

Beginning Term 2, 2010	Maths	Number: Understand Operations	Class: Junior Primary
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This document assumes that relevant diagnostic tasks for Understand Operations have been completed. Judgements can then be made on the appropriate activities to select below, as these aim to assist teachers in helping students to consolidate and develop new understandings.

You are strongly encouraged to read the background notes from page 87 – 94 in Book 2 of First Steps, as they help classify problems, as well as representations of problems.

### Curriculum Framework Outcomes

7. Understand Operations: students understand the meaning, use and connections between addition, multiplication, subtraction and division.

6. Understand Numbers: Students read, write and understand the meaning, order and relative magnitudes of whole and decimal numbers, moving flexibly between equivalent forms

<b>Key Understanding 1</b> Adding and subtracting numbers are useful when we: <ul style="list-style-type: none"> <li>• change a quantity by adding more or taking some away</li> <li>• think of a quantity as combined parts</li> <li>• equalise or compare two quantities</li> </ul> <p><b>Handy Hint:</b>  <i>"This KU is about the <b>meaning</b> of addition and subtraction operations, RATHER THAN how to carry out the calculation". Pg12 FSIM</i></p>		Relevant ANTT Tasks (to be filled in)	
Mathematical Focus	Activities / Tasks	Focus Questions	AEW Involvement
KU1: Adding and subtracting numbers are useful when we change a quantity, think of a quantity as combined parts, and equalise or compare two quantities.  Readings: FSIM pg 12 – 13  Reading: Thinkboards pg 87 FSIM Book 2	After doing the Diagnostic Assessment (ANTT) 'Frogs and Yummy Ice-cream' Change questions to suit  Create Stories for students to act out with: <ol style="list-style-type: none"> <li>1. Beginning</li> <li>2. Change (add or subtract)</li> <li>3. End (how many now?)</li> </ol>	Do students understand addition concept? Subtraction concept? What do they need to work it out? (Materials, pictures, etc)  What did we have at the beginning? What did we start with? Then what happened? How many have we got now?	<b>Some</b> possible roles and responsibilities AEWs for all these tasks can take include: <ul style="list-style-type: none"> <li>- running part of a lesson</li> <li>- working with a group</li> <li>- working with a particular student</li> <li>- running a game</li> <li>- acting as a translator</li> <li>- preparing resources</li> <li>- asking focus questions</li> </ul>

	<p>Use different language to build up students' vocab on these changes (eg. add, more, plus, also..) A word wall is a good idea to help this along.</p> <p><b>Plus or Minus FSIM p 14</b> - retell fav. Story to students and get them to hold up cards with – or + each time a character joins or leaves the scene. Write a number sentence for part of the story.</p> <p><b>Role Play FSIM p14</b> – Students act out characters in story. Each time people come or go, record the number and operation/action or sign on board.</p> <p>The book '<u>The Doorbell Rang</u>' is one example that would work with Role Play.</p> <p>Link the above stories / role plays to symbols and pictures using Think-boards or equivalent. Thinkboards pg 15 FSIM</p> <p>Have students use the same addition or subtraction (eg. 11 – 5) to create their own story and act it out and/or draw it.</p> <p><u>Maths 300</u> - Jumping Joey / Attachment A</p> <p><u>Break Down</u> / Attachment B (Good for younger students) NB: see KU2 as another way to use this game.</p> <p>Messages FS p14</p>	<p>Why did you decided show that card when I read out this? How do you know? Compare your choice and explain How could we write a number sentence to show this part of the story? (Work whole class example, then allow students to have a go. Write all number sentences on board to compare and discuss)</p> <p>At end of story (and using your recordings) ask: Which part of the stroy was the '+2' for? Could it have been when the wolf ran away? Why?</p> <p>What number of ___ did we start with? Then did we add or take away ___? How can we use numbers / pictures to show that?</p> <p>What could your story be about? How many of ___ should there be? Then what happened to the ___?</p> <p>As per lesson plan</p> <p>Which dominoes give the largest difference? What if you put the difference back on the smaller number? How many did you have to add onto this to make it the same/equal? How many did you have to pull off/take away to make them the same/equal?</p> <p>What do you need to tell your partner to make the</p>	<p>- assessing students</p> <p><i>(These roles should be negotiated between teacher and AEW in advance)</i></p>
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	<p>(Also as a sample lesson on page 36 but with multiplication instead of addition / subtraction)</p> <p>Can also play a similar barrier game where both students put out their choice of number of blocks (eg. between 10 and 20). One student then tells the other how to change their blocks to make them equal to their own number (eg “take five away”). This can be more challenging by introducing two steps (“add 4 more but then take one away”)</p> <ul style="list-style-type: none"> <li>- Allow students to record their findings using diagrams/and/o think boards. Share their diagrams.</li> <li>- Extension= record their findings in number sentences.</li> </ul> <p>Also do this barrier game without words – students can only use symbols (eg. -5) or pictures such as drawing 5 blocks with crosses through them.</p> <ul style="list-style-type: none"> <li>- Allow students to record their findings using diagrams/and/o think boards.</li> <li>- Extension= record their findings in number sentences.</li> </ul> <p>Finding all Possibilities / Attachment C (Robot activity)</p> <p>Hand out plastic pockets of different amounts of counters / \$1 coins. Students find secret partners based on a difference amount you call out such as 3.</p> <p>Maths 300 - Take Away of the Day / Attachment D Can use smaller numbers if needed.</p> <p>Roll these Dice / Attachment E <a href="http://nrich.maths.org/public/viewer.php?obj_id=53">http://nrich.maths.org/public/viewer.php?obj_id=53</a></p> <p>Separating Objects, FSIM pg15 Students describe the different ways a group of objects can be separated. Use toy animals, counters or play dough to represent a story such as: Five birds in a Tree. Three flew</p>	<p>numbers the same? Do they need to add more or take away some of the blocks? How many?</p> <p>Can you make a story – pretend your blocks are something else? Draw a diagram to show one of your number stories you made with your partner. Ext: can you write the number sentence?</p> <p>What story can you make up from this picture? Why did you use this word (e.g. gave some away)? What type of problem is this? How do you know? Is there any other way we can represent this?</p> <p>How can we organise our results? As per Lesson Plan</p> <p>How many counters will your partner have? Can you use counters to work it out?</p> <p>As per lesson plan</p> <p>As per lesson plan</p> <p>Which key on the calculator takes away? What does ‘went away’ ‘left’ mean?</p>	
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	<p>away. How many birds left in the tree? Use familiar stories (e.g. Five little Monkeys)</p> <p>Noah / Attachment F Also relevant for KU2. <a href="http://nrich.maths.org/136">http://nrich.maths.org/136</a></p> <p>Butterfly Flowers / Attachment G (also suitable for KU2 and KU1 Understanding Numbers. (Counting) <a href="http://nrich.maths.org/229">http://nrich.maths.org/229</a></p> <p>2, 4, 6, 8 / Attachment H Also relevant for KU2 <a href="http://nrich.maths.org/175">http://nrich.maths.org/175</a></p>	<p>As per lesson plan</p> <p>As per lesson plan</p> <p>As per lesson plan</p>	
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<b>Key Understanding 2</b> Partitioning numbers into part-part whole helps us relate addition and subtraction and understand their properties.		Relevant ANTT Tasks (to be filled in)	
Mathematical Focus	Activities / Tasks	Focus Questions	AEW Involvement
<p>KU2: Partitioning numbers into part-part whole helps us relate addition and subtraction and understand their properties.</p> <p>Reading: Thinkboards pg 87 FSIM Book 2 (Activity pg 23)</p> <p>See background notes FSIM book 2, pg 91</p> <p>Whole quantity unknown – addition and commutative (doesn't matter which order)</p> <p>One of the other quantities unknown – subtraction and not commutative (order is vital) or addition</p>	<p><u>Break Down</u> / Attachment B (Year 2) (from KU1) – Use dominoes look at portioning numbers into part-part whole to see the addition and subtraction relationship.</p> <ul style="list-style-type: none"> <li>- need to represent the whole amount (i.e. – how much both sides of the domino adds to) and then look at the different ways we can add or subtract these parts and wholes.</li> <li>- draw diagrams to show the different ways addition and subtraction is related.</li> <li>- use a think board to generate matching number sentences.</li> </ul> <p>Dice Breakup – roll the dice, land on a number. Student pulls out this amount of objects. He/she now breaks these up in as many ways as they can, i.e. – roll a 6, so: 3 and 3, or 4 and 2, or 5 and 1. Choose one of these counter groups to show part-part whole.</p> <p>Ten in the Bed FS p 22 Book 2</p> <p>Inverse Relationships FS p 22 (Modelling inverse relationships through stories)          (Focus on the idea that knowing how many are in one area/group enables us to know how many are left in the other.</p>	<p>How many cubes do you have in total?          Is <math>3 + 4</math> the same as <math>4 + 3</math>?</p> <p>What are the addition / subtraction number sentences you can use to show this? What if there were ten in the bed and 2 fell out? What about if three fell out?</p>	

	<p>Secret Numbers FS p 23</p> <p>Counting Cards / Attachment I Probably start with 10 as a target number, then can change depending on student level Can alter to have a subtraction target such as 1 or 2 (ie card on the table take away the card placed on top of it must equal 1).</p> <p>Number Line FS p23 Book 2 – Have students use a number line to solve word problems and then record them in their own way.</p> <p>Part-Part-Whole FS p22 Have small groups / pairs play a dice game collecting unifix cubes – each student has the one colour. After a certain number of turns, the compare the two lines using a third colour to find the difference. Write down relevant number sentences.</p>	<p>What number and / takeaway ___ would make ___? Can we draw a picture (eg. part-part-whole model) to help?</p> <p>Where do we start from? Where do we go? How many? Where will we finish? Can we go forwards and backwards to solve the same problem? Can we write it as a number sentence?</p> <p>How many have you got? How many more / less do they have? What is the difference between them?</p>	
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<b>Key Understanding 6</b> The same operation can be said and written in different ways.		Relevant ANTT Tasks (to be filled in)	
Mathematical Focus	Activities / Tasks	Focus Questions	AEW Involvement
<b>KU6</b> The same operation can be said and written in different ways.	<p>Equal Groups FSIM pg 63 – Students make poster of things that occur in equal groups, e.g. rows, bunches, lots, stacks. Lines. Draw attention to different situations with the same numbers. <i>“ Look, if this Three groups of four students make 12, so that is 3 lots of four; if we have 3 stacks of four boxes and it makes 12”</i></p> <p>When packing away the classroom, draw students attention to the words you are using. E.g. – put with, took out, added, missing etc (Check out FSIM Bk 2 pg 63) for more words to focus on.</p> <p>NB: Help students to see the link between these words and terms for joining, separating and equalising to ‘add’, ‘subtract’ ‘make equal’ or ‘make the same’.</p> <p>Alternative Expressions FSIM pg 63          This activity can be adapted to other real life examples.</p> <p>Maths Language, FSIM, pg 64. Book 2: Build a chart with students, a chart of language expressions for each of the operations.</p>	<p>How do you know they are the same? Can you make me something similar? How do you know?</p> <p>Create a poster displaying the conversations when clearing up and link to ‘joining’, ‘separating’ and equalising’.</p> <p>You had \$5 and you spent \$2; \$5 subtract \$2; \$5 take away \$2; the difference between \$5 and \$2; \$2 from \$5.</p> <p>During lessons or in reflection of a lesson, look at the language used and see if you can add anything onto your chart.</p>	