

ACER Portfolio Project

TEACHING FIELD: Primary
LEVEL: Highly Accomplished

**ENTRY 2: Building mathematics
understanding through
discussion**

The ACER Portfolio Project focuses on the research and practical challenges involved in developing valid and feasible methods by which teachers can demonstrate how they meet the Australian Professional Standards for Teachers at the highly accomplished level. Entry 2 is one of four portfolio entries for primary teachers.

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ENTRY 2: Building mathematics understanding through discussion

Overview

In this portfolio entry you will demonstrate how you use and encourage discussion about important mathematics content to move student learning forward.

Your entry will show how you set long- and short-term learning goals for students referenced to the Australian Curriculum Mathematics and how you plan and implement selected pedagogical approaches to guide, support and monitor students' understandings of important ideas in mathematics.

You will show how you strategically make the mathematics content explicit, engage students in discussion about the mathematics, probe student understanding and provide feedback to move students' learning forward.

You will provide evidence of your teaching by means of:

- **Video recordings** of three 5-minute segments selected from a teaching/learning sequence or unit of work, that illustrate how you have used or encouraged discussion about important mathematics content to guide, support and monitor students' mathematics understanding. The video segments will show you strategically making content explicit, engaging students in discussion, probing student understanding, or providing feedback to move students' learning forward. The segments might show discussions with pairs of students, small groups of students (3-4) or large groups of students (6 or more, including whole class). At least one segment should show a discussion with a large group of students.
- **Artefacts** associated with the planning and implementation of the teaching/learning sequence, and those used to guide, support and monitor students in their learning.
- A **written commentary** that provides the context of your teaching; reasons for selecting the particular segments recorded in the video; and a description, analysis, reflection and evaluation of the demonstrated teaching and learning activities related to this entry.

Note: This entry should not be based on the same teaching/learning sequence as those of the other Primary portfolio entries.

How is this entry designed and why?

This entry is designed to enable you to provide evidence of how you meet standards for highly accomplished teaching in your current teaching context. You will demonstrate your mathematics pedagogical content knowledge and your ability to apply it to build students' conceptual understanding of key mathematics ideas.

The entry is referenced to:

- A. The Australian Professional Standards for Teachers (Australian Institute of Teaching and School Leadership) at the Highly Accomplished career stage.
<http://www.aitsl.edu.au/australian-professional-standards-for-teachers/standards/career-stage/highly-accomplished>
- B. Australian Curriculum: Mathematics
<http://www.australiancurriculum.edu.au/mathematics/Rationale>
- C. Research on effective practices in the teaching of mathematics.

A. Australian Professional Standards for Teachers relevant to Entry 2

This entry requires you to provide evidence of your accomplishment relevant to the following *Australian Professional Standards for Teachers* at the Highly Accomplished career stage.

Standard 1: Know students and how they learn

Standard 2: Know the content and how to teach it

Standard 3: Plan for and implement effective teaching and learning

Standard 4: Create and maintain supportive and safe learning environments

Standard 5: Assess, provide feedback and report on student learning

The focus of this entry is on Standards 2, 3 and 5 although your entry will also provide evidence in relation to Standards 1 and 4.

B. Australian Curriculum: Mathematics

The following aims of the *Australian Curriculum: Mathematics* are particularly relevant to the preparation of this entry.

The Australian Curriculum: Mathematics aims to ensure that students:

- are confident, creative users and communicators of mathematics, able to investigate, represent and interpret situations in their personal and work lives and as active citizens
- develop an increasingly sophisticated understanding of mathematical concepts and fluency with processes, and are able to pose and solve problems and reason in *Number and Algebra*, *Measurement and Geometry*, and *Statistics and Probability*
- recognise connections between the areas of mathematics and other disciplines and appreciate mathematics as an accessible and enjoyable discipline to study.

[ACARA, 2010]

The Australian Curriculum: Mathematics is organised around the interaction of three content strands and four proficiency strands.

Content Strands	Proficiency Strands
Number and Algebra	Understanding
Measurement and Geometry	Fluency
Statistics and Probability	Problem Solving
	Reasoning

The content strands describe what is to be taught and learnt. The proficiency strands describe how content is explored or developed, that is, the thinking and doing of mathematics.

In this entry you should focus on one of the three content strands together with the *Understanding* proficiency strand.

The Australian Curriculum: Mathematics includes content descriptions at each year level. These describe the knowledge, concepts, skills and processes that teachers are expected to teach and students are expected to learn over time. However, they do not prescribe approaches to teaching. This is matter for a teacher's professional judgement given the particular circumstances of their teaching and the particular requirements of their students. In preparing this entry you should provide evidence of how your teaching builds students' conceptual understandings of an important area of mathematics content relevant to your particular teaching context.

C. Research on effective teaching practices in mathematics

There is a considerable body of research related to effective mathematics teaching. You will draw on and reference this research, explain how it has informed your approach to teaching and learning in mathematics, and relate it to the opportunities you provided in this entry to enable students to build their mathematics conceptual understanding.

Requirements for Entry 2

Your **Video**, **Artefacts** and **Written commentary** will provide evidence of how you used and encouraged discussion about important mathematics content to guide, support and monitor students' understandings to move student learning forward.

The teaching/learning sequence used for this entry should be different from those featured in the other Primary portfolio entries.

Video recording (3x5 minute segments - total 15 minutes)

You are required to video record mathematics lessons in a teaching/learning sequence and select from those lessons three 5-minute segments to submit. The segments that you select should provide you with the opportunity to demonstrate your professional knowledge and practice to best advantage. All segments should show how you use and encourage discussion to guide, support or monitor students' mathematics understandings.

The video segments might show discussions with pairs of students, small groups of students (3-4) or large groups of students (6 or more, including

whole class). At least one segment should show a discussion with a large group of students.

The teaching/learning sequence to be the focus of this entry could come from any point in a mathematics teaching and learning program, as long as it:

- focuses on students' understandings of key mathematics ideas; and
- provides opportunity for you to demonstrate your ability to use and encourage discussion to guide, support and monitor students' understandings, including:
 - (i) making key mathematics ideas explicit;
 - (ii) engaging students in discussion;
 - (iii) probing student understanding; and
 - (iv) providing useful feedback.

Guidance on the selection, formatting and submission of your video segments is provided in the *Supporting Information*. [\[link\]](#)

Artefacts (4 items, a maximum of 8 pages)

The artefacts that you submit must be relevant to this particular entry. Relevant artefact types might include: excerpts of teaching plans; resources constructed or drawn on in the lesson; diagnostic assessments; analysis of records; individual learning plans; lesson observation notes; student work samples and learning tasks.

Example artefacts and guidance on the selection, formatting and submission of artefacts are provided in the *Supporting Information*. [\[link\]](#)

Written commentary (11-12 pages)

Your written commentary will assist assessors to make judgements about your accomplishment in relation to this entry. Your written commentary will consist of 6 components.

1. School context (half page)

Provide an *outline* of the characteristics of your school and its wider community that gives an overall context for your entry.

- 1.1 Type of school, its location (rural/remote/urban), jurisdiction; year levels (primary, secondary, F-12); single/multi-campus, co-ed/single sex boys/girls *[use drop-down boxes]*
- 1.2 Total school enrolment, number and size of classes
- 1.3 Mandated curriculum requirements.
- 1.4 Demographic composition and characteristics of the school and wider community, for example: cultural, ethnic and socio-economic backgrounds, diversity of language, integration of students with disabilities.

2. Teaching context (half page)

Describe the characteristics of the class you are teaching and other factors that might influence the teaching and learning of these students in mathematics at this time.

- 2.1 What is the year level (or levels) and the number of students in your class?

2.2 What characteristics of your teaching setting and your students influenced how you prepared for the teaching shown in this portfolio entry? For example, curriculum requirements, staffing structure, student backgrounds, levels of English proficiency, range of student abilities.

2.3 What particular challenges does your class present? This might include, but is not limited to, a description of your students' skills and interests, background knowledge, level of confidence.

3. Research on effective teaching practice in mathematics (1-2 pages)

Select and reference 2-4 authoritative studies related to mathematics teaching and learning that have influenced the way you teach key mathematics ideas such as that featured in your selected video segments.

Describe how and why you have applied the research findings to the learning opportunities you have provided your students in the context of this entry.

Use these questions as a basis for your commentary on this research:

- What new insights into the teaching of mathematics in the primary years did you gain from this research?
- What changes did you implement in your teaching practices, or in your assessments of students' achievement as a result of reading this research?
- To what extent and in what ways has your teaching been strengthened by your learning from this research?

4. Planning (1 page)

Describe the goals that give the purpose, focus and context of the pedagogical approaches used in the teaching/learning sequence. Specifically:

- 4.1 What were the overall goals for the teaching/learning sequence? What particular goals did you have for the lessons from which the video segments were taken?
- 4.2 What challenges for the students we see in the video segments were inherent in the specific key mathematics idea(s) you focused on during the discussions?
- 4.3 Describe the range of methods you planned for assessing and monitoring students' developing understandings across the teaching/learning sequence.

5. Analysis (4-5 pages)

Analyse the video segments to demonstrate how you guided, supported and monitored students' understandings of key mathematics ideas in the teaching/learning sequence.

- How does what we see in the video segments fit into the teaching/learning sequence as a whole? (i.e. what happened in the balance of the lesson times, either before or after the video was taken?).

- Point to evidence in the video that demonstrates you guiding, supporting or monitoring students' understandings of the key mathematics ideas.
- What particular role did discussion play in developing students' understandings of the key mathematics ideas?
- Point to specific evidence in the video of interactions that provoked or allowed students to initiate and share their mathematical thinking and ideas. Explain how you used the students' thinking or ideas in the teaching/learning sequence (for example, to elaborate particular content and ideas, build on students' thinking, assess student understanding, or guide teaching decisions).
- Point to evidence in the video of any changes in direction or variations in the teaching plan that you made during the teaching/learning sequence. Explain the reasoning behind these changes or variations and their outcomes.

6. Evaluation and reflection (2-3 pages)

Evaluate and reflect critically on the teaching and learning segments shown in the video with a view to improving student learning and your practice.

- How did your knowledge of your students influence your approach to your teaching in this teaching/learning sequence?
- Which parts of the teaching/learning sequence were particularly effective in guiding, supporting or monitoring students' mathematics understandings? Why do you think so?
- How well did you achieve your goals for these students through this particular teaching/learning sequence?
- How did the discussion segments shown in the videos move student learning forward?
- What, if anything, would you do differently the next time you prepared a similar teaching/learning sequence on this mathematics content? Why?

Summary of requirements for Entry 2: Building mathematics understanding through discussion

Components of the entry	Summary	Length
Video segments	Three 5-minute segments providing evidence of how you use and encourage discussion to guide, support and monitor students' understandings of key mathematics ideas. The three segments should be taken from a single teaching/learning sequence or unit of work.	3 x 5 min segments (Total: 15 min)
Artefacts	Materials used by the teacher to plan for, guide, support or monitor student understanding of key mathematics ideas.	4 items, maximum 8 pages

Written commentary	Description, analysis, evaluation and reflection of how you used and encouraged discussion in a teaching/learning sequence to guide, support or monitor students' understandings of key mathematics ideas.	
<i>School context</i>	Description of characteristics of the school and wider community that provide the context for your teaching.	half page
<i>Teaching context</i>	Description of characteristics of the class and other factors that might influence the teaching and learning of the students in mathematics at this time.	half page
<i>Research on effective teaching practice in mathematics</i>	Description of how and why you applied particular research findings to the learning opportunities you provided students in the context of this entry.	1-2 pages
<i>Planning</i>	Description of the goals that give the purpose, focus and context of the approaches used in the teaching/learning sequence.	1 page
<i>Analysis</i>	Analysis of evidence in the video segments that demonstrates how you used and encouraged discussion to guide, support and monitor students' understandings of key mathematics ideas in the teaching/learning sequence.	4-5 pages
<i>Evaluation and reflection</i>	Evaluation and critical reflection on the teaching and learning segments shown in the video, with a view to improving student learning and your practice.	2-3 pages