

Subject Title:	Learning Numeracy		
Subject Code:	EDU1LNU	Credit Points:	15
Teaching Period:	Semester	Mode:	Blended
Prerequisite:		Level:	1
Subject Description:			
<p>The work in this subject is designed to meet the mathematical needs of each student. This is scaffolded through a diagnostic test where students will establish areas of strength and areas that require development. Each week students will build on previous mathematical understanding through targeted opportunities to deepen mathematical thinking. This subject is specifically designed to engage each learner in thinking and communication around mathematical concepts and procedures, to develop their mathematical understandings. Students have opportunities to interact in activities that deepen and enrich understanding of numeracy.</p> <p>Active involvement in this subject supports the skill development in Numeracy for completion of a final numeracy test hurdle task.</p>			
Intended Learning Outcomes (ILOs) & Australian Professional Standards for Teachers (APST)			
Upon successful completion of this subject, you will be able to:			APST
1	Document evidence of conceptual understanding of mathematics.		2.1
2	Demonstrate mathematical skills through modelling, problem solving, and performance.		2.1
3	Communicate effective mathematical thinking processes.		2.1
4	Interpret personal and others' mathematical performance from tests and classwork		2.1

Assessment:				
Assessment Summary		Word Count Equivalence	%	APST
1	Work book	1200	30%	2.1
2	Maths Pathway work	1200	30%	2.1
3	Evidence trajectory	1600	40%	2.1
4	Hurdle task – Numeracy Test Preparation for Australian professional accreditation requirement. Students must pass on second attempt.	NA		2.1
Assessment Details (including Assessment Criteria)				
1	<p>Work book</p> <p>Each student will build a comprehensive account of the mathematics work they undertake in the weekly tutorials. Students explore their knowledge base and learn about thinking mathematically using models and representations. The workbook provides opportunity to show another person what it is they know about mathematics and how it is that they engage in mathematics within differentiated mathematics classrooms. Students will be expected to connect their journey in mathematics with research in mathematics learning from reputable mathematics texts such as those included in the prescribed and recommended text lists.</p> <p>Assessment Criteria:</p> <ol style="list-style-type: none"> 1. In unpacking mathematical problems you must demonstrate a logical and coherent map/plan to interpret questions / problems (include definitions from the maths dictionary) 2. Provide complete, clear, coherent, unambiguous and elegant responses to mathematical questions or problems 3. Explain your rationale for arriving at particular solution/s 			
2	<p>Maths Pathway is an online program that addresses performance assessment as collated from Maths Pathways, an accredited online diagnostic report that informs and supports individually targeted maths development. The program provides each student with an individual account of personal strengths and weaknesses in mathematics. After a full diagnostic test Maths Pathway provides a detailed account of levels of understanding across each of the mathematical areas and assists the teacher/s by promoting and providing problems targeted to each student’s particular needs.</p> <p>Assessment Criteria:</p> <ol style="list-style-type: none"> 1. Major diagnostic assessment occurs online at the beginning of the semester. Most people complete this work in 2-3 hours. Four test dates are spread across the semester. Meeting all deadlines and demonstrating strong growth ensures a high overall grade. 2. Complete at least 10 modules of new work online prior to each test 			
3	<p>Evidence trajectory: Reflective account of mathematical growth. Each week students will be provoked to produce a record that demonstrates their mathematical knowledge, skills and strategies. Here the required texts will inform their conceptual growth. In their Work book students will address the following statements:</p> <ul style="list-style-type: none"> • Provide evidence of Maths Pathway work by building a formal record of ongoing Maths Pathway work • Provide answers to weekly set problems • Reflect on how you unpacked the set problems from each week • Analyse Work samples and connect them to the set texts. • Create a record of teacher and/or peer observations or discussions, have those involved write their name and sign off on these accounts as they are built each week. <p>Assessment Criteria: Evidence of demonstrated conceptual growth in mathematics will be supported by inclusion of the workbook assessment task 1 and a formal record of ongoing Maths Pathway work assessment task 2 and will include direct attention to collated examples of:</p> <ol style="list-style-type: none"> 1. Weekly reflections on how the set problems from each week directly relate to work samples provided, which are analysed and connected to the set text in class. 2. Evidence of teacher and/or peer observations or discussions each week, those involved write their name and sign off on these accounts as they are built each week. Examples may include but are not limited to: sharing when a concept is understood, example of how to apply it, the benefit of discussion opportunities, willingness to work independently to solve a problem. 3. Honest and justified accounts of how well you engaged with your peers when building understands of the questions/problems posed in class (connect understandings / misconceptions to set text). 			

	4. Appropriate use of References in exploring mathematical knowledge, skills and strategies.
--	--

Learning Resources	
--------------------	--

Required Texts	
----------------	--

- | | |
|---|---|
| 1 | Booker, G., Bond, D., Sparrow, L., & Swan P. (2014). <i>Teaching primary mathematics</i> (5 th ed.) Pearson: Frenchs Forrest |
| 2 | De Klerk, J., & Marasco, A. (2013). <i>Pearson illustrated maths dictionary</i> (5 th ed.). Pearson: Frenchs Forrest |

Recommended Reading	
---------------------	--

- | | |
|----|--|
| 1. | Bana, J., & Swan, P. (2007). <i>Maths terms and tables</i> . RIC publications: Greenwood WA. |
| 2 | Jorgensen R., & Dole S. (2011). <i>Teaching mathematics in primary schools</i> . (2 nd ed) Allen and Unwin: Crows nest Australia. |
| 3 | Reys, R. E., Lindquist, M. M., Lambdin, D. V., Smith, N. L., Rogers, A., Falle, J., & Bennett, S. (2012). <i>Helping children learn mathematics</i> . Milton, Qld: Wiley & Sons Australia. |
| 4 | Siemon, D., Beswick, K. Brady, C. Clarke J., Faragher, R. (2012). <i>Teaching mathematics: Foundations to middle years</i> . Oxford: Australia. |

Learning Activities Overview:		
Week	Learning Topic	Learning Activities/Readings
1	Unpacking numeracy	The Maths Pathway diagnostic test is used to promote discussions on numeracy and level of personal mathematical knowledge / understandings. The discussion is further prompted by reading <i>Siemon, D., Beswick, K. Brady, C. Clarke J., Faragher, R. (2012). Teaching mathematics: Foundations to middle years. Oxford: Australia. Chapter 2 pp. 23 - 45</i> , which covers the impact of beliefs about learning mathematics, and the valuing of mathematics as an individual and social activity. The aim this week is to begin the process of students articulating personal mathematical understandings.
2	Addition	Students unpack addition problems and further understand what is involved in computational fluency. Students explore the development of meaningful additive thinking within a targeted problem-solving environment. Work will connect personal understandings with information discussed in set text: <i>Booker, G., Bond, D., Sparrow, L., & Swan P. (2014). Teaching primary mathematics (5th edition) Pearson: Frenchs Forrest. pp. 196-230</i> . The set text, a teaching text, is selected due to its focus on providing opportunity to 'reflect and refine the way experiences with materials, language and the patterns of thinking that emerge from them can be used to construct mathematical ideas.' (Booker, et al. 2014. p. ix)
3	Subtraction	In unpacking subtraction problems students build on the conceptual understanding and problem-solving experiences that value their ability to explain and justify their reasoning. Using subtraction problems as the vehicle, as with last week and all future weeks a key focus is on how society needs to overcome an appreciation of procedural fluency over conceptual understanding. Work this week connects understandings with work in set text: <i>Booker, et al. (2014). pp. 234-264</i> , while mathematical terminology is explored through the <i>de Klerk & Marasca (2013). Pearson illustrated maths dictionary</i> .
4	Multiplication	In unpacking multiplication problems students demonstrate the depth of their understanding of the four operations and work toward establishing and articulating a well-developed sense of number. Understandings will connect with work in set text: <i>Booker, et al. (2014). pp. 266 – 308</i> .
5	Division	Students explore and further recognise the two ideas of division, partition and quotient. They will unpack division problems and explore well-intended shortcuts and rules. Work will focus on thinking, reasoning and justifying. Understandings will connect with work in set text: <i>Booker, et al. (2014). pp. 315 – 353</i> .
6	Fractions	Students will articulate different meanings and representations of fractions. They will engage in activities that require them to justify inverse relationships between the number of equal parts and size of each part as well as to interpret, select and apply different problem-solving approaches / methods according to the context of the problem. Understandings will connect with work in set text: <i>Booker, et al. (2014). pp. 151 - 194</i>
7	Algebra	The Maths Pathway diagnostic test is used to promote discussions on numeracy and level of personal mathematical knowledge / understandings. The discussion is further prompted by reading <i>Siemon, D., Beswick, K. Brady, C. Clarke J., Faragher, R. (2012). Teaching mathematics: Foundations to middle years. Oxford: Australia. Chapter 2 pp. 23 - 45</i> , which covers the impact of beliefs about learning mathematics, and the valuing of mathematics as an individual and social

		activity. The aim this week is to begin the process of students articulating personal mathematical understandings.
8	Chance	Students unpack addition problems and further understand what is involved in computational fluency. Students explore the development of meaningful additive thinking within a targeted problem-solving environment. Work will connect personal understandings with information discussed in set text: <i>Booker, G., Bond, D., Sparrow, L., & Swan P. (2014). Teaching primary mathematics (5th edition) Pearson: Frenchs Forrest. pp. 196-230.</i> The set text, a teaching text, is selected due to its focus on providing opportunity to 'reflect and refine the way experiences with materials, language and the patterns of thinking that emerge from them can be used to construct mathematical ideas.' (Booker, et al. 2014. p. ix)
9	Data	In unpacking subtraction problems students build on the conceptual understanding and problem-solving experiences that value their ability to explain and justify their reasoning. Using subtraction problems as the vehicle, as with last week and all future weeks a key focus is on how society needs to overcome an appreciation of procedural fluency over conceptual understanding. Work this week connects understandings with work in set text: Booker, et al. (2014). pp. 234-264, while mathematical terminology is explored through the de Klerk & Marasca (2013). <i>Pearson illustrated maths dictionary.</i>
10	Measurement	In unpacking multiplication problems students demonstrate the depth of their understanding of the four operations and work toward establishing and articulating a well-developed sense of number. Understandings will connect with work in set text: Booker, et al. (2014). pp. 266 – 308.
11	Geometry	Students explore and further recognise the two ideas of division, partition and quotient. They will unpack division problems and explore well-intended shortcuts and rules. Work will focus on thinking, reasoning and justifying. Understandings will connect with work in set text: Booker, et al. (2014). pp. 315 – 353.
12	Worded problems	Students will articulate different meanings and representations of fractions. They will engage in activities that require them to justify inverse relationships between the number of equal parts and size of each part as well as to interpret, select and apply different problem-solving approaches / methods according to the context of the problem. Understandings will connect with work in set text: Booker, et al. (2014). pp. 151 - 194

Assessment	
Assessment Task No.	Description of task:
1	Work book
APST	Description of how each Graduate Teacher Standards is Taught, Practiced and Assessed
2.1	<p>1.2 Class work is documented in the student workbooks. This work demonstrates mathematical understanding and knowledge growth.</p> <p>2.1 Class work is documented in the student workbooks. This work demonstrates understandings of mathematical concepts.</p> <p>2.5 Class work is documented in the student workbooks. This work includes direct reflections of how to teach numeracy.</p>
Assessment Task No	Description of task:
2	Maths Pathway work
APST	Description of how each Graduate Teacher Standards is Taught, Practiced and Assessed
2.1	<p>1.2 Maths Pathway work provides documented evidence of personally structured development in mathematical understanding and knowledge growth.</p> <p>2.5 Maths Pathway work provides documented evidence of how we learn numeracy and the Maths Pathway structure is connected in class discussions of how to scaffold learning.</p>
Assessment Task No	Description of task:
3	Evidence trajectory
APST	Description of how each Graduate Teacher Standards is Taught, Practiced and Assessed
2.1	<p>Description of how each Graduate Teacher Standards is Taught, Practiced and Assessed</p> <p>Work in class is based on episodes of interactive peer to peer teaching. This work requires all participants to engage in verbal and non-verbal communication strategies all designed and monitored to support student engagement.</p>