

Technology Unit Plan 2010: Year 9; Module 3

Title: Numeracy Booklet Creation

Key Competencies	
✓	Thinking
	Using language, symbols and text
	Managing self
	Relating to others
✓	Participating and contributing

Context Setting: Digital Technology
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Technological Area(s) Focus:	
	Materials technology (Accessories)
	Materials (Interior Creations)
✓	Communications technology
	Food technology
	Graphics

Links to IT:	
	Video camera
	Digital camera
	Photobooth
	Keynote
	Pages

Technological Practice	
	Brief Development
✓	Planning for Practice
✓	Outcome Development & Evaluation

Technological Knowledge	
	Technological Modelling
	Technological Products
✓	Technological Systems

Nature of Technology	
	Characteristics of Technology
	Characteristics of Technological Outcomes

Habits of Mind					
	Persistence		Managing impulsivity		Listening with empathy & understanding
	Thinking Flexibly		Thinking about your thinking		Striving for accuracy
✓	Applying past knowledge		Questioning & posing problems		Thinking & communicating with clarity & precision
	Gathering data through senses		Creating, imaging & innovating		Responding with wonderment & awe
	Taking responsible risks		Finding humour		Thinking independently
	Remaining open to continuous learning				

Glossary:		
Design Development	Objective/Subjective	Concepts
Prior Knowledge	Concise	Transactional
Partitioning	Compensating	Divisibility
Strategies	Stakeholder	Habits of Mind (Applying past knowledge to new situations)
Initial Brief		

Links to other curriculum areas:	Links to prior learning:
<p>Major Focus: English Level 5: Speaking, Writing and Presenting <u>Purposes and audiences:</u> Constructs texts that demonstrate an understanding of purpose and audience through deliberate choice of content, language and text form.</p> <p>Number & Algebra Level 4: <u>Number strategies and knowledge:</u> Number – Use a range of multiplicative strategies when operating on whole numbers.</p>	<p>Technological Practice from Year 8 - Brief Development, Planning, Outcome Development Recording of decisions in visual diary Importance of functional models Technological Practice from previous modules, HOM</p> <p>Numeracy – Knowledge of number strategies at, at least stage 5.</p> <p>Literacy – Recognise and understand how texts are constructed for a range of purposes, audiences and situations.</p>

TECHNOLOGY		
<i>Learning Experiences Students will:</i>	<i>Achievement Objectives Indicator Students will:</i>	<i>Resources</i>
Introduce the HOM that is the focus for the module: Applying prior knowledge to new situations.	KC (Thinking)	
Students explore the meaning of the HOM by brainstorming the questions: What does prior knowledge look like? What does prior knowledge sound like? What does prior knowledge feel like? What are some examples of prior knowledge? Who has prior knowledge? Why do we need prior knowledge?		Prepared flipchart
Students share ideas as an unorganized brainstorm on the interactive whiteboard. Copy given to students to glue into their visual diaries. Students categorise brainstorm in a way that they will remember.		
Discuss the various cues that can be used to increase alertness of the HOM: HOM logo on the whiteboard with a magnet, photographs of bridges on the interactive whiteboard, 'What can I do when I am stuck information.'		Image of a bridge HOM Stamp
Using photobooth students plan an interview using a interview planning guide.		
Students record interview and evaluate the quality of the video. Evaluation to be used as learning process for HOM interview at the end of the module.		Interview planning script emailed to the girls
Introduce context for learning – development of a Figure it Out booklet to communicate Number Strategies		
Learn features of Pages <i>Create a title page using pages</i>		
Skill development Uses specific tools in <i>Pages</i> software: <ul style="list-style-type: none"> • Border • An Image • Speech bubble • Rotated text/Image • Image with reflection/Shadow • Different types of text 		Sample page on flip chart with requirements

Class discussion on what protocols are appropriate for working in groups – protocols are recorded and displayed in classroom for future teaching/reflection.	Students are able to identify appropriate protocols for working in groups (KC – Relating to Others)	
<p>Planning exercise: Provide students with a range of familiar and unfamiliar products (see http://www.techlink.org.nz/curriculum-support/strategies/tp-planning/level5.htm) and, working in groups, answer the following:</p> <ul style="list-style-type: none"> • What planning tools might have been used? • What might have been their key stages? • What might have been the actions they needed to undertake? • When might they have reviewed their progress? • What would have informed changes to their planning? • How did they identify their resources and then manage them? 	Discussion: Why it is important to have the following in a planning template: time, key stages, resources etc?	Sample Gantt chart
<i>Create a Gantt chart</i> and discuss the time students have for the project – identify the key stages and how practice is broken down into TIME.		
<p>Knowledge development Understand that planning in an ongoing process.</p>		
<p>Skill development Creating and modifying tables in <i>Pages</i> in order for students to develop and manipulate own Gantt chart.</p>		
<p><i>Research Communication</i> What is communication? How do we communicate? What is information and what do we need to know? How do we send messages? Investigate one of the items from above stating interesting facts Look at a range of ways of communicating instructions, worksheets/booklets/video help</p>		Communication handout with research criteria
<p><i>Introduce the Personal profile template.</i> Discuss who would be a good key stakeholder (teacher) and other stakeholders who may be associated (other students/teachers who use room or office, school management). (glossary definition)</p>		Personal Profile handout

Profile Workbook styles		
<i>Knowledge development:</i> Analyse the features (visual and verbal) of existing Figure it Out booklets. Students work in groups to identify and record features – findings shared with class to determine features that will be used by all class members (generic) and those which will be specific to individual members (specific to a page).		Samples of Figure It Out booklets
Initial theme exploration – Student brainstorm to identify potential focus themes for individual pages for the booklet (e.g. shopping, deserted island, plants, sustainable environment, financial).	Identify a need or opportunity from the given context and issue.	
<i>Research existing book designs.</i> Knowledge Development: Understanding relationships between material used in a product and they way they are shaped and finished.		
Liaise with stakeholder/s to gather ideas of what would be acceptable as a booklet (compare what stakeholder thinks compared to research findings) and determine specific needs and theme for their page in the Figure it Out booklet designed. Further research may be required to clarify ideas from stakeholder.		
Develop <i>Initial Brief/Specs</i>	Establish a conceptual statement that communicates the nature of the outcome and why such an outcome should be developed.	Initial Brief handout
<i>Conceptual Design:</i> Sketch designs. Plan layout. Continue to liaise with stakeholder/s. Seek feedback on designs	Describe design ideas either through drawing and or models.	
Skill development Write ‘good’ questions which are open ended and will provide a detailed response from the stakeholder. Questions need to be focused to elicit quality answers which can be used to inform next practice.		
Explore and test different materials and techniques (including software) suitable for booklet construction.		Research handout

Use dice strategy for reflection on planning process – in pairs take turns to throw the dice and discuss the answers to the questions about their own planning and tech practice needs – record discussion in their planning templates – see: http://www.techlink.org.nz/curriculum-support/strategies/tp-planning/level5.htm	Review progress according to the current plan, and revise planning as appropriate to ensure completion of booklet.	
Design development Sketch any changes to conceptual design. Continue to liaise with stakeholder/s. Application of functioning modelling techniques (talking to stakeholders in order to seek feedback, showing concept ideas to seek feedback).		
Decide on suitable materials to construct booklet.	Evaluate suitability of materials based on their performance properties to select those appropriate for a booklet.	
Writing final brief - Final Brief must be written before starting the booklet. Check specifications are measurable.		Final Brief handout
Developing students understanding of functional modeling and why it is used. Types of functional modeling: oral, physical and visual. Use examples from other technology classes to discuss their form (ie: visual) and purpose (ie: to test). Test stakeholder acceptance of the features. Reflect on types of functional modeling undertaken to date (eg: interviewing stakeholders).	Undertake functional modelling to develop design ideas into a conceptual design that addresses the key attributes.	
Construction of individual pages - students must continue working with stakeholder presenting and critiquing their designs development towards a final prototype.		
Individual pages completed (page prototype) and evaluated as being fit for purpose.		
Students self identify interest in developing a cover, contents page and acknowledgement section to present the classes individual pages as a complete booklet. Use of democratic voting to select the best design to use.		
Produce and trial a prototype of their booklet. Evaluate the fitness for purpose of the final		Photo/evaluation handout

outcome against their final brief including feedback from stakeholders.		
HOM interview. Remind students to use evaluation at the beginning of the unit to improve quality of video produced earlier.		HOM interview script emailed to the girls

English

<p><i>Learning Experiences Students will:</i></p>	<p><i>Achievement Objectives Indicator Students will:</i></p>	<p><i>Resources</i></p>
<p>Immersion in a range of transactional texts including reading narratives, diaries, articles, interviews, instructions.</p>		<p>Range of texts, school journals, newspaper articles, narratives, short stories, instruction sheets, workbooks</p>
<p>Discuss the differences and complete a 'compare and contrast' chart. Begin to label the texts in 'student language'. Research the correct names for the genres and display in class.</p>	<p>Complete compare and contrast chart in a pair.</p>	
<p>Look specifically at transactional texts and begin to identify their features.</p>		<p>Range of transactional texts</p>
<p>Create class brainstorm of 'what makes a good transactional book', for example: objective language, concise sentences etc.</p>	<p>In small groups, identify features of transactional texts.</p>	
<p>Practice writing objectively – walk around the school and write 5 objective sentences on what you see.</p>	<p>Write five objective sentences</p>	
<p>Teacher modeling writing instructions on interactive white board with student input.</p>	<p>Brainstorm some ideas for what to write instructions for, for example: how to shoot a netball, how to draw anime etc.</p>	
<p>In small groups write instructions for how to....</p>		
<p><u>Homework:</u> Create a board game that uses numeracy strategies and transactional writing techniques.</p>	<p>Create board game – friends play the game and then peer assess instructions.</p>	
<p>Begin writing own instructions for numeracy strategies to be included in booklet.</p>		

Numeracy		
<i>Learning Experiences Students will:</i>	<i>Achievement Objectives Indicator Students will:</i>	<i>Resources</i>
Rounding and compensating (Multiplication)	AO3: Understand operations on fractions, decimals, percentages, and integers.	nzmaths.co.nz
<p><i>Example:</i> Bozo the Clown fires 4.8 L of water from his water pistol each night at the circus. How many litres does he fire over two weeks? □The tidy numbers strategy involves rounding a number in a question to make it easier to solve. In the above question 4.8 can be rounded to 5 (by adding 0.2). The problem then becomes 5 x 14. The 14 groups of 0.2 L added to 'tidy' the problem now need to be subtracted, leaving a total of 67.3 L.</p> <p>The following questions can be used to elicit discussion about the strategy:</p> <ul style="list-style-type: none"> • <i>What tidy number could you use that is close to one of the numbers in the problem?</i> • <i>What do you need to do if you tidy up this number? Why?</i> • <i>Why is this strategy useful for this problem?</i> • <i>What knowledge helps you to solve a problem like this?</i> <p>If the students do not understand the rounding and compensation concept, use place value equipment to show the problems physically. Some students may find it useful to record and keep track of their thinking.</p> <p>Use the following questions for further practice if required: 6.9 x 9; 1.48 x 7; 13.98 x 6; 12.96 x 32; 7 x 9.998; 5.48 x 3</p> <p>Note: the problems posed here are using a tidying up strategy rather than tidying down. If one of the factors is just over a tidy number (such as 203) then place value tends to be a more useful strategy.</p>	<p>SLO: mentally solve decimal fraction multiplication and division problems using:</p> <ul style="list-style-type: none"> • proportional adjustment • place value • tidy numbers <p>Use appropriate recording techniques predict the usefulness of strategies for given problems evaluate the effectiveness of selected strategies generalise the types of problems that are connected with particular strategies</p>	
Rounding and compensating (Division) Example: Ohau		

<p>House uses 0.7L of detergent every time they do a fundraising car wash. They have 13.3L of detergent left... how many car washes will that last? □ Rounding and compensating for division involves finding a number that is close to the total, and working from that number to find an answer. For the question above, a student might say: I know that 0.7 times 20 would be 14. 13.3 is 0.7 less than 14, so the detergent would last 19 car washes.</p> <p>The following questions can be used to elicit discussion about the strategy:</p> <ul style="list-style-type: none"> • <i>What tidy number could you use that is close to one of the numbers in the problem?</i> • <i>What do you need to do if you tidy to this number?</i> • <i>Why is this strategy useful for this problem?</i> • <i>What knowledge helps you to solve a problem like this?</i> <p>If the students do not seem to understand the rounding and compensation concept, show the problems physically. Some students may find it useful to record and keep track of their thinking. $34.3 \div 7$; $19.8 \div 9$; $119.4 \div 6$; $13.3 \div 0.7$; $1683 \div 1.7$</p>		
<p>Proportional Adjustment (Multiplication) <i>Example:</i> Bob the bodybuilder adds 2.5 kg to his weightlifting bar each day. How much will he have added after 32 days? Proportional adjustment involves using knowledge of multiples to create equivalent equations. Factors are proportionally adjusted to make one (or both) factors easier to work from. In the above problem the factors could be adjusted as follows: Alternatively, students might double the 2.5 to 5, and halve 32 to 16.</p> <p>The following questions can be used to elicit discussion about the strategy:</p> <ul style="list-style-type: none"> • <i>What could you multiply one of these numbers by to make it easier to work with?</i> • <i>What would you then need to do to the other number?</i> • <i>Why is this strategy useful for this problem?</i> • <i>What knowledge helps you to solve a problem like this?</i> <p>If the students do not understand the proportional adjustment concept, use place value equipment to show the concept physically. Some students may find it useful to</p>		

<p>record and keep track of their thinking.</p> <p>Use the following questions for further practice if required: 3.33×18 (thirding and trebling) ; 60×7.5; 300×1.8 (thirding and trebling) ; 120×2.25; 24×1.25</p>		
<p>Proportional Adjustment (Division)</p> <p><i>Example:</i> Jonno has 168m of rope to cut into 1.2m lengths. How many bits of rope can he make? In division proportional adjustment involves reducing or increasing both numbers in the equation by the same number. Therefore, the numbers used to proportionally adjust the problem must be factors of both numbers in the equation. For example, if I divide the 168 and the 1.2 by 2 my equation becomes $84 \div 0.6$ and I can divide them both by 2 again to get $42 \div 0.3$ which is 140 or I could divide them both by 4 to get the same equation.</p> <p>The following questions can be used to elicit discussion about the strategy:</p> <ul style="list-style-type: none"> • <i>What could you divide both of these numbers by to make an easier equation?</i> • <i>Why is this strategy useful for this problem?</i> • <i>What knowledge helps you to solve a problem like this?</i> <p>If the students do not understand the proportional adjustment concept, use equipment to show the problems physically. Some students may find it useful to record and keep track of their thinking.</p> <p>Use the following questions for further practice if required: $180 \div 1.5$ ($\rightarrow 360 \div 3$) □ $367.5 \div 3.5$ ($\rightarrow 735 \div 7$); $196.2 \div 18$ ($\rightarrow 98.1 \div 9$); $1498 \div 1.4$ ($\rightarrow 749 \div .7$); $172.8 \div 16$ ($\rightarrow 86.4 \div 8$)</p>		
<p>Place Value Partitioning (Multiplication) <i>Example:</i> Mae Ling uses 3.12m to make a traditional dance outfit. How much fabric will she use to make 8 outfits? The place value strategy involves multiplying in place value (e.g. ones, tenths and hundredths). In the above problem the student might say the following: I multiplied 3×8 and got 24. Then I added the 0.8 (0.1×8) and 0.16 (0.02×8) to get 24.96 m</p> <p>The following questions can be used to elicit discussion about the strategy:</p>		

<ul style="list-style-type: none"> • <i>How can you use your knowledge of place value to solve this problem?</i> • <i>Why is this strategy useful for this problem?</i> <p>Use the following questions for further practice if required: 613.23×30; 7×4.1112; 10.21×40; 354×0.11</p> <p>If the students do not understand the partitioning concept, use place value equipment to show the problems physically. Some students may find it useful to record and keep track of their thinking. An extension of the place value strategy involves the use of standard written form for multiplication.</p>		
<p>Place value partitioning (division)</p> <p><i>Example:</i> Sheila mixes 0.8kg of milk powder with water each time she feeds the calves. If there is 49.6kg left in the bag, how many feeds will the milk powder last? The place value partitioning strategy for division involves ‘chunking’ known facts and subtracting them from the answer. The long division written form will be familiar to most teachers. In the case above, a student might think: <i>Ok, 10 lots would be 8kg. That means 50 lots would be 40kg. That leaves me with 9.6 kg. So if I take off another 10 lots that’s another 8kg. That leaves me with 16 kg left over, or 2 lots. So the answer is 50, plus 10, plus 2... 62 feeds!</i></p> <p>The following questions can be used to elicit discussion about the strategy:</p> <ul style="list-style-type: none"> • <i>How can you use your knowledge of place value to solve this problem?</i> • <i>Why is this strategy useful for this problem?</i> <p>If the students do not understand the partitioning concept, use place value equipment to show the problems physically. Some students may find it useful to record and keep track of their thinking. An extension of the place value strategy involves the use of standard written form for division.</p> <p>Use the following questions for further practice if required: $67.6 \div 0.4$; $97.6 \div 0.8$; $380.8 \div 0.7$; $472 \div 1.5$; $546 \div 1.8$</p>		