a tool to improve standards (Coniam & Falvey, 2001). It comprises written tests in Reading, Listening, Writing (both an expository piece and a task involving correction of student work), as well as a test of Speaking and an observed Classroom Language Assessment. All components must be passed for successful completion. In Australia, English language proficiency is required for any candidates for registration who did not receive their teacher qualification in a select number of English-speaking countries. Applicants are required to prove success in the International English Language Testing System (IELTS), the International Second Language Proficiency Rating (ISLPR) examination, or the University of New South Wales Institute of Language-developed Professional English Assessment for Teachers (PEAT) Test. For students who received their secondary education in a country other than the one in which they are applying for an initial teacher education program, language proficiency at a defined standard is often a prerequisite for admission.

More generally, for students who received their secondary education in a country other than the one in which they are applying for an initial teacher education program, language proficiency at a defined standard is often a prerequisite for admission. This is the case in both Canada (in English or French, depending on the province) and Germany (in German). In those two countries, other than these language proficiency requirements there are no skills-based tests specific to teaching, either for entry to initial teacher training, or for certification as an entry-level teacher, at either the national or provincial/state level.