


Specifying and Assessing Knowledge and Skills for Life

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What are the skills, knowledge and attributes that students require for life and work in the 21st Century, and what can governments and education and training institutions do to ensure that students acquire these?

assumption:

An essential purpose of schooling is to provide every student with knowledge, skills, understandings, attitudes and values to equip them for life beyond school.



QUESTIONS


1. Are there fundamental understandings and skills that *all* students need to develop during their schooling?

to stimulate discussion

Our language suggests that we believe there are. For example:

“*essential* learnings”

“*basic* skills”



We also know that low levels of *literacy* and *numeracy* in Year 9 are correlated with:

- non-completion of secondary school
- not obtaining post-school qualifications
- poor labour market outcomes

QUESTIONS

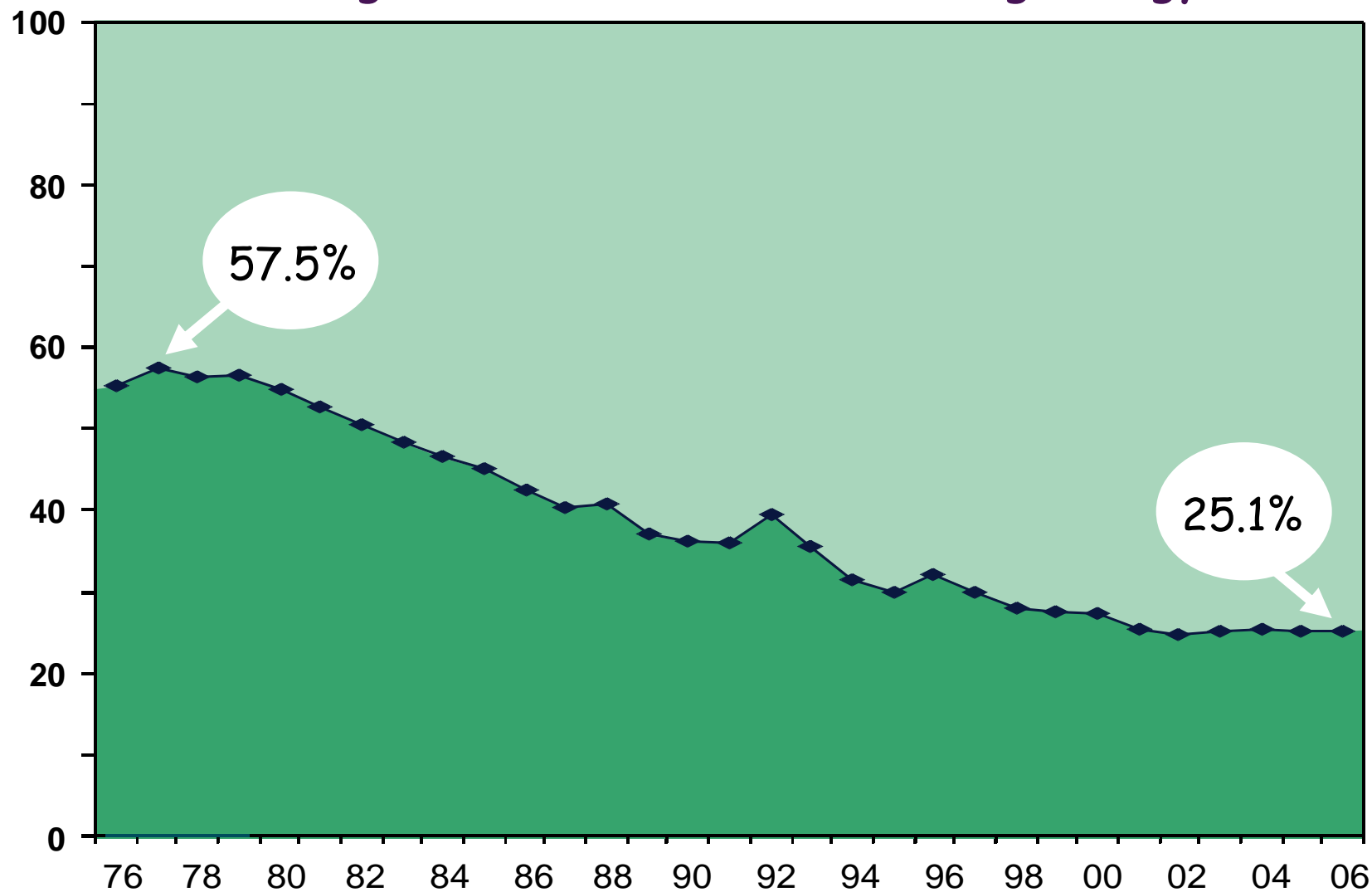
1. Are there fundamental understandings and skills that all students should be expected to develop during their school years?
2. In what areas or domains should all students be expected to achieve at least minimal standards of understanding or skill?

which skill areas / domains ?

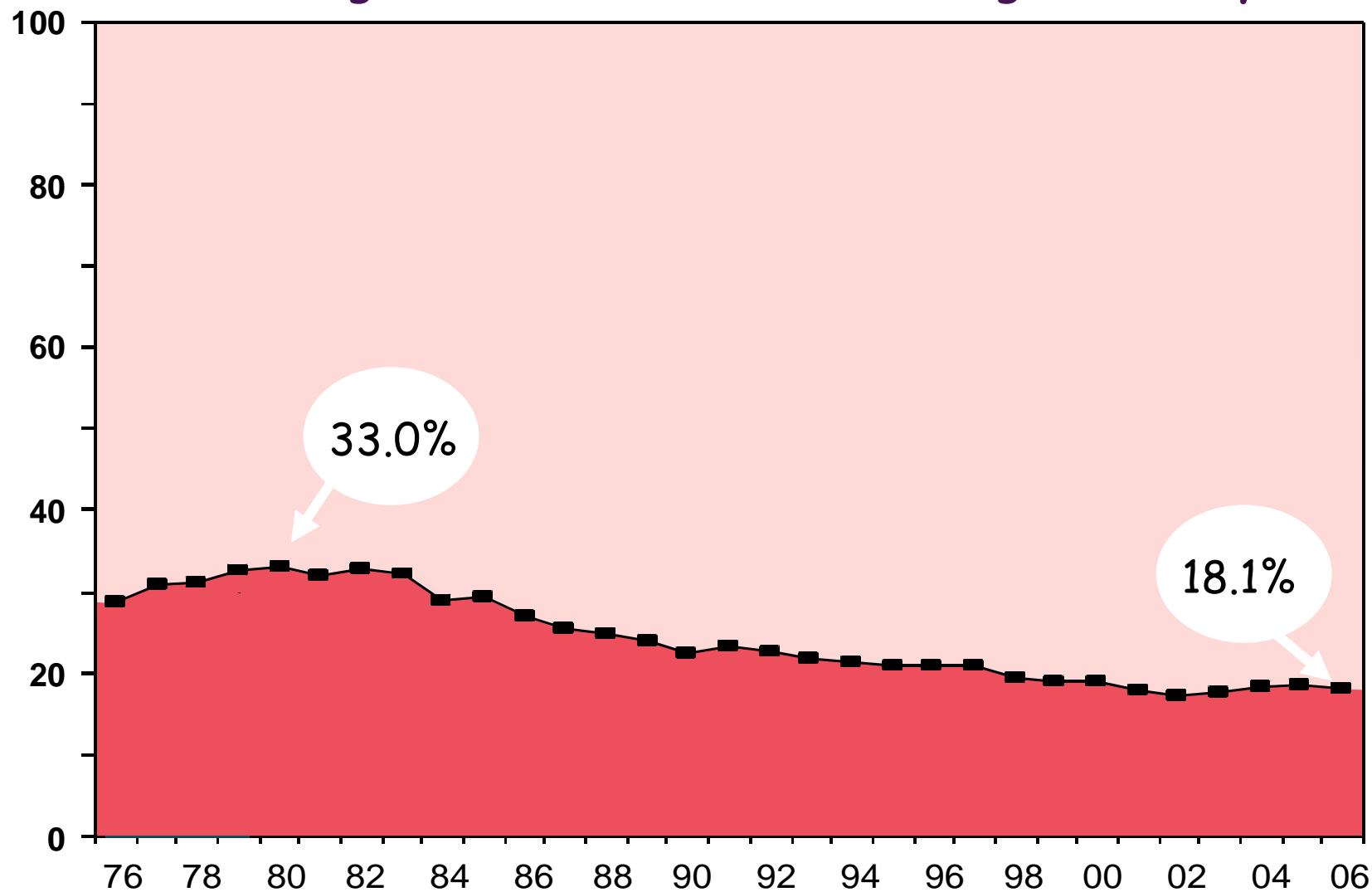
For example...

Are there minimum standards of *scientific literacy* that should be expected of *all* students -- even those who choose not to continue their study of science in the senior secondary school?

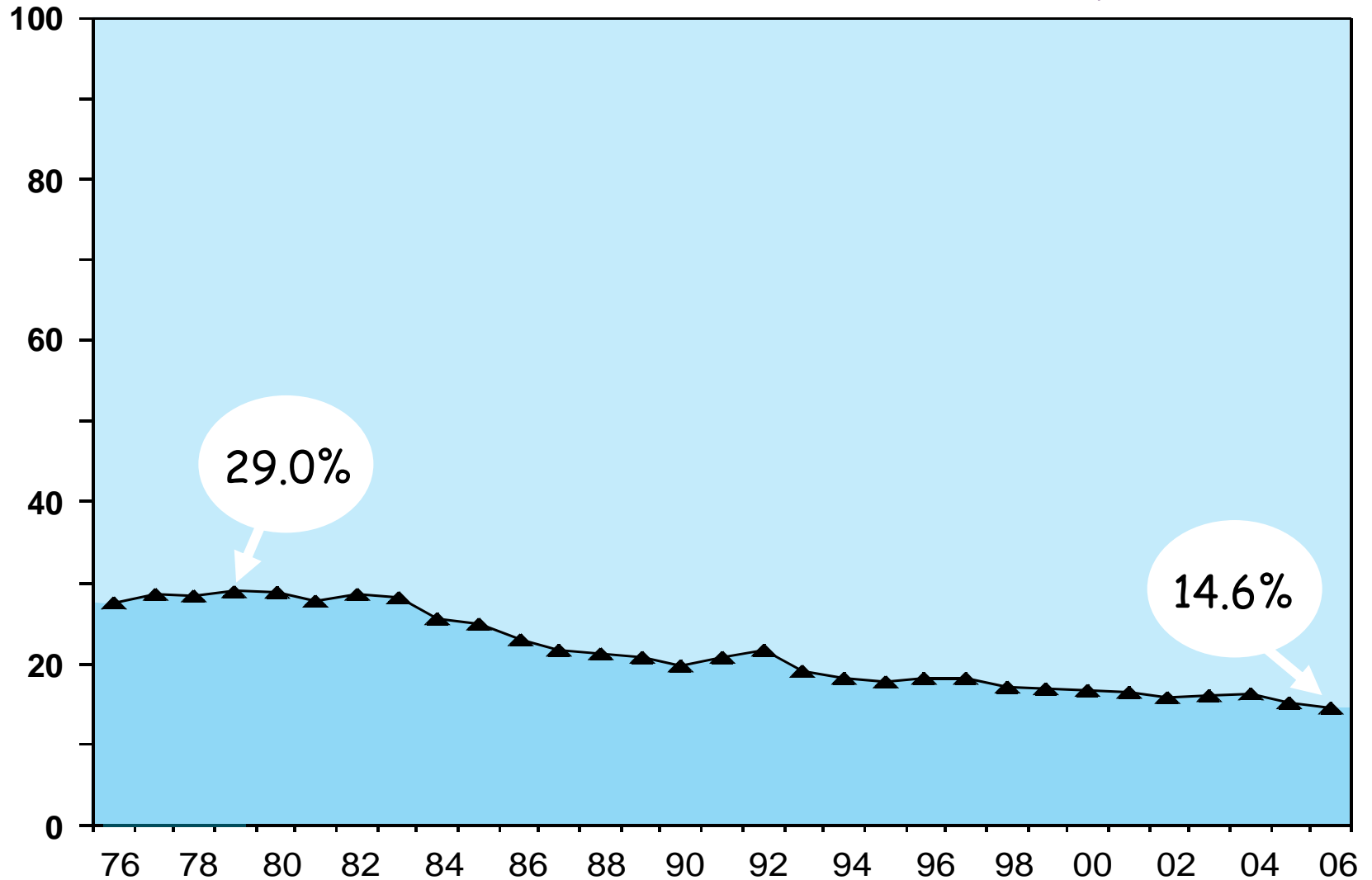
Percentage of Year 12 students taking Biology



Percentage of Year 12 students taking Chemistry



Percentage of Year 12 students taking Physics



which skill areas / domains ?

For example...

Are there minimum standards of *scientific literacy* that should be expected of *all* students -- even those who choose not to continue their study of science into the senior secondary school?

which skill areas / domains ?

National and international assessment programs suggest some possible priority areas ...

which skill areas / domains ?

National Assessment Program in
Literacy and Numeracy (NAPLAN)
tests at Years 3, 5, 7 and 9

Literacy (Reading; Writing)

Numeracy

which skill areas / domains ?

OECD Program for International Student Assessment (PISA) tests at 15 years of age

Reading Literacy

Mathematical Literacy

Scientific Literacy

which skill areas / domains ?

National Assessment Program
sample assessments, Year 6 and Year 10

Science Literacy

Civics and Citizenship

ICT Literacy

which skill areas / domains ?

OECD Program for International Student Assessment (PISA) tests at 15 years of age

Problem Solving

ICT Literacy

which skill areas / domains ?

ACCI and BCA 'Employability Skills'

Communication

Problem Solving

Technology


Team Work

Initiative and Enterprise

Planning and Organising

Self-Management

Learning Skills



But even if we can agree on skill areas or domains, what level of competence in these areas should we expect?

QUESTIONS

1. Are there fundamental understandings and skills that all students should be expected to develop during their school years?
2. In what areas or domains should all students be expected to achieve at least minimal standards of understanding or skill?
3. What would be minimally acceptable standards and should these be set *nationally*?

minimally acceptable standards ?

Decisions about minimally acceptable standards are always a matter of judgement.

Standard setting processes (eg, Angoff) ask:

“How likely is it that a minimally competent person would be able to complete this task?”

minimally acceptable standards ?

The OECD sets a 'baseline' standard.

Students performing below the 'baseline' are judged by the OECD to be “at serious risk of not achieving at levels sufficient to allow them to adequately participate in the 21st century workforce and contribute as productive citizens.”

Level

5

deal with difficult texts and to complete sophisticated reading tasks. They can deal with information that is difficult to find in unfamiliar texts, especially in the presence of closely competing information, show detailed understanding of these texts and sort out which information is relevant to the task. They are able to evaluate texts critically, draw on specialized knowledge to build hypotheses, and cope with concepts that may be contrary to expectations.

4

cope with difficult tasks, such as locating embedded information, construing meaning of part of a text through considering the text as a whole, and dealing with ambiguities and negatively worded ideas. They show accurate understanding of complex texts and are able to evaluate texts critically.

3

deal with moderately complex reading tasks, such as finding several pieces of relevant information and sorting out detailed competing information requiring consideration of many criteria to compare, contrast or categorise. They are able to make links between different parts of a text and to understand text in a detailed way in relation to everyday knowledge.

2

cope with basic reading tasks, such as locating straightforward information, making low-level inferences, using some outside knowledge to help understand a well defined part of a text, and applying their own experience and attitudes to help explain a feature of a text.

1

deal with only the least complex reading tasks developed for PISA, such as finding explicitly stated pieces of information and recognising the main theme or author's purpose in a text on a familiar topic when the required information is readily accessible in the text. They are also able to make a connection between common, everyday knowledge and information in the text.

reading

minimally acceptable standards ?

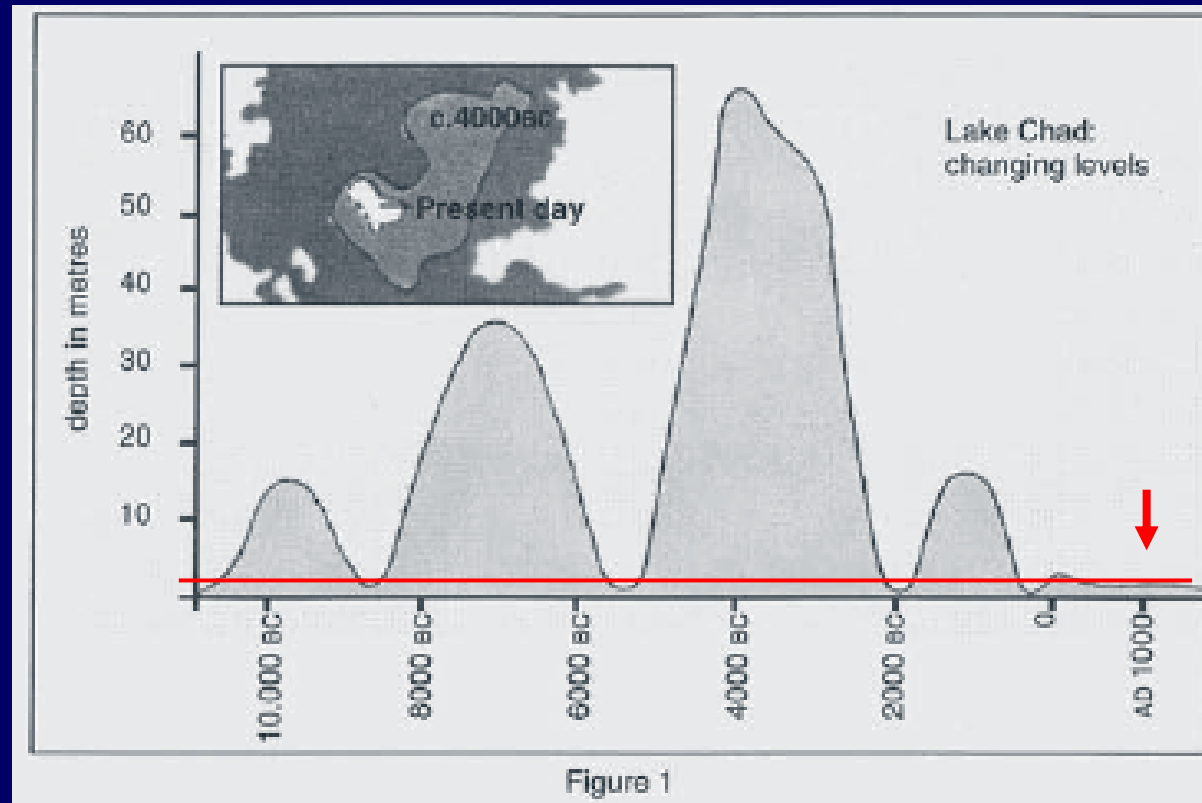
is able to:

- locate straightforward information
- make low-level inferences
- use some outside knowledge to help understand a well-defined part of a text
- apply their own experience and attitudes to help explain a feature of a text

Reading Literacy

LAKE CHAD

Figure 1 shows changing levels of Lake Chad, in Saharan North Africa. Lake Chad disappeared completely in about 20,000 BC, during the last Ice Age. In about 11,000 BC it reappeared. Today, its level is about the same as it was in AD 1000.



What is the depth of Lake Chad today?

- A. About two metres
- B. About fifteen metres
- C. About fifty metres
- D. It has disappeared completely
- E. The information is not provided

minimally acceptable standards ?

In Reading Literacy, is able to:

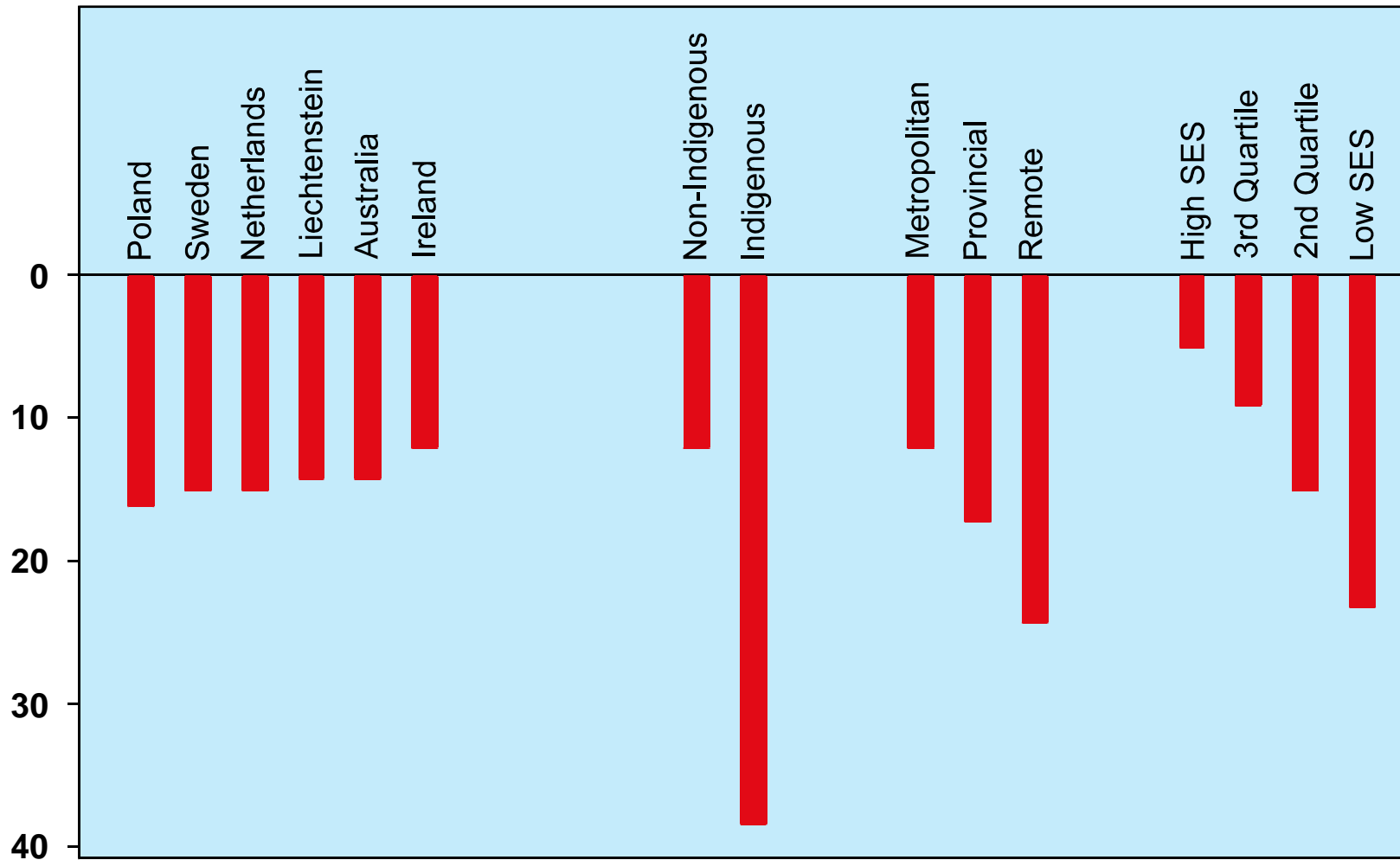
- locate straightforward information
- make low-level inferences
- use some outside knowledge to help understand a well-defined part of a text
- apply their own experience and attitudes to help explain a feature of a text

Reading Literacy

14% of Australian 15-year-olds are below the OECD baseline

minimally acceptable standards ?

Percentage below OECD baseline (Reading Literacy)



minimally acceptable standards ?

is able to:

- interpret and recognise situations in contexts that require no more than direct inference
- extract relevant information from a single source and make use of a single representational mode
- employ basic algorithms, formulae, procedures or conventions
- make literal interpretations of results

Mathematical Literacy

minimally acceptable standards ?

EXCHANGE RATE

Mei-Ling had 3 900 South African rand (ZAR).
She changed this to Singapore dollars (SGD), noting
that the exchange rate was:

$$1 \text{ SGD} = 4.0 \text{ ZAR}$$

How much money in Singapore dollars did Mei-Ling get?

minimally acceptable standards ?

In Mathematical Literacy, is able to:

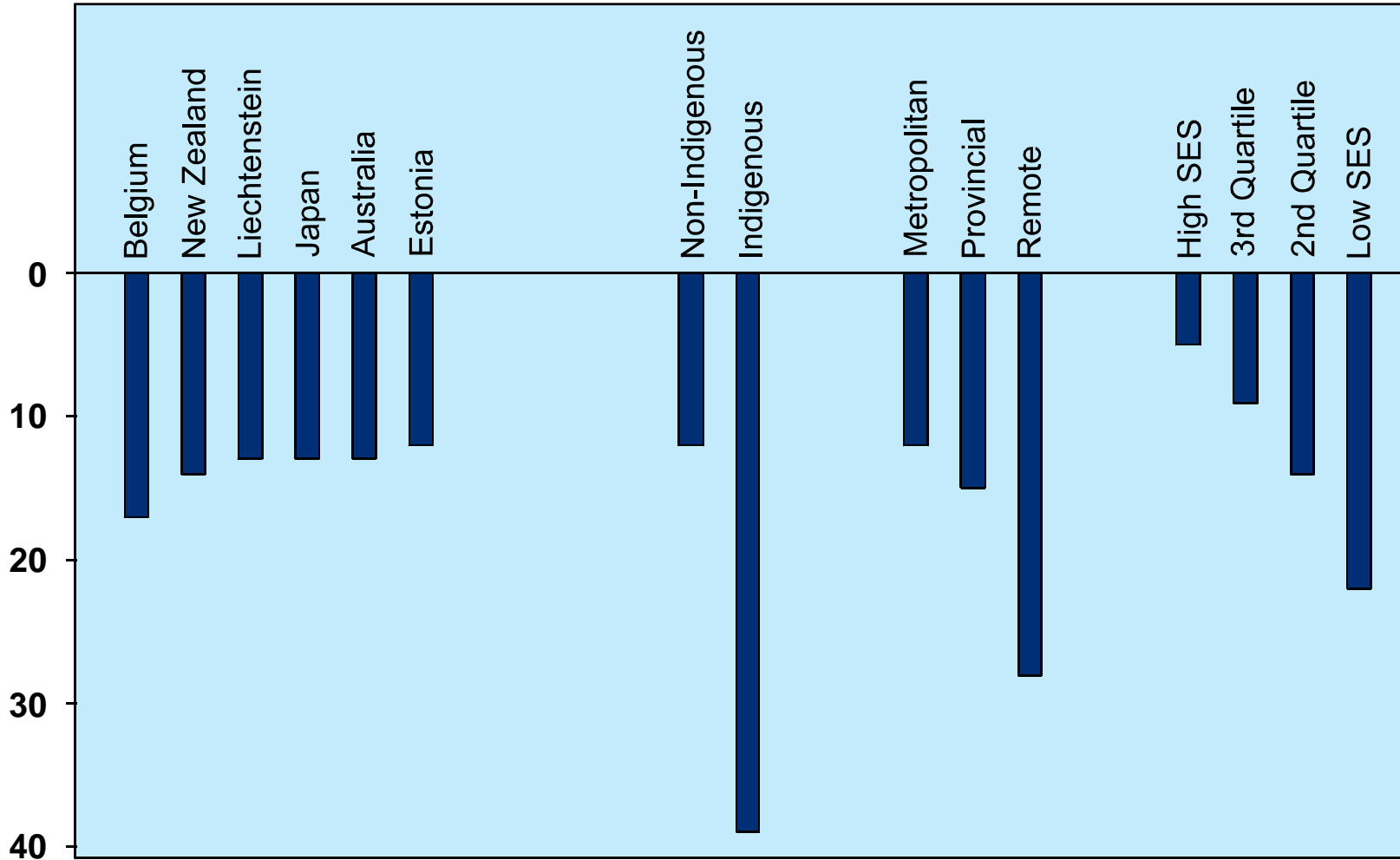
- interpret and recognise situations in contexts that require no more than direct inference
- extract relevant information from a single source and make use of a single representational mode
- employ basic algorithms, formulae, procedures or conventions
- make literal interpretations of results

Mathematical Literacy

13% of Australian 15-year-olds are below the OECD baseline

minimally acceptable standards ?

Percentage below OECD baseline (Mathematical Literacy)



minimally acceptable standards ?

is able to:

- provide possible explanations in familiar contexts
- draw conclusions based on simple investigations
- make literal interpretations of results of scientific inquiry or technological problem solving

Scientific Literacy

ACID RAIN

Below is a photo of statues called Caryatids that were built on the Acropolis in Athens more than 2500 years ago. The statues are made of a type of rock called marble. Marble is composed of calcium carbonate.

In 1980, the original statues were transferred inside the museum of the Acropolis and were replaced by replicas. The original statues were being eaten away by acid rain.



minimally acceptable standards ?

A marble chip has a mass of 2.0 grams before being immersed in vinegar overnight. The chip is removed and dried the next day. What will the mass of the dried marble chip be?

- A. Less than 2.0 grams
- B. Exactly 2.0 grams
- C. Between 2.0 and 2.4 grams
- D. More than 2.4 grams

minimally acceptable standards ?

In Scientific Literacy, is able to:

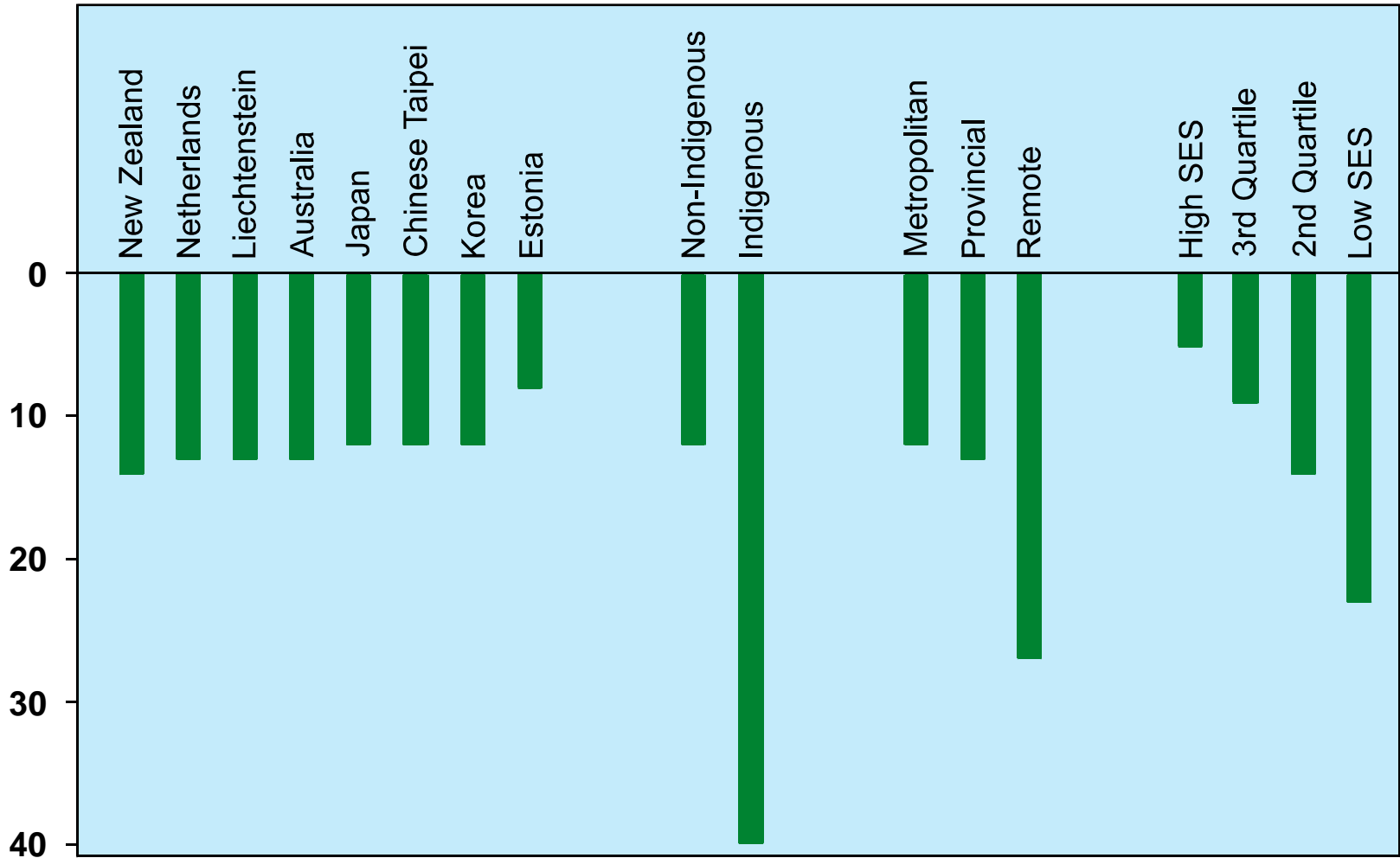
- provide possible explanations in familiar contexts
- draw conclusions based on simple investigations
- make literal interpretations of results of scientific inquiry or technological problem solving

Scientific Literacy

13% of Australian 15-year-olds are below the OECD baseline

minimally acceptable standards ?

Percentage below OECD baseline (Scientific Literacy)



minimally acceptable standards ?

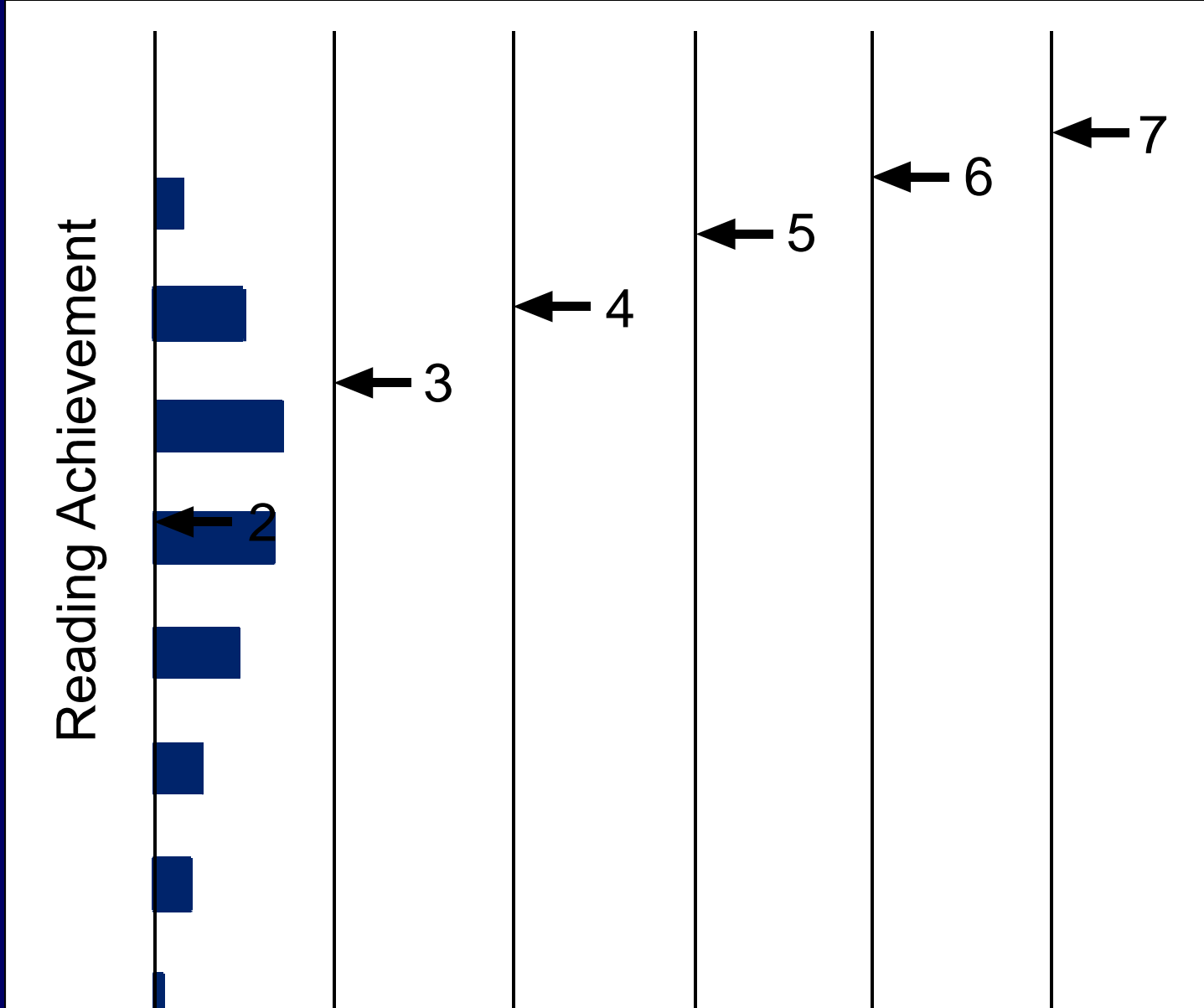
It would be a mistake to assume that all students currently attain minimally acceptable standards in fundamental areas of knowledge and skill because they spend up to 13 years at school.

minimally acceptable standards ?

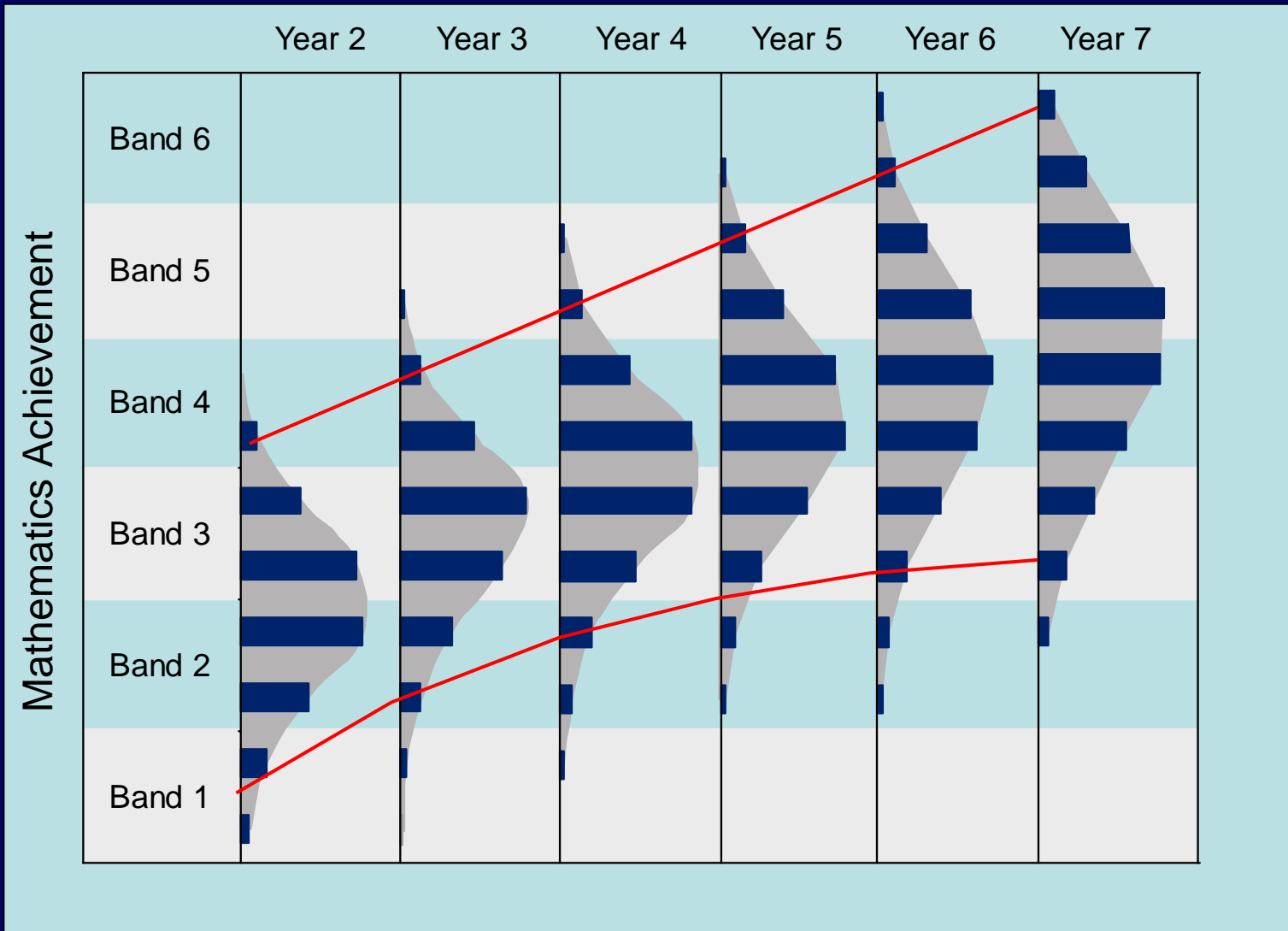
Children of the same age can be at vastly different levels of knowledge and skill development, and remain at very different levels throughout their years at school.



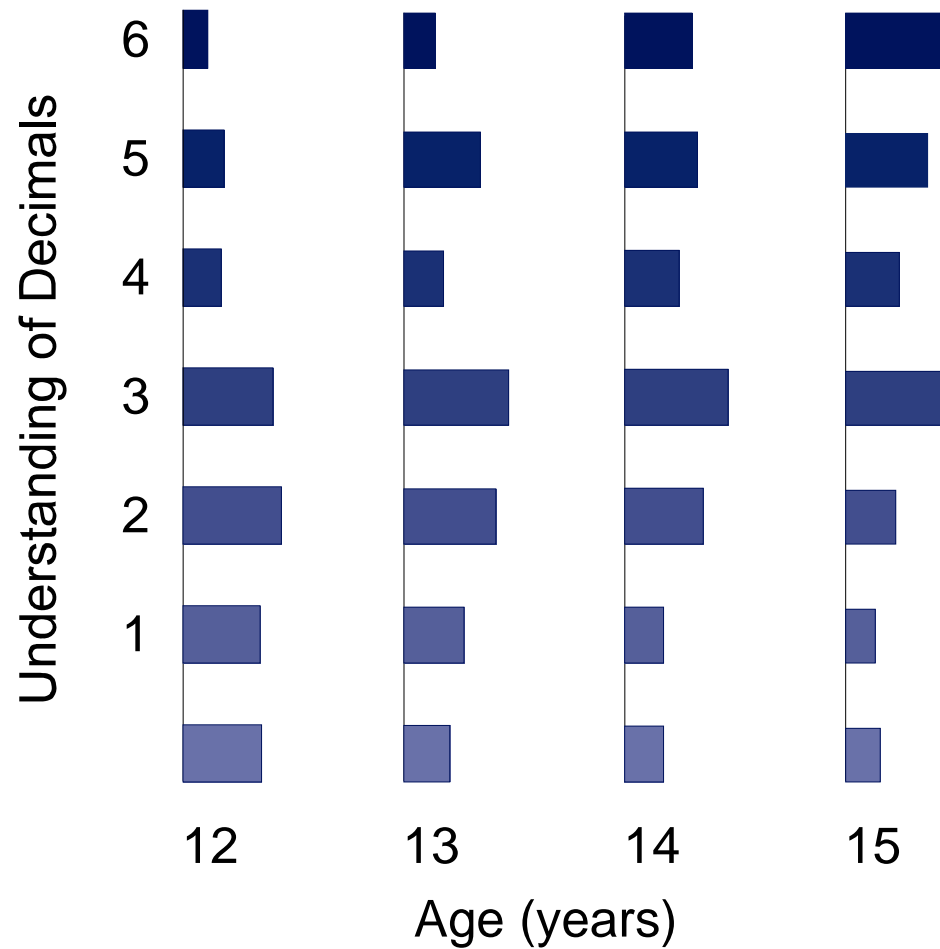
minimally acceptable standards ?



minimally acceptable standards ?



minimally acceptable standards ?



minimally acceptable standards ?

“Attainment is only loosely related to age.”

Dylan Wiliam (2007)

Very little can be assumed about a student's knowledge or skills from their age or years at school.

QUESTIONS

1. Are there fundamental understandings and skills that all students should be expected to develop during their school years?
2. In what areas or domains should all students be expected to achieve at least minimal standards of understanding or skill?
3. What would be minimally acceptable standards and should these be set nationally?
4. How could the achievement of minimally acceptable standards be confirmed?

how confirm achievement ?

Students could be given the opportunity to demonstrate that they have met minimally acceptable standards in an area / domain when they feel ready to do that.

Year 10 or earlier?

Year 11?

Year 12?

how confirm achievement ?

National Tests?

One possibility would be to introduce common, national tests, along the lines of the NAPLAN literacy and numeracy tests.

how confirm achievement ?

It should be possible for students to demonstrate the achievement of minimally acceptable standards of literacy and numeracy on the Year 9 NAPLAN tests.

how confirm achievement ?

Students who are unable to do this should have opportunities to demonstrate the achievement of minimum standards in Year 10 and further opportunities in the senior secondary school.

how confirm achievement ?

In our investigation of options for the introduction of an *Australian Certificate of Education* in the senior secondary school, we recommended assessments of key capabilities using nationally developed tests...

how confirm achievement ?

- reading literacy / verbal reasoning
- mathematical literacy / quantitative reasoning
- written English
- ICT Literacy

“The assessment of these ‘key capabilities’ could be administered part way through Year 12; might eventually be expanded to include other skills; and in some states and territories, might replace existing generic skills tests. We envisage students’ results on the key capabilities assessment being reported alongside their subject results.”

how confirm achievement ?

Existing Assessments?

Students also might demonstrate the achievement of minimally acceptable standards through their performances on other, existing tests and assessments

(eg, NSW School Certificate; senior secondary certificate; Core Skills Test; GAT; AST)

how confirm achievement ?

On-line Assessments?

On-line “on demand” tests could be made available for teachers to administer whenever students feel ready to demonstrate that they have achieved the standards. Such tests also might be used to monitor a student’s progress towards the achievement of minimally acceptable standards.

how confirm achievement ?

Professional judgements?

For some skill areas (eg, *Teamwork; Planning and Organising*) valid assessments are likely to require direct observation and judgement by teachers trained in making assessments against standards.

in summary...

observations

Currently, we make no attempt to spell out what every child should know and be able to do as a result of (up to) 13 years of school.

National and international sample surveys (Reading Literacy, Mathematical Literacy, Scientific Literacy, Civics & Citizenship, ICT Literacy) reveal significant numbers of Australian students not meeting Year 10 standards set by those surveys.

in summary...

questions

Should we set standards that every child is expected to meet by the end of their schooling?
(a 'guarantee'?)

Should such expectations be set nationally?

If so, in what areas / domains?

Should the award of a senior certificate depend on a student meeting at least minimal standards of achievement in these areas / domains?
(an 'assurance' to users of senior certificates?)



Thank You