

## Lesson 1 - Time Lines and the Nature of Time

### 1.1 Overview

Year Level: .....5

Date: ..... 17/08/2007

KLA: ..... Mathematics

Lesson Duration: .....60 mins

Syllabus Outcome/s:

- **Maths - M3.2** - Students read, record and calculate with 12-hour time, and interpret calendars and simple timetables related to daily activities.
- **Science - 3.2** - Students discuss regular and irregular events in time and space that occur on the Earth and in the sky.

Lesson Objectives:

- Understand the nature and origin of time.
- Reinforce that the method of recording time is a human contrivance and is not decimal.
- Understand the passage of time and sequences of events
- Relate that understanding to a graphical representation of time

I want the learners to KNOW...	I want the learners to DO
<p>.... that a “year” is fixed and is related to the <b>natural</b> movements of the Sun and the Earth</p> <p>.... that the division of a year into months and weeks is an <b>artificial</b>, man made system</p> <p>.... that a “day” is fixed and is related to the <b>natural</b> rotation of the Earth</p> <p>.... that the division of a day into hours and minutes is an <b>artificial</b>, man made system.</p> <p>.... that the man made system that divides a day into hours and minutes is <b>not decimal</b> in nature.</p> <p>.... that using <b>graphs and timelines</b> is a common and very effective method of simplifying problems with time</p>	<ul style="list-style-type: none"> <li>➤ <b>Translate</b> English language sentences into number sentences</li> <li>➤ <b>Solve</b> those addition and subtraction sums</li> <li>➤ <b>Allow</b> for the non-decimal nature of the hour/minute system</li> <li>➤ <b>Transpose</b> the solutions above onto a timeline graph</li> <li>➤ <b>Read</b> their own graph to solve further English language sentence problems</li> <li>➤ <b>Collaborate</b> effectively and respectfully in ability-derived pairs</li> <li>➤ <b>Participate</b> in discussion</li> </ul>

Formative Assessment:

- Observation and discussion participation
- Random personal interaction
- Quality of production in paired discussion

Summative Assessment:

- Observation and discussion participation
- Evaluation of task work for achievement of objectives

Pre-requisite or Prior Knowledge:

- Addition and Subtraction skills
- Ability to tell time
- Basic knowledge of the Solar System

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PHASE	OUTCOMES AND/OR OBJECTIVES	ASSESSMENT	KEY CONTENT OR CONCEPTS	TEACHING STRATEGY	KEY QUESTIONS	SPECIAL NEEDS	CLASSROOM MANAGEMENT	RESOURCES	TIME
ORIENT	Students understand that our way of recording time is artificial but that it is based on the natural movement of the Sun & the Earth	Observation & discreet singling of at risk students for discussion participation.  Review at end of phase - “what have we done so far” again singling at risk students.	The nature of time. Weeks in Year, Days in Week, Hours in a Day, Minutes in an Hour, Seconds in a Minute.	Whole class discussion starting with the basics - the sun and the earth, moving to human units of time. Animated display of a <a href="#">Solar Year</a>	What Makes a Year, a Year? Why are there 24 hours in a day? Why are there less daylight hours in Winter?	Maths Advanced = OW, DS, RH, BG & AF will pair with OP, SA, PM, IB & CH	Display <a href="#">Pairing Sheet</a> Emphasise expectations for paired work - quiet talking, everyone contributes, listen to each other, respect. Arrange desks & students for easy pairing. As per Pairing Sheet.	Pairing Sheet - <a href="#">click here</a> Network access and data projector. Animated Solar Year - <a href="#">click here</a> Whiteboard & markers	20
ENHANCE	Students know that time can be written down and displayed in a variety of ways. Student realise that graphical recording of time is often used to simplify complex sequences of events.	Over the shoulder observation of + performance.  Review at end of phase singling lesser performed workers. Build on review singling advanced students.	How time is recorded. Graphs of time. Clocks as Graphs Time as a sequence of events.	Display and explain of various <a href="#">time charts</a> and program aids. Discussion of how time is measured & displayed. <a href="#">Task</a> part 1 following each step with the <a href="#">Animated Assistant graph</a> .	How many ways can you show or write down time? What is the purpose of “graphing” time?	Advanced & at risk students paired for Task	Short reiteration of expectations when working in groups/ pairs. Ensure quick transition to & from paired work Quiet talking only in pairs not between pairs. Monitor that pairs are functioning well through personal interaction.	Time chart examples - <a href="#">click here</a> Timeline Task - <a href="#">click here</a> Paper, ruler & coloured pencils Animated Assistant Graph - <a href="#">click here</a>	15
SYNTHESISE	Students know what “decimal” means. Students understand that our time system is not decimal but is mathematically based.	Personal interaction during Task performance.  Review at end of phase singling lesser performed workers. Observation of discussion participation Task performance indicating comprehension	Time as a sequence of events. Non Decimal nature of Months, Weeks, Days, Hours, Minutes, Seconds.	Student paired discussion - write down five things about time. <a href="#">Task</a> part 2. Use their own graphs to solve the rest of the questions. Lesson review with main points on board.	What are the differences between adding & subtracting numbers and adding and subtracting hours & minutes? Does the word “minute” have another meaning? What is the smallest unit of time?	Advanced & at risk students paired for discussion & task work.	Ensure quick transition to & from paired work Quiet talking only in pairs not between pairs Monitor that pairs are functioning well through personal interaction.		25

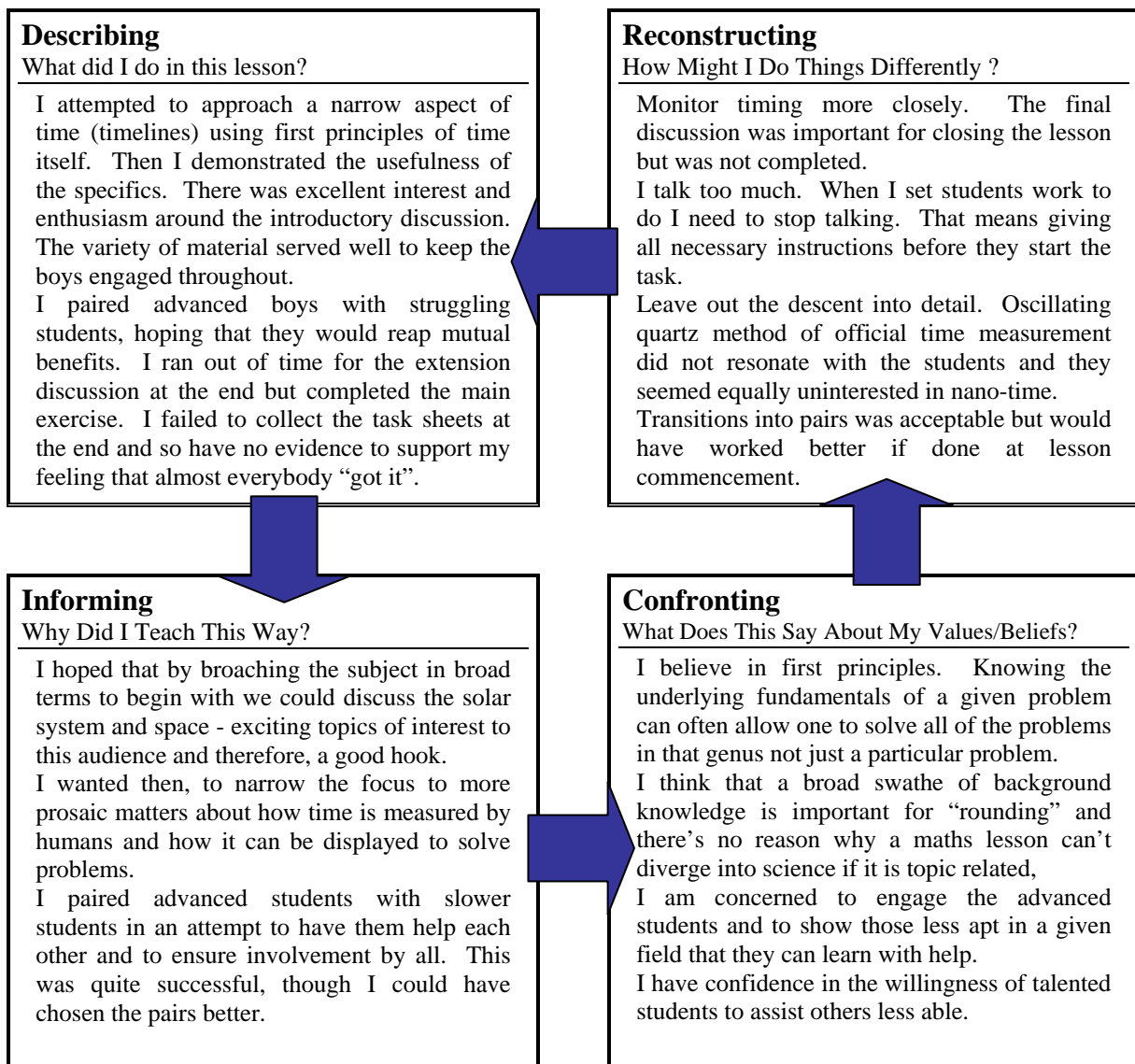
## 1.2 - Phase & Activity Table

Full URLs for hyperlinked resources are given in Appendix II

### 1.3 White Board Planning

- Outline lesson activities, introduce timelines and display pairs for upcoming exercise. Emphasise the rules for paired work - quiet talking, everyone contributes, listen to each other.
- General discussion. How is time defined? What is a year? Show Earth/Sun model. How many days in a year? What about leap years? How many hours in a day? Why?
- Introduce transition, reiterate the “rules”, move into pairs
- Handout blank timeline with hypothetical sequence of events and subsequent questions.
- Explain the task requirements
- Go through animated solution with students following and filling in blank timeline
- Students to use completed timeline to answer questions.
- Continue with slideshow to reveal solutions
- Reflection - Minutes and seconds - is there any thing smaller? The official definition of a second - 32,768 oscillations of a quartz crystal. How small is the smallest unit of time?
- Review the lesson in discussion

### 1.4 Self Reflection



## Lesson 2 - Multiplication of Decimal Numbers

### 2.1 Overview

Year Level: .....5

Date: ..... 20/08/2007

KLA: ..... Mathematics

Lesson Duration: .....60 mins

Syllabus Outcome/s:

- **Maths - N3.1** - Students compare, order and represent whole numbers to 9999 and common and decimal fractions
- **Maths - N3.3** - Students identify and solve multiplication and division problems involving whole numbers and decimal fractions in context
- **English** - develop skills in word identification through applying knowledge of word origins and word building

Lesson Objectives:

- Introduce the role of the decimal point in multiplication sums
- Reinforce place value for tens, ones, tenths, hundredths etc
- Reinforce what “decimal” means
- Use the decimal “place” to break multiplications into smaller components
- Demonstrate the importance of 1 as a transition number for multiplication

I want the learners to KNOW...	I want the learners to DO
<p>.... that <b>place value</b> as it applies to whole numbers <b>also applies</b> to decimal numbers</p> <p>.... that multiplication <b>principles</b> for whole numbers <b>still apply</b> to multiplying decimals</p> <p>.... that 1 is a <b>transition number</b> in multiplication. Multiply something by 1 it does not change, by <b>more than 1</b>, it <b>increases</b>, by <b>less than 1</b> it <b>decreases</b></p> <p>.... that the <b>total</b> number of decimal places in a multiplication sum is the <b>same</b> in the solution</p> <p>.... that decimal numbers can be <b>separated</b> to <b>simplify</b> multiplication sums</p> <p>.... multiplying two numbers which are both <b>less than one</b> will give a product which is <b>less than both</b> the numbers</p>	<ul style="list-style-type: none"> <li>➤ <b>Recognise</b> that the left side of a decimal place is larger than 1 and the right side is less than 1</li> <li>➤ <b>Separate</b> decimal numbers into left and right, multiply them and add the two products</li> <li>➤ <b>Solve</b> multiplication sums using an understanding of decimal place value</li> <li>➤ <b>Approximate</b> solutions mentally to check their own answers</li> <li>➤ <b>Participate</b> in deriving on-the-board solutions</li> <li>➤ <b>Assist</b> others when they finish tasks quickly</li> </ul>

Formative Assessment:

- Board working participation
- Random personal interaction
- Over the shoulder observation of performance/ methods

Summative Assessment:

- Observation and board working participation
- Evaluation of task work for achievement of objectives

Pre-requisite or Prior Knowledge:

- Understanding of place value
- Ability to multiply 2 digit numbers

## 2.2 - Phase &amp; Activity Table

Full URLs for hyperlinked resources are given in Appendix II

PHASE	OUTCOMES AND/OR OBJECTIVES	ASSESSMENT	KEY CONTENT OR CONCEPTS	TEACHING STRATEGY	KEY QUESTIONS	SPECIAL NEEDS	CLASSROOM MANAGEMENT	RESOURCES	TIME
ORIENT	Follow on from Time and reinforce what “decimal” means Revise place value for hundreds, tens, ones, etc Determine how much the class knows about decimal multiplication.	Observation & discreet singling of at risk students for discussion participation Board working participation Random personal interaction	Decimal numbers are still subject to the rules of place value The same principles for multiplying whole numbers also apply to decimal numbers Multiplying by more than 1 increases a number and Multiplying by less than 1 decreases a number	Whole class discussion Examples and explanations worked on the whiteboard with class assistance	What happens when you multiply something by 1? By more than 1? By less than 1? Why is it that?  What does the phrase “decimal place” mean?	Monitor advanced students for engagement. Adjust conceptual difficulty as necessary if too many struggle	Advise the group that fast finishers will be asked to assist their classmates to complete tasks. Insist that this will be done quietly, politely and respectfully. Class to remain in usual pods of 5 & 6	Network access and data projector. Whiteboard & markers	15
ENHANCE	Students understand the role of the decimal point in multiplication sums. Students use the decimal “place” to break multiplications into smaller components	Over the shoulder observation of task performance. Review at end of phase singling lesser performed workers. Build on review singling advanced students.	The number of decimal places in the solution to a multiplication sum is the same as the total number of decimal places in the problem Multiplication sums can be simplified by breaking decimal numbers into parts, multiplying those parts separately and then adding the results.	Show the <a href="#">animated example</a> and question the group to ensure clarity. Explain the method carefully Emphasise that the example method is to be used on the task.. <a href="#">Task</a> part 1	What is the difference between $26 \times 3$ and $2.6 \times 3$ ? How can a decimal number be broken into parts?	Monitor and assist at-risk students - ensure they are with it. Use the graphical component of the task for simplification if necessary. Fast finishers move on to more stimulating, contextualised word problems from the board	Leave the animated example repeating on screen while students work on task. Write advanced problems on board while students work on task. Monitor student work through personal interaction	Network access and data projector. Whiteboard & markers Animated example 1 - <a href="#">click here</a> Task part1 - <a href="#">click here</a> Paper, ruler & coloured pencils	25
SYNTHESISE	Build on the above to multiply decimal by decimal. Students use mental approximation and “number sense” to check answers	Personal interaction during task performance. Review at end of phase singling lesser performed workers. Observation of discussion participation Task performance indicating comprehension	Multiplying two numbers which are both less than one will give a product which is less than both the numbers. Reiterate key principles of multiplying decimals and construct new meaning for numbers less than 1	Review & add to the Enhance Phase Multiply two decimals together. Show the <a href="#">animated example</a> and explain the method carefully <a href="#">Task</a> part 2 Lesson review with main points on board	If 2 numbers, both less than 1, are multiplied is the result larger or smaller than the original numbers? Why is it that? What is the difference between $2.6 \times 3$ and $2.6 \times 0.3$ ?	Monitor and assist at-risk students. Keep CH & PM on task. Fast finishers - OW, DS, RH, BG & AF in particular become “assistants”	Leave the animated example repeating on screen while students work on task. Ensure that advanced students who are assisting others, and those that they are assisting, behave respectfully toward each other.	Network access and data projector. Whiteboard & markers Animated example 2 - <a href="#">click here</a> Task part2 - <a href="#">click here</a> Paper, ruler & coloured pencils	20



## 2.3 White Board Planning

- Introduction - discussion on the nature of 1 in multiplication sums.
- Multiply by more than one, what happens? Multiply by less than one, what happens?
- Definition of “decimal place” - place of tenths
- Demonstrate on the board that  $3 \times 26$  is very similar to  $3 \times 2.6$
- Hand out work sheet and show first animated example
- Emphasise that the method in the example is to be emulated by the students
- Put more advanced, in context problems on the board for fast finishers
- Students complete the first work sheet
- Demonstrate the multiplication method on the board showing that the number of decimal places in the question is the same as that in the answer
- Hand out work sheet and show second animated example
- Students complete the second work sheet
- Note and discuss what happens when two numbers less than one are multiplied

## 2.4 Self Reflection

### Describing

What did I do in this lesson?

I introduced the topic with an abstraction, a point of theory, that multiplying by one makes no change to a number.

The intention was that this would lead to consideration of what happens when a number is multiplied by less than one.

I demonstrated, with class participation, how to separate decimal numbers, multiply the parts separately and then add the resulting products.

I provided a task which restrained the students to the method discussed and gave them the means to emulate the example graphically, mentally and with number sums.

I provided more complex, in context problems for fast finishers.

### Reconstructing

How Might I Do Things Differently ?

I failed to really emphasise the main point of the lesson - that place values can be separated to make multiplication sums easier.

Fortunately the task design obliged the boys to separate place values and much good was almost accidentally salvaged.

I must learn to stay on topic instead of rambling on about pseudo related stuff.

It is easy for a short digression to expand into a time waster, especially when the students are clearly interested.

Ran out of time and failed to adequately cover the second part of multiplying numbers that are both less than one.

### Informing

Why Did I Teach This Way?

This was a topic which I believe students should grasp in just one way (any way) to begin with. For that reason I explained and demonstrated a method of multiplying decimals and then provided a task which was structured such that it could only be done using the method explained.

I wanted them to take little steps and grasp the meaning fully. The task sheet required them to colour areas representing the sums, then to write out the sums, then to solve the sums, so that the concept of separating, multiplying, then adding for a result was unavoidable.

Some of these students are well ahead and for them there were real life word problems.

### Confronting

What Does This Say About My Values/Beliefs?

I believe that it is occasionally best to be somewhat dictatorial, to insist that something be done a particular way - to begin with. Then, when some proficiency has developed, consider and allow other valid methods.

I respect the theoretical underpinning and I think it is sometimes valuable to consider seemingly obvious things. Giving due thought to basic stuff like, “what happens when you multiply a number by 1”, can lead to deeper understandings.

I have high expectations about how much work we can do in one hour.

I think it important to provide stimulating material and challenges for advanced students

## Lesson 3 - Division of Whole Numbers

### 3.1 Overview

Year Level: .....5

Date: ..... 22/08/2007

KLA: ..... Mathematics

Lesson Duration: .....45 mins

Syllabus Outcome/s:

- **Maths - N3.1** - Students compare, order and represent whole numbers to 9 999 and common and decimal fractions
- **Maths - N3.3** - Students identify and solve multiplication and division problems involving whole numbers and decimal fractions in context, selecting from a range of computation methods, strategies and known number facts.
- **Maths - PA3.1** - Students create and continue number patterns, identify, describe and represent relationships between two quantities and use backtracking to reverse any one of the four operations.

Lesson Objectives:

- Revise the concept of division
- Reinforce that division is the opposite of multiplication and vice-versa
- Introduce imperfect division and remainders
- Demonstrate the importance of 1 as a transition number for division

I want the learners to KNOW...	I want the learners to DO
<p>.... that the result of division sum is called the <b>quotient</b></p> <p>.... that division is <b>often</b> produces quotients that are <b>not</b> whole numbers</p> <p>.... that multiplication is the <b>opposite</b> of division and therefore that multiplication <b>undoes</b> division</p> <p>.... that 1 is also a <b>transition point</b> in division. Divide something by 1 it does not change, by <b>more than 1</b>, it <b>decreases</b>, by <b>less than 1</b> it <b>increases</b></p>	<ul style="list-style-type: none"> <li>➤ <b>Translate</b> word problems into number sentences</li> <li>➤ <b>Solve</b> those number sentences using graphical means provided.</li> <li>➤ <b>Create</b> graphical devices to solve further simple division problems</li> <li>➤ <b>Reverse</b> division sums to confirm the relationship between multiplication and division</li> <li>➤ <b>Check</b> solutions using such reversal</li> <li>➤ <b>Participate</b> in deriving on-the-board solutions and class discussion.</li> </ul>

Formative Assessment:

- Discussion participation
- Random personal interaction
- Over the shoulder observation of performance/ methods

Summative Assessment:

- Observation and board working participation
- Evaluation of task work for achievement of objectives

Pre-requisite or Prior Knowledge:

- Understanding of multiplication

PHASE	OUTCOMES AND/OR OBJECTIVES	ASSESSMENT	KEY CONTENT OR CONCEPTS	TEACHING STRATEGY	KEY QUESTIONS	SPECIAL NEEDS	CLASSROOM MANAGEMENT	RESOURCES	TIME
ORIENT	Determine how much of the class knows how much about division. Students understand language & nomenclature requirements to translate words into division number sums.	Board working participation Random personal interaction Observation & discreet singling of at risk students for discussion participation	Real problems don't always come in mathematical language. In order to solve a given problem a student will often have to transpose from its context, into a number sum, solve the sum and then check that the answer is correct for the original context.	Examples and explanations worked on the whiteboard with class assistance Whole class discussion	Is maths separate from English? Can one help the other? Do they both need each other? What does the word "division" mean?	Monitor advanced students for engagement. Adjust conceptual difficulty as necessary if many are already familiar with division.	Advise the group that there will be a <a href="#">special problem</a> for fast finishers. One person who solves the special problem will get to his explain their brilliance to the group. Class to remain in usual pods of 5 & 6	Network access and data projector. Whiteboard & markers	10
ENHANCE	Revisit multiplication and connect its principle with division. Students understand that division undoes multiplication	Over the shoulder observation of task performance. Review at end of phase singling lesser performed workers. Build on review singling advanced students.	Multiplication and division are two sides of the same coin. As with multiplication, dividing a number by one does not change the number.	Whole class discussion Show the <a href="#">animated example Task 5-8</a> Calculator examples & discussion <a href="#">Task 9-16</a>	What is the connection between multiplication & division? How can this connection be demonstrated, proven?	Use the graphical component of the task for simplification if necessary. Monitor and assist at-risk students - ensure they are with it. Fast finishers move on to the special problem	Write the <a href="#">special problem</a> on board while students work on task Monitor student work through personal interaction. Leave the <a href="#">animated example</a> repeating on screen while students work on task.	Animated example - <a href="#">click here</a> Task - <a href="#">click here</a> Network access and data projector. Whiteboard & markers Paper, ruler & coloured pencils. The Special Problem - <a href="#">click here</a>	15
SYNTHESISE	Students demonstrate knowledge of remainders and include imperfect division. Students use new knowledge to check own answers	Personal interaction during task performance. Observation of discussion participation Task performance indicating comprehension. Solutions to the <a href="#">special problem</a> .	Division sums do not always produce quotients that are whole numbers. That which is left over is called the remainder. Multiplication solutions can be checked by dividing and division sums can be checked by multiplying.	Whole class discussion <a href="#">Task 17-20</a> One student shows how the special problem works - with much praise to all attempters Lesson review with main points on board	What happens when a number can't be divided evenly by the divisor? If division is the opposite of multiplication how can we check our own answers?	Ensure fast finishers are actually working on the <a href="#">special problem</a> . Monitor and assist at-risk students.	Monitor student work through personal interaction. Chose one student (soothe others) to expose the crux of the <a href="#">special problem</a> - that division undoes multiplication.	Network access and data projector. Whiteboard & markers Paper, ruler & coloured pencils	20

### 3.2 - Phase & Activity Table

Full URLs for hyperlinked resources are given in Appendix II



### 3.3 White Board Planning

- Discuss Division - see who knows what and how well
- Clarify the language. The result of a division sum is called a quotient. In English we say, "How many groups of 6 does it take to make 42?" In maths we write  $42 \div 6 =$
- Complete Qs 5 through 8. Fast finishers attack the special problem
- Division undoes multiplication and Multiplication undoes division
- With calculators  $53 \times 21 = 1113$  - now do  $1113 \div 21$  and then  $1113 \div 53$  - and others
- Notice a pattern? Complete Qs 9 through 16. Fast finishers attack the special problem
- Contrast division and multiplication with relation to greater and less than 1. Divide by greater than one - quotient is smaller. Divide by less than one - quotient is larger.
- Discuss imperfect division and the term "remainder"
- Demonstrate remainders and the notation Complete Qs 17 through 20
- Solve the special problem - with one student explaining the principle to the class.
- Brief reiteration of main points.

### 3.4 Self Reflection

#### Describing

What did I do in this lesson?

I introduced the lesson by ensuring that everyone could transpose words into number sentences, then reinforced that with graphical task work.

Advanced students were provided with an interesting curiosity to solve - which one of them could later explain to the class.

A discussion of fundamental multiplication/division concepts followed. This was guided such that a compare/contrast exercise was undertaken.

I ended the lesson by linking to the abstraction with which the previous lesson was introduced - dividing (or multiplying) by one makes no change to a number.

#### Reconstructing

How Might I Do Things Differently ?

The tasks were too few. I felt that more work time and less talk time would have achieved greater absorption amongst middle and lower students.

I didn't anticipate the enthusiasm that the advanced students would have for the special problem. I could have made much greater advantage of the competition between them to be the one who would explain their solution to the class.

The subtlety of 1 as a transition number is eluding many. I must either find a way to communicate it better or leave it out.

Don't talk to the board. Write on the board, then talk to the students.

#### Informing

Why Did I Teach This Way?

The heart of this lesson is teacher/student interaction aimed at reaching an understanding of the relationship between the operation of division and that of multiplication.

I was aware that for some this would be the first time they had dealt with division, for others it was a re-introduction. So, while I wanted to spend an appropriate amount of time introducing the concept, it was important to have an interesting quandary prepared for those who were familiar with the basics and more.

The tasks were short, as I wanted to maximise discussion and examples, but were stepped to coincide with the steps of conceptual gradation planned for discussion .

#### Confronting

What Does This Say About My Values/Beliefs?

I am committed to finding ways to stimulate all the students - particularly the advanced. The special problem used in this lesson is one which fascinated me as a child and it took only a little pre-checking to ensure that today's grade 5s were also intrigued.

I think it is important to provide a variety of learning methods and I value the role that graphical and kinaesthetic exercises can play. I am aware that the obvious is often overlooked and so I almost always provide explanations for the basic things upon which a student might stumble - like transposing words into number sentences when tackling a new concept.

I believe in fundamentals first.

## Lesson 4 - Working with Money

### 4.1 Overview

Year Level: .....5

Date: ..... 23/08/2007

KLA: ..... Mathematics

Lesson Duration: .....45 mins

Syllabus Outcome/s:

- **Maths - N 3.1** - Students compare, order and represent whole numbers to 9 999 and common and decimal fractions, calculate cash transactions and describe other methods of payment.
- **Maths - N 3.2** - Students identify and solve addition and subtraction problems whole numbers and decimal in context, selecting from computation methods, strategies known number facts.
- **Maths - N3.3** - Students identify and solve multiplication and division problems involving whole numbers and decimal fractions in context, selecting from a range of computation methods, strategies and known number facts.

Lesson Objectives:

- Emphasise real world application of working with money
- Introduce rounding of cash and other numeric calculations
- Apply division and multiplication concepts in context
- Reinforce the use of units, like dollars and cents

I want the learners to KNOW...	I want the learners to DO
<p>.... that <b>100 cents</b> make a <b>dollar</b></p> <p>.... that this makes dollar/cents currency a <b>decimal</b> number system</p> <p>.... that monetary amounts are <b>always</b> written with <b>2 decimal places</b></p> <p>.... that monetary amounts are <b>always</b> accompanied by the <b>unit of currency</b> to which they refer.</p> <p>.... that the Australian dollar is <b>just one</b> of many <b>different types</b> of currency in the world</p> <p>.... that <b>rounding</b> is a <b>quick</b> method of <b>approximating</b> money sums</p>	<ul style="list-style-type: none"> <li>➤ <b>Translate</b> word problems into number sentences</li> <li>➤ <b>Apply</b> knowledge of units to aid in such translation</li> <li>➤ <b>Solve</b> those number sentences using addition, subtraction, an understanding of decimal place value and creative thinking</li> <li>➤ <b>Approximate</b> using rounding or use exact calculation as appropriate in context</li> <li>➤ <b>Participate</b> in class discussion and in deriving on-the-board solutions</li> </ul>

Formative Assessment:

- Discussion participation
- Random personal interaction
- Over the shoulder observation of performance/ methods

Summative Assessment:

- Observation and board working participation
- Evaluation of task work for achievement of objectives

Pre-requisite or Prior Knowledge:

- Lessons 2 and 3, above
- Ability to add and subtract using place value to “carry”
- Some knowledge of units eg: g per Kg and ml per L

## 4.2 - Phase &amp; Activity Table

Full URLs for hyperlinked resources are given in Appendix II

PHASE	OUTCOMES AND/OR OBJECTIVES	ASSESSMENT	KEY CONTENT OR CONCEPTS	TEACHING STRATEGY	KEY QUESTIONS	SPECIAL NEEDS	CLASSROOM MANAGEMENT	RESOURCES	TIME
ORIENT	Students know the basics of Australian Currency - coin denominations, decimal nature. Students appreciate that Australian currency is one of many in the world.	Board working participation Random personal interaction Observation & discreet singling of at risk students for discussion participation	The Australian currency system and Australian money is unique in the world. There are many other systems. Our system is decimal having 100 cents to the dollar	Whole class discussion Key points worked on the whiteboard with class assistance	What are the Australian coins? Can any amount be made with the coins available? Why not? Is that a problem? How many cents in a dollar? What sort of system is that?		Advise the group that today they will find out how to “ <a href="#">Make a Dollar</a> ” a competitive exercise for fast finishers. Class to remain in usual pods of 5 & 6	Whiteboard & markers	15
ENHANCE	Students grasp the direct connection to monetary transactions Students use correct symbols and units in number sums using money.	Self marking and show of hands Over the shoulder observation of task performance. Review at end of phase singling lesser performed workers. Build on review singling advanced students.	Money is just another unit of measurement. Like all units of measurement it refers to real amounts in the real world, like kilograms and millilitres. All units of measurement have appropriate symbols that must be used to make them meaningful	Whole class discussion interspersed with brief tasks <a href="#">Tasks</a> worked by students then on the whiteboard with class assistance.	Why do we have units of measurement. Why do we show 2 decimal places when writing money figures? How is this related to the idea of percent?	Discreet singling of at risk students for Fast finishers “ <a href="#">Make a Dollar</a> ”	<a href="#">Tasks</a> Part 1 to the screen. Hand out “ <a href="#">Make a Dollar</a> ” to all while monitoring student work through personal interaction.	Make a Dollar Exercise - <a href="#">click here</a> Tasks Part 1 - <a href="#">click here</a> Network access and data projector. Whiteboard & markers Maths workbook and writing implements.	15
SYNTHESISE	Students understand and use rounding or exact calculation as appropriate in context	Personal interaction during task performance. Discussion participation Task performance indicating comprehension. Progress, if any, at “Making a Dollar”	Money sums are often too difficult to do precisely in your head while you are shopping. Rounding can help to simplify calculations but the result is only an estimate. If a precise answer is required, then rounding can't be used anywhere in a calculation Rounding to the nearest 5 cents is used to calculate all change in Australia.	Whole class discussion interspersed with brief tasks <a href="#">Tasks</a> worked by students then on the whiteboard with class assistance. Lesson review with main points on board	What can rounding be used for? When do you round up and when down? When is rounding acceptable? Everybody has to round sometime - why?	Ensure fast finishers are actually “Making a Dollar” Ensure at-risk students are involved in discussion and can perform task	<a href="#">Tasks</a> Part 2 to the screen. Monitor student work through personal interaction.	Tasks Part 2 - <a href="#">click here</a> Network access and data projector. Whiteboard & markers Maths workbook and writing implements.	15

### 4.3 White Board Planning

- Introduction - personal anecdote about calculating change
- Money basics - coin denominations, cents per dollar, foreign currencies, decimal nature and decimal places, money, like time is in units
- Introduce “Making a Dollar” - students who finish ahead of others move on to this.
- Assisted examples - rounding to the nearest dollar - usefulness in estimating
- Students solve problem group 1 from board - then work answers on the board
- Slightly harder - In context estimating - then precise calculation
- Students solve problem group 2 from board - then work answers on the board
- Discussion - Subtraction of money - Number sums and word problems
- Students solve problem group 3 from board - then work answers on the board
- Coin algebra - problems, solved one by one.
- See how many ways have been found to “Make a Dollar”
- Brief reiteration of main points

### 4.4 Self Reflection

#### Describing

What did I do in this lesson?

This lesson aimed to bring several threads from previous lessons together, working with units division and multiplication.

It was conducted as a sequence of discussions and assisted examples reinforced with interspersed performance.

A personal anecdote concerning the embarrassment and sympathy that I felt for a sales person who had recently been unable to make correct change for me was used as an introductory settler.

Basic money content was covered for the benefit of recent migrants.

A special fun exercise kept fast finishers on-topic and engaged occupied.

#### Reconstructing

How Might I Do Things Differently ?

This was a lesson that would lend itself well to group work. Greater authenticity could have been achieved (with such an authentic topic) and more fun could have been had, by setting up mock shops in the class. “Shopkeepers” would have calculators, buyers use their heads to begin, then pen and paper to check their change. Certain shopkeepers at certain times would short change.

Having many transitions to and from discussion and performance reduces inattention but can also provide opportunity for distraction, particularly for advanced students. The “Making a Dollar” exercise was fun but did not really extend advanced students.

#### Informing

Why Did I Teach This Way?

I thought money would be a good topic with which to combine previous work because of its obvious authenticity and its high esteem.

I wanted to cover basic stuff and not charge on having assumed that everyone knew, for instance that monetary figures are always written with 2 decimal places even when the last one is zero. I also thought that some students from overseas may need the fundamentals of Australian currency.

I know that these students respond well to a discussion style with activities in between and , given the very basic nature of some of the material, I wanted to provide a fun, competitive, extension for fast finishers.

#### Confronting

What Does This Say About My Values/Beliefs?

I believe in personability as a powerful means of communication. Allowing students to see what moves you (my embarrassment and sympathy for the shop assistant) will almost always be endearing to them - if it is genuine.

My emphasis on basics first is also apparent in this lesson.

Additionally, a desire for including all students is manifest in such emphasis, in this case, as it ensured that several foreign born students were familiar with local currency, without drawing undue attention to any deficiencies that they may or may not have had.

Commitment to a variety of learning activities, breadth of difficulty, and some fun are also evidenced.