School of Education

EDST6779
Primary Mathematics

Semester 1, 2018

1. LOCATION

Faculty of Arts and Social Sciences
School of Education
EDST6779 Mathematics 1 (6 units of credit)

2. STAFF CONTACT DETAILS

Course Coordinator: Kathryn Harris
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3. COURSE DETAILS

Course Name	Primary Mathematics Method 1
Credit Points	6 units of credit (uoc)
Workload	Includes 150 hours including class contact hours, readings, class preparation, assessment, follow up activities, etc.
Schedule	

2.1	Demonstrate knowledge and understanding of the concepts, substance and structure of the content and teaching strategies of the teaching area	1, 2
2.2	Organise content into an effective learning and teaching sequence	1, 2
2.3	Use curriculum, assessment and reporting knowledge to design learning sequences and lesson plans	1, 2, 3
2.6	Implement teaching strategies for using ICT to expand curriculum learning opportunities for students	2
3.3	Include a range of teaching strategies	2
3.4	Demonstrate knowledge of a range of resources including ICT that engage students in their learning	2
5.1	Demonstrate understanding of assessment strategies, including informal and formal, diagnostic, formative and summative approaches to assess student learning	3
5.3	Demonstrate understanding of assessment moderation and its application to support consistent and comparable judgements of student learning	3
5.4	Demonstrate the capacity to interpret student assessment data to evaluate student learning and modify teaching practice	3
6.3	Seek and apply constructive feedback from supervisors and teachers to improve teaching practices	2

National Priority Area Elaborations

Priority area		Assessment/s
A. Aboriginal and Torres Strait Islander Education	4, 8,	1, 2, 3
B.		

4. RATIONALE FOR THE INCLUSION OF CONTENT AND TEACHING APPROACH

Students need to understand the scope and sequence of the NSW Board of Studies (2012) Mathematics K-10 syllabus and use it appropriately to select concepts, sequence and connect lessons and map progress. The course investigates pedagogy appropriate for the developmental stages of diverse students learning mathematics and numeracy. Students are required to develop their use of mathematical language to explain concepts at different levels and in appropriate ways. Developing appropriate use of ICT and concrete materials is also important to develop engaging lesson activities.

5. TEACHING STRATEGIES

Student-centred practical activities provide opportunities for critique and reflection on the importance, methodology and pedagogy for teaching mathematics and numeracy. Lectures demonstrate and explicitly model teaching strategies. A hands-on teaching environment will allow students to model, collaborate and critique explicit strategies and resources within a supportive, reflective environment. On-line learning from readings on the Moodle website and selected websites and the use of a range of digital resources allow students to become confident is selecting, evaluating and using and demonstrating a range of ICT resources. Students will be able to discuss, question and critically respond to their own teaching experiences.

6. COURSE CONTENT AND STRUCTURE

(Note: Course starts in Week 2) **Lecture Date**	**Session Topic(s) and Content** Note: From 29 March to 24 May, all verbs represent what students need to do as a result of teaching and learning. The verbs indicate how the concepts in each strand relate to skills and strategies needed for the components of Working Mathematically.
(Week 2) 8 March	Exploration of own numeracy levels, personal beliefs and attitudes to mathematics. Affect and emotion in learning mathematics. Strategies for self-improvement Introduction to the **NSW K-10 Mathematics syllabus,** Stages 1-3. Importance of explicit teaching, play, investigation, continuous assessment. The role of the numeracy continuum (each topic needs to be taught with the continuum referenced). Influence of **varied experiences prior to school entry**. Assessing early numeracy and mathematics experiences, e.g., **Best Start/** Port Jackson Number Sense.
(Week 3) 15 March	Dominant **theories and approaches to teaching and learning** in mathematics.: importance of working mathematically and **articulating and demonstrating understanding**. **Strategies** for selecting, organizing, implementing and evaluating effecting learning experiences K-6, including groups/work stations and hand-on, practical activities. Importance of **working mathematically** to explore/communicate understanding and reasoning, represent and solve problems and develop fluency of language and strategies. **Continuous assessment for learning:**

	display and count. Compare size and quantity. **Exact v comparative language**: *equal to, same as, more, fewer* (using arrays and randomised groups). **Subtraction and addition** as taking away/adding in real contexts. Addition and Subtraction connected to count me in and the continuum **Working mathematically in other cultures**: Use of abacus and Aboriginal and Torres Strait Islander spatial patterns. Representations of addition and subtraction using drawings, words and numerals. Assessing conceptual understanding using interviews, SENA (DoE) and LIEN (AIS).
(Week 5) 29 March	**Measurement and Geometry Early Stage 1 and Stage 1: Application to school, community and home.** Importance of **physical handling of objects**. Understand and apply **length** [formal v informal units]; **area** [surface = covering, compare by superimposing/superpositioning shapes, count using cm^2 grids, boundary v area, *tessalation*]; **volume** and capacity (complicated topic) [open 3D objects, predict, measure and record, exploring units and strategies, including *displacement*], **mass** [conservation, balance, logic of comparing two objects to common third object]; **time** [sequence of day/night/parts of days/months/seasons, calendars, (formal v informal ways to indicate/compare time, analog/digital, identify quarter hours], compare/select **shapes**

	(*minus*) and record as a *number sentence* to link concepts to real world. Explain equivalence of number sentences and justify true/false for number sentences. *difference between'* numerically using concrete objects, number line and drawings. Add equal groups to *double,* then add left over digits for near doubles. *Demonstrate how reversing* factors for addition keeps answer the same. Explore different *strategies* to solve a number problem and explain reason for choosing the strategy. **Stage 1: Chance.** Use everyday model language to describe *chance* for events which are certain, likely, possible etc. Arrange words using opposites.
(Week 11) 17 May	**Stage 1: Position.** Use left/right from perspective of a person facing them**.** Give/follow simple directions using a diagram. Link to addition (forward) and subtraction (backwards). **Stage 1 Multiplication and division:** Demonstrate fluency for rhythmic *skip* counting by 2s, 5s and 10s. Use equal groups to model *multiplication* and model *groups of'* equal *sets* with some *left over*. Demonstrate *sharing'*. Link multiplication by first dividing a collection and then recombining the groups.
(Week 12) 24 May	**Stage 1 Fractions:** Apply halves, quarters and eighths to divide wholes. Explain vertical, horizontal or area. Combine fractions to make a whole. Explore equivalence of fractions. **Stage 1 (Patterns and Algebra):** Use objects to represent counting patterns; describe repeated patterns as one, two or three patterns and relate to adding on by three; odd and even numbers. **Stage 1 (Data):** Use symbols for objects (including *tally* marks), recording displays of data, interpreting/explaining data displays using comparative/superlative language.
(Week 13) 31 May	**Revisiting the issue of diverse learners in mathematics.** Recording progress and identifying conceptual gaps. **Language of mathematics**: Different ways of saying the same idea; moving from everyday language to more mathematical language, words used differently in non-mathematical contexts. Changing word problems to number sentences and inventing scenario to match a number sentence. Drawing word problems and number sentences. Supporting students in the transition to Stage 2.

7. RESOURCES

Required Readings

NSW Mathematics K-10 syllabus (2012)
http://syllabus.bostes.nsw.edu.au/mathematics/mathematics-k10/

NSW DET (2003) *Quality Teaching in NSW Public Schools,* Sydney, NSW.

Further Readings

Boaler, J. (2010). *The elephant in the classroom: Helping children learn and love maths.* London: Souvenir Press Limited.

Bobis, J. (2012). Mathematics for Children Challenging children to think mathematically (4th ed). Pearson

De Klerk, J. & Marasco, A. (2013) *Pearson Illustrated Maths Dictionary* (5th ed) Pearson

Gibbons, P. (2002). *Scaffolding language, scaffolding learning: Teaching second language learners in the mainstream classroom.* Portsmouth: Heinemann.

Harrison, N. & Sellwood, J. (2016). *Learning and Teaching in Aboriginal and Torres Strait Islander Education* (3rd ed). Melbourne: Oxford.

Haylock, D. & Manning, R. (2014) *Mathematics Explained for Primary Teachers* (5th ed). London: Sage

Jackson, E. (2015) *Reflective Primary Mathematics* London: Sage

Jorgenson, R. & Dole, S. (2012) *Teaching Mathematics in Primary Schools* (2nd ed.). Sydney: Allen & Unwin

Macdonald, A. with Rafferty, J. (2015) *Investigating Mathematics, Science and Technology in Early Childhood.* Melbourne: OUP

Siemen, D. et al (2015) Teaching Mathematics: Foundations to Middle Years. Melbourne: OUP

MeTRC (Mathematics eText Research Centre) (2012) What roles does vocabulary play in learning mathematics?

Assessment 2: Assessing Understanding of Measurement and Geometry

Interview a student in Stage 1 to assess their understanding of size, shapes and dimensions. Design some hands-on activities which require students to demonstrate and articulate an understanding of capacity. Write a report outlining what the student already understands and can already do. Design a 50-minute lesson plan for the next step to move the student forward in their learning.