Professional Learning 5
Multiplication and Division
Booklet 5.3: Multiplication Computation Strategies

YuMi Deadly Maths
Past Project Resource
Acknowledgement

We acknowledge the traditional owners and custodians of the lands in which the mathematics ideas for this resource were developed, refined and presented in professional development sessions.

YuMi Deadly Centre

The YuMi Deadly Centre is a Research Centre within the Faculty of Education at Queensland University of Technology which aims to improve the mathematics learning, employment and life chances of Aboriginal and Torres Strait Islander and low socio-economic status students at early childhood, primary and secondary levels, in vocational education and training courses, and through a focus on community within schools and neighbourhoods. It grew out of a group that, at the time of this booklet, was called “Deadly Maths”.

“YuMi” is a Torres Strait Islander word meaning “you and me” but is used here with permission from the Torres Strait Island Regional Educational Council to mean working together as a community for the betterment of education for all. “Deadly” is an Aboriginal word used widely across Australia to mean smart in terms of being the best one can be in learning and life.

YuMi Deadly Centre’s motif was developed by Blacklines to depict learning, empowerment, and growth within country/community. The three key elements are the individual (represented by the inner seed), the community (represented by the leaf), and the journey/pathway of learning (represented by the curved line which winds around and up through the leaf). As such, the motif illustrates the YuMi Deadly Centre’s vision: Growing community through education.

More information about the YuMi Deadly Centre can be found at http://ydc.qut.edu.au and staff can be contacted at ydc@qut.edu.au.

Restricted waiver of copyright

This work is subject to a restricted waiver of copyright to allow copies to be made for educational purposes only, subject to the following conditions:

1. All copies shall be made without alteration or abridgement and must retain acknowledgement of the copyright.
2. The work must not be copied for the purposes of sale or hire or otherwise be used to derive revenue.
3. The restricted waiver of copyright is not transferable and may be withdrawn if any of these conditions are breached.

© QUT YuMi Deadly Centre 2008
Electronic edition 2011

School of Curriculum
QUT Faculty of Education
S Block, Room S404, Victoria Park Road
Kelvin Grove Qld 4059
Phone: +61 7 3138 0035
Fax: +61 7 3138 3985
Email: ydc@qut.edu.au
Website: http://ydc.qut.edu.au
CRICOS No. 00213J

This booklet was developed as part of a project which ran from 2005–2008 and was funded by an Australian Research Council Linkage grant, LP0562352: Sustainable education capacity building: Empowering teacher aides to enhance rural and remote Indigenous students’ numeracy outcomes, with support provided by Education Queensland.
PROFESSIONAL LEARNING 5: MULTIPLICATION AND DIVISION

BOOKLET 5.3
MULTIPLICATION COMPUTATION STRATEGIES
2008

Research Team:
Prof Tom Cooper
Dr Annette Baturro
Ms Petrina Underwood
Ms Gillian Farrington
Assoc Prof Elizabeth Warren
Ms Denise Peck

Contributing EQ Organisations:
Mount Isa EQ Regional Office       Mornington Island State School
Boulia State School                Sunset State School
Burketown State School            Urandanji State School
Dajarra State School              Indigenous Education and Training Alliance
Doomadgee State School

YuMi Deadly Centre
School of Mathematics, Science and Technology Education,
Faculty of Education, QUT
# CONTENTS

<table>
<thead>
<tr>
<th>Overview</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>1</td>
</tr>
<tr>
<td>Directions</td>
<td>1</td>
</tr>
<tr>
<td>Interview Schedule</td>
<td>2</td>
</tr>
<tr>
<td>Interview Materials</td>
<td>3</td>
</tr>
<tr>
<td>Student Recording Sheet</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Introduction</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents</td>
<td>7</td>
</tr>
<tr>
<td>Pedagogy</td>
<td>7</td>
</tr>
<tr>
<td>Approach</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activities</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS1: Higher decade multiplication facts</td>
<td>9</td>
</tr>
<tr>
<td>MS2: Separation strategy</td>
<td>14</td>
</tr>
<tr>
<td>MS3: Sequencing strategy</td>
<td>26</td>
</tr>
<tr>
<td>MS4: Compensation strategy</td>
<td>50</td>
</tr>
</tbody>
</table>
OVERVIEW

PURPOSE

These materials were designed to be used in conjunction with a Professional Learning program for teacher aides. The objective of this Professional Learning was to empower teacher aides to enhance rural and remote Indigenous students’ numeracy outcomes. This document contains the materials of the third of five different booklets on multiplication and division.

If your school would like to receive a YuMi Deadly Maths Professional Learning program please contact the YuMi Deadly Centre (YDC) on: 07 3138 0035 or ydc@qut.edu.au.

DIRECTIONS

(1) Interviewing the students:

Pick one or more students who appear to be having trouble understanding multiplication. Interview these students using the interview schedule and the materials. Mark what they do and put their results on the Student Recording Sheet.

(2) Trialling the student activities:

Use the Recording Sheet to work out the activities the students need to do and trial these activities with the students (with each student one at a time or with a group of students). Keep a record of what happens and collect the students’ work.
Interview Schedule

Materials:
Unifix cubes or counters, washable felt pens, pen, pencil, paper

Materials within this booklet: interview questions, interview cards, Student Recording Sheet

Directions:
1. Photocopy and laminate attached interview cards.
2. Gather other material (unifix or counters, paper, pens, pencils).
3. Place material in front of students. Give students pen and paper to write with.
4. Tell the students you are trying to find out what they know. Say they are not expected to know it and you will teach what is not known.
5. Give the student directions slowly – read problems. Do not give hints. If student cannot do a question, pass on to the next question, repeating that it is not important if they don’t know how to do the question.
6. Allow students to use material and make drawings but only after they say they do not know how to do it with symbols alone.
# INTERVIEW QUESTIONS
## Strategies for Multiplication Computation

| C1 | Show and read Card 1  
|    | • Ask: *What is the answer?*  
|    | • If student can answer, ask: *How did you work it out?*  
|    | • If cannot answer, give answer and write on card.  
|    | Do the same for Card 2.
| C2 | Show and read Card 3  
|    | • Ask: *What is the answer?*  
|    | • If student can answer, ask: *How did you work it out?*  
|    | • If cannot answer, ask: *Can you use Card 1 to assist you?* Show Card with answer.  
|    | Repeat for Card 4, but refer to Card 2 and 5.
| C3 | Show and read Card 6  
|    | • Say: *Calculate the answer by separating the 2-digit number into ones and tens.*  
|    | • If cannot answer, say *Can you use MAB to help?*
| C4 | Show and read Card 7  
|    | • Say: *Calculate the answer by leaving the 2-digit number as is and breaking the 1-digit number up somehow.*  
|    | • If cannot answer, say can you use a drawing to help?
| C5 | Show and read Card 8  
|    | • Say: *Calculate the answer by changing the multiplication to something that is easier to multiply and then compensating.*
**INTERVIEW CARDS**

Strategies for Multiplication Computation

<table>
<thead>
<tr>
<th>CARD 1</th>
<th>CARD 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>$\times 4$</td>
<td>$\times 7$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CARD 3</th>
<th>CARD 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>$\times 4$</td>
<td>$\times 70$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CARD 5</th>
<th>CARD 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>35</td>
</tr>
<tr>
<td>$\times 70$</td>
<td>$\times 7$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CARD 7</th>
<th>CARD 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>39</td>
</tr>
<tr>
<td>$\times 6$</td>
<td>$\times 4$</td>
</tr>
</tbody>
</table>
# STUDENT RECORDING SHEET

<table>
<thead>
<tr>
<th>Interview item</th>
<th>Result (✓, ✗)</th>
<th>Comments</th>
<th>Activities to be completed if incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1:</td>
<td></td>
<td></td>
<td>Undertake practice in basic multiplication facts.</td>
</tr>
<tr>
<td>C2: Higher decade multiplication facts</td>
<td></td>
<td></td>
<td>MS1</td>
</tr>
<tr>
<td>C3: Separation strategy</td>
<td></td>
<td></td>
<td>MS2</td>
</tr>
<tr>
<td>C4: Sequencing strategy</td>
<td></td>
<td></td>
<td>MS3</td>
</tr>
<tr>
<td>C5: Compensation strategy</td>
<td></td>
<td></td>
<td>MS4</td>
</tr>
</tbody>
</table>
**INTRODUCTION**

**Contents**
This package contains:

- four tutoring activities (MS1 to MS4) and their student materials (games and worksheets), as well as an activity feedback sheet for each activity; and

**Pedagogy**
The activities MS1 to MS4 are based on the Rathmell Triangle Relationship below; real world problems are related to set, array and number line models, language and symbols (and vice versa) to teach strategies for computation.

```
REAL WORLD PROBLEM
  \[ \downarrow \]
MODEL
  \[ \downarrow \]
  Set
  Array
  Number line
LANGUACE
  \[ \leftrightarrow \]
SYMBOLS
```

However, the focus of the activities is to develop a repertoire of strategies for computing such examples as $34 \times 6$ and $257 \times 3$. The activities are designed to allow you to tutor students who are having difficulties with multiplication computation for 2- and 3-digit numbers $\times$ 1 digit numbers. The activities are based on the belief that it is more important to use the algorithms to teach a variety of strategies than to get a correct answer. However, the activities also show how to get correct answers.

There are three strategies (or strategy groupings) associated with multiplication computation. These are:

1. **Separation:**
   
   This strategy (separate, operate, combine) is to break the 2- or 3-digit number into parts usually based on place value, multiply the numbers as separated, then recombine for the answer. It is based on the distributive law that, e.g., if 34 is $30+4$ then $7 \times 34$ is $7 \times 30 + 7 \times 4$. It is widely used in mathematics, for example, multiplying measures (m and cm), time (hrs and mins), mixed numbers (wholes and parts), and algebra (x’s and y’s). The strategy may involve renaming or carrying. It is based on the set or array model – materials to teach separation are place-value charts, bundling sticks, and MAB, or square tiles and graph paper. Examples of written algorithms for $7 \times 34$ below.
Example 1:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

\[
\begin{array}{c}
7 \\
(210) \\
(28) \\
\end{array} \quad \text{34} \quad \text{7} \\
\text{30} \quad \text{4} \\
\text{7} \\
\text{210} \quad \text{28} \\
\end{array}
\]

\[
7 \times 34 = 238
\]

Example 2:

\[
\begin{array}{c}
7 \\
\text{11} \\
\text{11} \\
\text{11} \\
\text{1} \\
\end{array} \quad \text{34} \quad \text{3} \\
\text{34} \quad \text{3} \\
\text{34} \quad \text{3} \\
\text{34} \quad \text{3} \\
\text{34} \quad \text{3} \\
\frac{\text{34}}{\text{7}} \\
\frac{\text{34}}{\text{7}} \\
\frac{\text{34}}{\text{7}} \\
\frac{\text{34}}{\text{7}} \\
\frac{\text{34}}{\text{7}} \\
\frac{\text{34}}{\text{7}} \\
\end{array}
\]

(2) Sequencing:

This strategy is to leave the 2- or 3-digit as a whole and multiply parts of the second 1-digit number until all parts have been multiplied. It is associated with arrays and is also useful for measures, time and mixed numbers, and for variables and algebra. In some ways it is number separation because a common way to break up a number is by place value. However, as the examples below show, there are other ways to break up numbers. Again it is based on the distributive law. Materials to teach sequencing are square counters, squared paper (graph paper) and drawings. An example for \(7 \times 34\) is below.

\[
\begin{array}{c}
1 \\
2 \\
4 \\
\end{array} \quad \text{34} \quad \text{3} \\
\frac{\text{34}}{\text{3} \times 34} \quad \frac{\text{136}}{[136]} \\
\frac{\text{3} \times 34}{\text{34}} \quad \frac{\text{68}}{[68]} \\
\frac{\text{4} \times 34}{\text{34}} \\
\end{array}
\]

\[7 \times 34 = 34 + 68 + 136 = 238\]

[Note: If one of the numbers has factors like 24 = 6\times 4, then another method is to use two stages; e.g., \(7 \times 24\) can be done by \(7 \times 6 = 42\) and then \(42 \times 4 = 168\).]

(3) Compensation:

This strategy is to leave both numbers as they are but to look for a change (to both numbers if necessary) that will make the multiplication easy, then compensate for that change if necessary. This is the basis of many of the methods used in algebra as well as being useful for multiplying measures, time and mixed numbers. Materials to teach compensation are mainly symbolic but
are based on the distributive law (as in the other two strategies) which can be developed with graph paper and geoboards. Two examples for $7 \times 34$ are below.

- An easy problem related to $7 \times 34$ would be $10 \times 34$. This equals 340 but the 10 is 3 larger than the 7, so have to compensate by removing $3 \times 34$ or three thirty-fours. Thus $7 \times 34$ is $340 - 34 = 306 - 34 = 272 - 34 = 238$.

- Another easy problem would be $7 \times 35$. This equals: $3\frac{1}{2} 70s = 210 + \frac{1}{2} 70 = 210 + 35 = 245$ but 35 is 1 more than 34, so have to compensate by removing 7, so answer is: $245 - 7 = 238$. Another way is to look at $7 \times 34$ as $10 \times 34 = 340$, halve this to get $5 \times 34 = 170$ and then add $2 \times 34$ or 68.

All the three strategies require knowledge of basic number facts (e.g., $6 \times 8 = 48$) and also higher-decade number facts (e.g., $6 \times 80 = 480$, $60 \times 80 = 4800$).

Thus, the four activities in this booklet are the higher decade facts (Activity MS1), separation strategy (Activity MS2), sequencing strategy (Activity MS3), and compensation strategy (Activity MS4).

**Approach**

**Meaning, not answers**

The first imperative is to get across understanding – to focus on meaning and not on answers. Thus time is spent on

(a) Relating different representations of multiplication, for example, $7 \times 34$ is “7 thirty-fours”, “34 multiplied by 7”’, $34 + 34 + 34 + 34 + 34 + 34 + 34$, problems such as “I had seven bags of lollies; there were 34 lollies in each bag, how many lollies overall?”, and vertical settings out and arrays such as:

![Array for 7 \times 34]

(b) Sequencing from basic facts to algorithms, for example, for $7 \times 34$ need to develop basic facts ($7 \times 3$, $7 \times 4$) higher decade multiplication facts ($7 \times 3 = 21$, $7 \times 30 = 210$), distributive law (see below) and finally $7 \times 34$ is $210 + 28$.

(c) Variety, not one algorithm, for example, for $7 \times 34$ will develop a variety of ways to teach it (sequencing, compensation, etc). This allows students to choose the best ways for numbers they are given. This requires metacognition (being in control of own thinking).
**ACTIVITIES**

**ACTIVITY MS1**

[Higher decade multiplication facts]

**Materials:** Square tiles, graph paper (2mm), calculators, pen, paper, resources attached (worksheets, games)

**Directions:**

1. Use tiles to form a 3 by 7 rectangle. Ask: *Is this similar to an array?* [Yes] *What is the answer?* [21] *What is the operation?* 3×7, “three sevens”, “seven multiplied by three”.

   Use graph paper to show 3×2 and 3×20. Ask: *Calculate the number of squares in each. What do you notice?* [6 and 60]. Repeat this for 7×4 and 7×40. See if students can propose a rule or pattern.

2. Use graph paper to show 2×3 and 20×30. Ask: *Calculate the number of squares in each. What do you notice?* [6 and 600]. *Why is the answer 600 and not 60?* [2 zeros in 20 and 30]. Repeat this for 4×6 and 40×60. See if students can propose a rule or pattern.

3. Use calculators to answer:

   3×4  ____  30×4  ____  3×40  ____  30×40  ____
   6×7  ____  60×7  ____  6×70  ____  60×70  ____
   5×8  ____  50×8  ____  5×80  ____  50×80  ____

   Ask: *Can anyone see a pattern? Can you use this pattern to answer 4×80 if 4×8=32?*

4. Complete Worksheets 1.1 and 1.2.

5. Play the game; “Higher Decade Multiplication Tic-Tac-Toe”.

---

YuMi Deadly Maths Past Project Resource  © 2008, 2011 QUT YuMi Deadly Centre
### MS1 – Worksheet 1.1

1. Complete these with a calculator:
   
   (a) \(5 \times 3 = \) \____  \(50 \times 3 = \) \____  \(5 \times 30 = \) \____  \(50 \times 30 = \) \____
   
   (b) \(2 \times 7 = \) \____  \(20 \times 7 = \) \____  \(2 \times 70 = \) \____  \(20 \times 70 = \) \____
   
   (c) \(4 \times 9 = \) \____  \(40 \times 9 = \) \____  \(4 \times 90 = \) \____  \(40 \times 90 = \) \____
   
   (d) \(6 \times 4 = \) \____  \(60 \times 4 = \) \____  \(6 \times 40 = \) \____  \(60 \times 40 = \) \____
   
   (e) \(8 \times 5 = \) \____  \(80 \times 5 = \) \____  \(8 \times 50 = \) \____  \(80 \times 50 = \) \____

2. Can you see a pattern? Write it down:

3. Complete these without a calculator:
   
   (a) \(4 \times 2 = 8\)  \(40 \times 2 = \) \____  \(4 \times 20 = \) \____  \(40 \times 20 = \) \____
   
   (b) \(8 \times 9 = 72\)  \(80 \times 9 = \) \____  \(8 \times 90 = \) \____  \(80 \times 90 = \) \____
   
   (c) \(5 \times 4 = 20\)  \(50 \times 4 = \) \____  \(5 \times 40 = \) \____  \(50 \times 40 = \) \____

4. Can you extend the idea – complete these without a calculator:
   
   (a) \(6 \times 8 = 48\)  \(60 \times 80 = \) \____  \(600 \times 80 = \) \____
   
   (b) \(4 \times 7 = 28\)  \(40 \times 700 = \) \____  \(400 \times 700 = \) \____
   
   (c) \(5 \times 9 = 45\)  \(500 \times 900 = \) \____  \(5000 \times 9000 = \) \____
**MS1 – Worksheet 1.2**

**WHAT IS AN IG?**

1. \(3 \times 6 = 18\) \(30 \times 60 = \) S
2. \(3 \times 6 = 18\) \(30 \times 600 = \) K
3. \(5 \times 7 = 35\) \(500 \times 7 = \) U
4. \(5 \times 7 = 35\) \(50 \times 700 = \) E
5. \(5 \times 6 = 30\) \(50 \times 600 = \) O
6. \(5 \times 6 = 30\) \(50 \times 6000 = \) T
7. \(6 \times 7 = 42\) \(60 \times 70 = \) M
8. \(6 \times 7 = 42\) \(6000 \times 7 = \) W
9. \(5 \times 8 = 40\) \(50 \times 800 = \) H
10. \(5 \times 8 = 40\) \(50 \times 8000 = \) L
11. \(5 \times 8 = 40\) \(500 \times 8 = \) I

<table>
<thead>
<tr>
<th>35000</th>
<th>18000</th>
<th>18000</th>
<th>40000</th>
<th>42000</th>
<th>30000</th>
</tr>
</thead>
<tbody>
<tr>
<td>40000</td>
<td>30000</td>
<td>35000</td>
<td>18000</td>
<td>35000</td>
<td></td>
</tr>
<tr>
<td>42000</td>
<td>40000</td>
<td>300000</td>
<td>40000</td>
<td>30000</td>
<td>35000</td>
</tr>
<tr>
<td>300000</td>
<td>30000</td>
<td>40000</td>
<td>400000</td>
<td>35000</td>
<td>30000</td>
</tr>
</tbody>
</table>
**MS1 – Game:**

**Higher Decade Multiplication Tic-Tac-Toe**

**Materials:** Boards below, Unifix (one colour per page), calculators

**Number of players:** 2

**Directions:**

1) Players in turn select a number from the top and a number from the bottom. Calculate the product of these (use calculator to check).

2) Cover vacant square with unifix (if square already has unifix, miss a turn).

3) First player with 3-in-a-row wins (across, down or diagonal).

Use the following:

3×6=18, 3×7=21, 3×9=27, 4×6=24, 4×7=28, 4×9=36, 5×6=30, 5×7=35, 5×9=45
**MS1 Activity Feedback Sheet**

1. How the student found the activity (put a cross on lines)

<table>
<thead>
<tr>
<th>NAME</th>
<th>STUDENTS’ REACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boring -------------- Interesting</td>
</tr>
<tr>
<td></td>
<td>Difficult ----------- Easy</td>
</tr>
<tr>
<td></td>
<td>Not learning -------- Learning</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Boring -------------- Interesting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difficult ----------- Easy</td>
</tr>
<tr>
<td></td>
<td>Not learning -------- Learning</td>
</tr>
</tbody>
</table>

2. How did you feel about trialling the activity?

Mark the line with an X: Unconfident -------------- Very confident

3. Do you think the student was engaged in the activity? Explain.

________________________________________________________________________

4. What do you think the student learnt from the activity?

________________________________________________________________________

5. Do you think the student has gained an understanding of the concept being taught? Explain.

________________________________________________________________________

6. What do you think of the activity?

________________________________________________________________________

7. What are your suggestions for improving the activity?

________________________________________________________________________

________________________________________________________________________

8. What else do you suggest could be done to help students who have trouble with this activity?

________________________________________________________________________

________________________________________________________________________
ACTIVITY MS2
[Sequencing strategy for Multiplication Computation]

Materials: MAB blocks, place value chart (PVC), pen, paper, calculator, attached resources.

Directions:

1. Meaning. Ask students: What does $4\times37$ mean? Focus on set model [“4 lots of 37”]. Ask: Can you think up a story?


3. Distributive Law. Ask, what does $4\times37$ mean? [4 lots of 37]. State, we have one 37 on PVC with MAB. How can we show $4\times37$? [4 lots of 37]. Put this on PVC with MAB. State, look at tens. How many 30s? Look at ones. How many 7’s? Get students to finish 4 lots of 37 = _______ of 30s and _______ of ones.

4. Computation. Put out 4 lots of 37 on PVC and record as you go. Ask, how many in each lot? [37]. How many lots? [4]. How do we write this? [37 on top, $\times4$ under and a line to show equals].

<table>
<thead>
<tr>
<th>Step 1</th>
<th>100</th>
<th>10</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 lots of 37</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>37</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\times4$</td>
<td></td>
</tr>
</tbody>
</table>

Step 2
Discuss that we have to find 4 lots of 7 and regroup. Separate 37 into tens and ones and look at the ones. Ask, what is $4\times7$ (use calculator)? [28]. Ask, have we enough ones to make a ten? [Yes]. Have we enough ones to make 2 tens? [Yes]. Have we enough ones to make 3 tens? [No]. Direct, make the tens. Move to tens position. How many ones are left over? [8]. How many extra tens? [2]. Write 28 under the 4.
Step 3
Direct, now look at tens. How many tens in each lot? How many lots? Discuss that we have to find 4 lots of 30 and regroup. Ask, what is $4 \times 30$ (use calculator)? [120]. How many tens? Remind that $4 \times 3 = 12$ means $4 \times 30 = 120$ or 12 tens. Ask, do we have enough tens to form a hundred, two hundred, ...? [one 100]. Make the one hundred and move to hundreds position. How many tens left over? [2]. How many extra hundreds? [1]. Write 120 under the 28.

<table>
<thead>
<tr>
<th>100</th>
<th>10</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Step 4
Add the 28 and 120 to give 148, the result of $4 \times 37$. Note: can do the tens first:

\[
\begin{array}{c}
37 \\
\times 4 \\
\hline
28 (4 \times 7) \\
120 (4 \times 30)
\end{array}
\]

5. Repeat direction 4 for example $3 \times 265$:

Step 1

<table>
<thead>
<tr>
<th>100</th>
<th>10</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Step 2

\[
\begin{array}{c|c|c}
100 & 10 & 1 \\
\hline
265 & \times3 & 15 \ (3\times5) \\
\end{array}
\]

Step 3

\[
\begin{array}{c|c|c}
100 & 10 & 1 \\
\hline
265 & \times3 & 15 \ (3\times5) \\
& & 180 \ (3\times60) \\
\end{array}
\]

Step 4

\[
\begin{array}{c|c|c}
100 & 10 & 1 \\
\hline
265 & \times3 & 15 \ (3\times5) \\
& & 180 \ (3\times60) \\
& & 600 \ (3\times200) \\
\end{array}
\]

Step 5

Add all the parts. Note: could have done larger place values first as on right:

\[
\begin{align*}
265 & \times3 & 15 \ (3\times5) \\
180 & (3\times60) \\
600 & (3\times200) \\
795 & \\
\end{align*}
\]

6. Repeat directions 4 and 5 but without materials.
   \[
   \begin{align*}
   48 \times7 & = 336 \\
   \frac{56}{7 \times 8} & = \frac{280}{336} \\
   \frac{149}{6 \times 19} & = \frac{600}{(6 \times 100)} \\
   \frac{240}{6 \times 40} & = \frac{54}{6 \times 9} \\
   \end{align*}
   \]

(a) \ 7\times48: \text{separate 48 into 40 and 8 and multiply} \\
   \text{(note: } 7\times8=56, 7\times4=28 \text{ so } 7\times40=280) \\

(b) \ 6\times149: \text{separate 149 into 100, 40 and 9 and multiply} \\
   \text{(note: } 6\times9=54, 6\times4=24, 6\times1=6, \text{ so } 6\times40=240 \text{ and } 6\times100=600) \\

7. Complete Worksheets 2.1 and 2.2.

8. Complete the games “Multiplication Separation Tic-Tac-Toe” and “Multiplication Computation Mix and Match”.

\[
\begin{array}{c}
100 \\
15 \\
180 \\
600 \\
795 \\
\end{array}
\]

\[
\begin{array}{c}
265 \\
\times3 \\
15 \ (3\times5) \\
180 \ (3\times60) \\
600 \ (3\times200) \\
795 \\
\end{array}
\]

\[
\begin{array}{c}
48 \\
\times7 \\
\frac{56}{7 \times 8} \\
\frac{280}{336} \\
149 \\
\times6 \\
\frac{600}{(6 \times 100)} \\
\frac{240}{(6 \times 40)} \\
\frac{54}{(6 \times 9)} \\
\end{array}
\]
1. Use your calculator to complete the following:

(a) \[ 40 \times 7 \times 7 \times 7 = A + B \]
\[ \_A \quad _B \]

(b) \[ 60 \times 3 \times 3 \times 3 = A + B \]
\[ \_A \quad _B \]

(c) \[ 200 \times 4 \times 4 \times 4 \times 4 = A + B + C \]
\[ \_A \quad _B \quad _C \]

(d) \[ 400 \times 9 \times 9 \times 9 \times 9 = A + B + C \]
\[ \_A \quad _B \quad _C \]

2. Look at (a), (b), (c) and (d) what pattern do you see? Write it down:

3. Complete these without your calculator

(a) \[ 70 \times 5 \times 5 \times 5 = 76 \times 5 \]
\[ 350 \quad 30 \]

(b) \[ 200 \times 7 \times 7 \times 7 = 246 \times 7 \]
\[ 1400 \quad 280 \quad 42 \]

(c) \[ 300 \times 6 \times 6 \times 6 = 359 \times 6 \]
\[ 1800 \quad 300 \quad 54 \]

(d) \[ 800 \times 8 \times 8 \times 8 = 872 \times 8 \]
\[ 6400 \quad 560 \quad 16 \]
**MS2 – Worksheet 2.2**

Why did the chicken cross the road?

1. 24 \( \times 6 \)
   - 24 \((6 \times 4)\)
   - 120 \((6 \times 20)\)
   - 144

2. 56 \( \times 7 \)
   - 392 \((7 \times 6)\)
   - 420 \((7 \times 50)\)
   - \_

3. 38 \( \times 8 \)
   - 304 \((8 \times 8)\)
   - 308 \((8 \times 30)\)
   - \_

4. 53 \( \times 5 \)
   - 265 \((5 \times 7)\)
   - 265 \((5 \times 40)\)
   - \_

5. 49 \( \times 2 \)
   - 98 \((2 \times 49)\)
   - \_

6. 44 \( \times 9 \)
   - 396 \((9 \times 44)\)
   - \_

7. 236 \( \times 4 \)
   - 944 \((4 \times 6)\)
   - \_

8. 347 \( \times 5 \)
   - 1735 \((5 \times 7)\)
   - \_

9. 683 \( \times 3 \)
   - 2049 \((3 \times 60)\)
   - \_

10. 284 \( \times 4 \)
    - 1136 \((4 \times 284)\)
    - \_

11. 629 \( \times 8 \)
    - 5032 \((8 \times 629)\)
    - \_

12. 844 \( \times 9 \)
    - 7596 \((9 \times 844)\)
    - \_

---

396 1735 392 5032 944 7596 396 1735 396 304 144 1735 396 304 144 98 1126 2049 265 144
MS2 – Games

Separation Multiplication Tic-Tac-Toe

Materials: Playing boards, unifix of one colour for each player
Number of Players: 2
Directions:
1) Players in turn choose a number from top row and a number from bottom row.
2) Players multiply the numbers and cover the answer with unifix.
3) First player to cover 3 in a row, column or diagonal wins.

\[
\begin{array}{ccc}
64 & 37 & 48 \\
\times & & \\
6 & 8 & 7
\end{array}
\]

Separation Mix and Match

Materials: Mix and Match cards (attached)
Number of Players: 1 (or a group)
Directions:
1) Print all cards in same colour.
2) Cut cards along lines into pieces.
3) Mix pieces together.
4) Students put pieces back together to form cards.
**MS2 – Separation Multiplication Tic-Tac-Toe games**

**Game 1**

\[
\begin{array}{ccc}
64 & 37 & 48 \\
\times & & \\
6 & 8 & 7 \\
\end{array}
\quad \begin{array}{ccc}
222 & 336 & 296 \\
\times & & \\
288 & 384 & 512 \\
\end{array}
\quad \begin{array}{ccc}
448 & 259 & 384 \\
\end{array}
\]

**Game 2**

\[
\begin{array}{ccc}
78 & 55 & 63 \\
\times & & \\
7 & 9 & 5 \\
\end{array}
\quad \begin{array}{ccc}
441 & 275 & 702 \\
\times & & \\
546 & 385 & 495 \\
\end{array}
\quad \begin{array}{ccc}
315 & 390 & 567 \\
\end{array}
\]

**Game 3**

\[
\begin{array}{ccc}
49 & 81 & 68 \\
\times & & \\
8 & 7 & 9 \\
\end{array}
\quad \begin{array}{ccc}
648 & 544 & 343 \\
\times & & \\
441 & 392 & 729 \\
\end{array}
\quad \begin{array}{ccc}
476 & 567 & 612 \\
\end{array}
\]
John bought 6 cameras
At $92 each.
How much did he spend?

6 groups of $92

6 x $90 and 6 x $2

Freda bought 11 meals
for $28 each.
How much for the food?

11 lots of $28

11 x $20 and 11 x $8

$ 92
$x 6

$ 28
$x 11
The pants were $46, I bought 6 pairs. How much did I spend?

6 groups of $46

6 x $40 and 6 x $6

$ 46 x 6

Fred gave his 9 friends $62 each. How much did he give away?

9 lots of $62

9 x $60 and 9 x $2

$ 62 x 9
Alan paid 6 weeks of rent at $134 a week. How much did he pay?

6 groups of $134

6 x $100, 6 x $30 and 6 x $4

Sue bought 14 DVD’s at $28 each. How much did she pay?

14 lots of $28

14 x $20 and 14 x $8
Joe paid the power bills. For 8 months it cost $115 per month. How much did he pay?

- 8 lots of $115
- 8 x $100, 8 x $10 and 8 x $5

Jacquie bought 13 uniforms at $57 each. How much did she pay?

- 13 lots of $57
- 13 x $50 and 13 x $7
MS2 Activity Feedback Sheet

1. How the student found the activity (put a cross on lines)

<table>
<thead>
<tr>
<th>NAME</th>
<th>STUDENTS’ REACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boring</td>
</tr>
<tr>
<td></td>
<td>Difficult</td>
</tr>
<tr>
<td></td>
<td>Not learning</td>
</tr>
</tbody>
</table>

2. How did you feel about trialling the activity?

Mark the line with an X: Unconfident       Very confident

3. Do you think the student was engaged in the activity? Explain.

_________________________________________________________________

4. What do you think the student learnt from the activity?

_________________________________________________________________

5. Do you think the student has gained an understanding of the concept being taught? Explain.

_________________________________________________________________

6. What do you think of the activity?

_________________________________________________________________

7. What are your suggestions for improving the activity?

_________________________________________________________________

8. What else do you suggest could be done to help students who have trouble with this activity?

_________________________________________________________________
ACTIVITY MS3
[Sequencing Strategy for Multiplication Computation]

Materials: Graph paper (2mm), pen, paper, calculator, attached resources

Directions:
1. Multiplication as rectangular arrays
   Hand out 2mm graph paper. Ask the students to draw rectangles to enclose the following squares:
   (a) 4×3  (b) 8×7  (c) 3×24  (d) 6×58
   Draw diagrams to show larger numbers:
   (a) 8×87  (b) 9×234  (c) 23×642
   Discuss how multiplication can be represented by rectangles.

2. Distributive Law
   Discuss how rectangles can be broken up. Draw 6×7 on rectangle. Look at what happens when break 7 into 5 and 2. Discuss how it breaks multiplication 6×7 into 6×5 and 6×2.

   Look at 7×34 and discuss ways each number could be broken up for example:
   (a) 7
       34
   →
       7
       30  4
   = 7×30
   + 7×4

   (b) 7
       34
   →
       7
       20  10  4
   = 7×20
   + 7×10
   + 7×4

   (c) 7
       34
   →
       5
       2  34
   = 5×34
   + 2×34

   Obviously when the 34 side of the rectangle is broken up by place value (as in example (a) or example (b)), we are looking at separation. For sequencing, we look at breaking up the 1-digit number (as in example (c)). We will focus on sequencing in this activity (but will include separations).

3. Applying Distributive Law to computation
   Ask: We are going to solve multiplications by thinking arrays and breaking up one number. Look at example 7×34.
Step 1  Make a drawing

Step 2  Break up one of the numbers, e.g.:

(a) separation

(b) separation

(c) sequencing

(d) sequencing

34

7

30 4

20 10 4

34

5

2

1

2

4

Step 3  Consider the multiplication as a number of parts and add them:

(a) separation

(b) separation

(c) sequencing

(d) sequencing

×7

210 (7×30)

×7

140 (7×20)

70 (7×10)

28 (7×4)

70 (7×10)

68 (2×34)

238

28 (7×4)

238

238

238

170 (5×34)

34 (1×34)

68 (2×34)

136 (4×34)

34

34

4.

Good/easy multiplications

Ask students: We could have broken 34 into 17 and 17, and 7 into 3 and 4. Why did we choose 30 and 4 for 34 and 5 and 2 for 7? State: Answer is that these are easy. Ask: Why are they easy and what other numbers are easy?

After discussion, elicit the following:

Answer  (a) Multiples of 10 are easy

7×30 = (7×3) tens = 21 tens = 210

(b) 1, 2, 4 and 8 are easy

1×34 = 34

2×34 = double 34 = 68

4×34 = double double 34 = double 68 = 136

8×34 = double double double 34 = double double double 68 = double 136 = 272

(c) 10 and 5 are easy

10×34 = 340

5×34 = $\frac{1}{2}$ (10×34) = 120
5. **Sequencing strategy for multiplication**

Ask: In $7 \times 34$, the separation strategy involves breaking up the 34 and the sequencing strategy involves breaking up the 7. Let’s use arrays to see what happens for some examples. Repeat step 3 for a variety of numbers, discussing different ways of breaking things up by sequencing

(a) $6 \times 58$

(b) $8 \times 87$

(c) $7 \times 234$

6. Complete Worksheets 3.1 and 3.2.

7. Play games: “Sequence Multiplication Snap”, “Sequence Multiplication Rummy”, “Sequence Multiplication Concentration”, “Sequence Multiplication Cover the Board”, “Sequence Multiplication Mix-and Match”, and “Sequence Multiplication Mix-and Match Bingo”.
MS3 – 2mm Graph Paper
**MS3 – Worksheet 3.1**

[Sequencing and separation use of breaking up rectangles]

Complete the drawings. The first one has been done for you.

<table>
<thead>
<tr>
<th>1. <strong>PROBLEM</strong></th>
<th><strong>SEPARATIONWAYS</strong></th>
<th><strong>SEQUENCINGWAYS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>53</td>
<td>50 3 20 20 10 3</td>
<td>1 2 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 4 53</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>86</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>347</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**MS3 – Worksheet 3.2**

Complete the following by sequencing. The first one has been done for you.

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>ARRAY</th>
<th>WRITTEN ALGORITHM</th>
</tr>
</thead>
</table>
| 1. 6×48 | ![Array for 6×48] | 48 × 6  
|        |       | 48 (1×48)  
|        |       | 240 (5×48)  
|        |       | 288 (½10×48) |
| 2. 3×74 |       |                  |
| 3. 9×93 |       |                  |
| 4. 5×128 |     |                  |
| 5. 6×329 |     |                  |
| 6. 7×807 |     |                  |
MS3 - Multiplication Computation Card Games

Snap, Rummy and Concentration

Materials: Five pages of pictures following these instructions (equation, array, algorithm, partitioned array, extended algorithm).

Number of players: 2-4

Directions:

- Print the five pages in 5 different colours, cut each page into 12 cards (making 60 cards of 5 different colours) for Snap, Rummy and Concentration. Shuffle the cards. Follow instructions for these games:
- Snap. Two players, cards divided equally between players. Together, the two players play the top card of their deck face up in front of them. First to call snap when two cards show the same number wins a point. The player with the most points wins when all cards played.
- Rummy. Two to four players, deal out 7 cards to each player. Remaining cards face down in middle with one card face-up beside deck. Players put out any doubles or triples. Players in turn pick up a card (either the top face-up card or face-down card) and place a card face-up on the face-up pile. Doubles, triples, quadruples, and quintuples are put out as they are formed. The winner is the first player to put out all their cards as doubles, triples, quadruples or quintuples.
- Concentration. Two to three players or two groups of players. Place all cards face down on table. Players take turns selecting 2 cards. If they are the same, keep the pair and take another turn. The winner is the player with the most pairs when all cards used.

2-D x 1-D Multiplication Cover-the-Board

Materials: Same materials as for card games except the symbols page is kept as a base board, while the other 4 pages are each cut into 12 picture cards.

Number of players: 2-5

Directions:

1) Print the five pages from the above card games, each on different coloured paper or light card. Laminate the equation page to use as a base board.
2) Cut the other 4 pages into 12 cards each.
3) Each player gets a set of cards.
4) In turn, each player places a card correctly on the base board (card and board have to display same number) or on top of another card already placed.
5) At the end when all cards played, the player with most cards on top wins.
**Multiplication Computation Mix & Match Cards**

**Materials:** 12 mix and match cards (two per page for the next 6 pages)

**Number of players:** 1 (though can be a group)

**Directions:**
1) Print all cards in same colour.
2) Cut cards along lines into pieces.
3) Mix pieces together.
4) Students put pieces back together to form cards.

**Multiplication Computation Bingo Game**

**Materials:** 7 pages of material following these instructions – one set of equation flash cards and six bingo base boards, unifix cubes.

**Number of players:** 2-6

**Directions:**
1) Print the flash cards (equations) on white paper or card, laminate and cut out.
2) Print the six bingo base boards, each on different coloured paper or card (laminate if possible).
3) One player (caller) takes the flash cards and shuffles them, other players take a base board and unifix cubes.
4) Caller shows cards one at a time.
5) Players cover same operation on their board with unifix cube.
6) First player to get 3 in a row (across, down or diagonal) is the winner (calls “bingo”) and becomes caller in next game.
### MS3 – Multiplication Computation Cards (equation)

<table>
<thead>
<tr>
<th>Equation</th>
<th>Equation</th>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$7 \times 34 = 238$</td>
<td>$3 \times 42 = 126$</td>
<td>$4 \times 61 = 244$</td>
</tr>
<tr>
<td>$9 \times 26 = 234$</td>
<td>$5 \times 74 = 370$</td>
<td>$6 \times 87 = 522$</td>
</tr>
<tr>
<td>$4 \times 23 = 92$</td>
<td>$2 \times 58 = 116$</td>
<td>$7 \times 98 = 686$</td>
</tr>
<tr>
<td>$4 \times 56 = 224$</td>
<td>$9 \times 67 = 603$</td>
<td>$8 \times 71 = 568$</td>
</tr>
</tbody>
</table>
MS3 – Multiplication Computation Cards (array)
### MS3 – Multiplication Computation Cards (algorithm)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>42</td>
<td>61</td>
</tr>
<tr>
<td>x 7</td>
<td>x 3</td>
<td>x 4</td>
</tr>
<tr>
<td>28</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>210</td>
<td>120</td>
<td>240</td>
</tr>
<tr>
<td>238</td>
<td>126</td>
<td>244</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>74</td>
<td>87</td>
</tr>
<tr>
<td>x 9</td>
<td>x 5</td>
<td>x 6</td>
</tr>
<tr>
<td>54</td>
<td>20</td>
<td>42</td>
</tr>
<tr>
<td>180</td>
<td>350</td>
<td>480</td>
</tr>
<tr>
<td>234</td>
<td>370</td>
<td>522</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>58</td>
<td>98</td>
</tr>
<tr>
<td>x 4</td>
<td>x 2</td>
<td>x 7</td>
</tr>
<tr>
<td>12</td>
<td>16</td>
<td>56</td>
</tr>
<tr>
<td>80</td>
<td>100</td>
<td>630</td>
</tr>
<tr>
<td>92</td>
<td>116</td>
<td>686</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>56</td>
<td>67</td>
<td>71</td>
</tr>
<tr>
<td>x 4</td>
<td>x 9</td>
<td>x 8</td>
</tr>
<tr>
<td>24</td>
<td>63</td>
<td>8</td>
</tr>
<tr>
<td>200</td>
<td>540</td>
<td>560</td>
</tr>
<tr>
<td>224</td>
<td>603</td>
<td>568</td>
</tr>
</tbody>
</table>
### MS3 – Multiplication Computation Cards (partitioned array)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>4</td>
<td>34</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
<td>42</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
<td>61</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
<td>74</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>4</td>
<td>87</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>5</td>
<td>98</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>56</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
<td>67</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>4</td>
<td>71</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### MS3 – Multiplication Computation Cards (extended algorithm)

<table>
<thead>
<tr>
<th>Calculation</th>
<th>Calculation</th>
<th>Calculation</th>
</tr>
</thead>
</table>
| \[
\begin{array}{c}
34 \\
\times 7
\end{array}
\]
\[
\begin{array}{c}
34 \ (1 \times 34) \\
68 \ (2 \times 34) \\
136 \ (4 \times 34) \\
\hline
238
\end{array}
\]
| \[
\begin{array}{c}
42 \\
\times 3
\end{array}
\]
\[
\begin{array}{c}
42 \ (1 \times 42) \\
84 \ (2 \times 42) \\
126
\end{array}
\]
| \[
\begin{array}{c}
61 \\
\times 4
\end{array}
\]
\[
\begin{array}{c}
122 \ (2 \times 61) \\
122 \ (2 \times 61) \\
\hline
244
\end{array}
\]
| \[
\begin{array}{c}
26 \\
\times 9
\end{array}
\]
\[
\begin{array}{c}
26 \ (1 \times 26) \\
52 \ (2 \times 26) \\
52 \ (2 \times 26) \\
104 \ (4 \times 26) \\
\hline
234
\end{array}
\]
| \[
\begin{array}{c}
74 \\
\times 5
\end{array}
\]
\[
\begin{array}{c}
74 \ (1 \times 74) \\
148 \ (2 \times 74) \\
148 \ (2 \times 74) \\
370
\end{array}
\]
| \[
\begin{array}{c}
87 \\
\times 6
\end{array}
\]
\[
\begin{array}{c}
174 \ (2 \times 87) \\
480 \ (4 \times 87) \\
\hline
522
\end{array}
\]
| \[
\begin{array}{c}
23 \\
\times 4
\end{array}
\]
\[
\begin{array}{c}
46 \ (2 \times 23) \\
46 \ (2 \times 23) \\
\hline
92
\end{array}
\]
| \[
\begin{array}{c}
58 \\
\times 2
\end{array}
\]
\[
\begin{array}{c}
116 \ (2 \times 58)
\end{array}
\]
| \[
\begin{array}{c}
98 \\
\times 7
\end{array}
\]
\[
\begin{array}{c}
196 \ (2 \times 98) \\
490 \ (5 \times 98) \\
\hline
686
\end{array}
\]
| \[
\begin{array}{c}
56 \\
\times 4
\end{array}
\]
\[
\begin{array}{c}
112 \ (2 \times 56) \\
112 \ (2 \times 56) \\
\hline
224
\end{array}
\]
| \[
\begin{array}{c}
67 \\
\times 9
\end{array}
\]
\[
\begin{array}{c}
67 \ (1 \times 67) \\
134 \ (2 \times 67) \\
134 \ (2 \times 67) \\
268 \ (4 \times 67) \\
\hline
603
\end{array}
\]
| \[
\begin{array}{c}
71 \\
\times 8
\end{array}
\]
\[
\begin{array}{c}
142 \ (2 \times 71) \\
142 \ (2 \times 71) \\
284 \\
\hline
568
\end{array}
\]
\[
\begin{align*}
7 \times 34 &= 238 \\
30 \quad 4 \\
7 \\
28 \quad (7 \times 4) \\
210 \quad (7 \times 30) \\
238 \\
34 \\
x \quad 7 \\
28 \\
34 \quad (1 \times 34) \\
68 \quad (2 \times 34) \\
136 \quad (4 \times 34) \\
238
\end{align*}
\]
4 × 61 = 244

9 × 26 = 234
5 x 74 = 370

6 x 78 = 522
4 x 23 = 92

2 x 58 = 116
7 \times 98 = 686

4 \times 56 = 224
67 \times 9 = 603

8 \times 71 = 497
### MS3 – Multiplication Computation Flash Cards (equation)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7 × 34 = 238</td>
<td>3 × 42 = 126</td>
<td>4 × 61 = 244</td>
</tr>
<tr>
<td>9 × 26 = 234</td>
<td>5 × 74 = 370</td>
<td>6 × 87 = 522</td>
</tr>
<tr>
<td>4 × 23 = 92</td>
<td>2 × 58 = 116</td>
<td>7 × 98 = 686</td>
</tr>
<tr>
<td>4 × 56 = 224</td>
<td>9 × 67 = 603</td>
<td>8 × 71 = 568</td>
</tr>
<tr>
<td>34 \times 7</td>
<td>28</td>
<td>210</td>
</tr>
<tr>
<td>42 \times 3</td>
<td>42</td>
<td>84</td>
</tr>
<tr>
<td>61 \times 4</td>
<td>4</td>
<td>240</td>
</tr>
<tr>
<td>26 \times 9</td>
<td>26</td>
<td>52</td>
</tr>
<tr>
<td>26 \times 2</td>
<td>116</td>
<td></td>
</tr>
</tbody>
</table>

| 74 |
| 87 |
| 23 |
| 58 \times 2 |

| 70 |
| 70 | 1 |

| 74 |
| 42 \times 3 | 6 | 120 | 126 |
| 71 |
| 26 \times 9 |
| 54 | 180 | 234 |

| 58 |
| 67 \times 9 | 63 | 540 | 603 |
| 90 | 8 |
| 34 \times 7 | 28 | 210 | 238 |

| 61 \times 4 | 4 | 240 | 244 |
| 87 \times 6 | 174 | 348 | 522 |
| 23 |
### MS3 - Multiplication Computation Bingo Boards

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>23 [\times 4]</td>
<td>58 [\times 2]</td>
<td>2 [\times 5]</td>
<td>9 [\times 6]</td>
</tr>
<tr>
<td>[46]</td>
<td>[16]</td>
<td>[2]</td>
<td>[74]</td>
</tr>
<tr>
<td>[46]</td>
<td>[100]</td>
<td>[74]</td>
<td>[480]</td>
</tr>
<tr>
<td>[92]</td>
<td>[116]</td>
<td>[148]</td>
<td>[522]</td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[9]</td>
<td>[67]</td>
<td>[71]</td>
<td>[30]</td>
</tr>
<tr>
<td>[2]</td>
<td>[4]</td>
<td>[4]</td>
<td>[2]</td>
</tr>
<tr>
<td>[7]</td>
<td>[4]</td>
<td>[4]</td>
<td>[2]</td>
</tr>
<tr>
<td>[3]</td>
<td>[40]</td>
<td>[2]</td>
<td>[4]</td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[1]</td>
<td>[98]</td>
<td>[61]</td>
<td>[87]</td>
</tr>
<tr>
<td>[2]</td>
<td>[4]</td>
<td>[5]</td>
<td>[6]</td>
</tr>
<tr>
<td>[4]</td>
<td>[240]</td>
<td>[244]</td>
<td>[480]</td>
</tr>
<tr>
<td>[4]</td>
<td>[244]</td>
<td>[370]</td>
<td>[522]</td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[1]</td>
<td>[67]</td>
<td>[23]</td>
<td>[98]</td>
</tr>
<tr>
<td>[2]</td>
<td>[4]</td>
<td>[4]</td>
<td>[2]</td>
</tr>
<tr>
<td>[2]</td>
<td>[46]</td>
<td>[46]</td>
<td>[4]</td>
</tr>
<tr>
<td>[4]</td>
<td>[92]</td>
<td>[112]</td>
<td>[224]</td>
</tr>
</tbody>
</table>

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>[87]</td>
<td>[34]</td>
<td>[98]</td>
<td>[40]</td>
</tr>
<tr>
<td>[\times 6]</td>
<td>[\times 7]</td>
<td>[\times 5]</td>
<td>[\times 2]</td>
</tr>
<tr>
<td>[42]</td>
<td>[28]</td>
<td>[2]</td>
<td>[16]</td>
</tr>
<tr>
<td>[480]</td>
<td>[210]</td>
<td>[148]</td>
<td>[100]</td>
</tr>
<tr>
<td>[522]</td>
<td>[238]</td>
<td>[370]</td>
<td>[116]</td>
</tr>
</tbody>
</table>
### MS3 - Multiplication Computation Bingo Boards

<table>
<thead>
<tr>
<th>Multiplication</th>
<th>Computation</th>
<th>Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 2 = 4</td>
<td>61</td>
<td>56 x 4 = 224</td>
</tr>
<tr>
<td>3 x 5 = 15</td>
<td>42</td>
<td>24</td>
</tr>
<tr>
<td>56 x 4 = 224</td>
<td>34</td>
<td>200</td>
</tr>
<tr>
<td>67 x 9 = 603</td>
<td>63</td>
<td>42 x 6 = 252</td>
</tr>
<tr>
<td>540 x 1 = 540</td>
<td>26</td>
<td>490 x 7 = 686</td>
</tr>
<tr>
<td>603 x 1 = 603</td>
<td>98</td>
<td>196 x 7 = 1372</td>
</tr>
<tr>
<td>71 x 8 = 568</td>
<td>70</td>
<td>4 x 8 = 32</td>
</tr>
<tr>
<td>142 x 5 = 710</td>
<td>50</td>
<td>5 x 8 = 40</td>
</tr>
<tr>
<td>284 x 3 = 852</td>
<td>4</td>
<td>8 x 3 = 24</td>
</tr>
<tr>
<td>568 x 2 = 1136</td>
<td>3</td>
<td>7 x 2 = 14</td>
</tr>
<tr>
<td>87 x 6 = 522</td>
<td>8</td>
<td>6 x 2 = 12</td>
</tr>
<tr>
<td>61 x 2 = 122</td>
<td>3</td>
<td>4 x 2 = 8</td>
</tr>
<tr>
<td>2 x 2 x 2 = 8</td>
<td>34</td>
<td>7 x 7 = 49</td>
</tr>
<tr>
<td>61 x 2 = 122</td>
<td>61</td>
<td>34 x 7 = 238</td>
</tr>
<tr>
<td>2 x 2 = 4</td>
<td>42</td>
<td>34 x 7 = 238</td>
</tr>
<tr>
<td>4 x 3 = 12</td>
<td>3</td>
<td>136 x 2 = 272</td>
</tr>
<tr>
<td>2 x 2 = 4</td>
<td>4</td>
<td>136 x 2 = 272</td>
</tr>
<tr>
<td>61 x 2 = 122</td>
<td>1</td>
<td>4 x 2 = 8</td>
</tr>
<tr>
<td>2 x 2 x 2 = 8</td>
<td>2</td>
<td>6 x 2 = 12</td>
</tr>
<tr>
<td>61 x 2 = 122</td>
<td>2</td>
<td>7 x 2 = 14</td>
</tr>
</tbody>
</table>

---

Page 48  
ARC LP0562352 PL5 Multiplication and Division Booklet 5.3: Multiplication Computation Strategies, 2008
**MS3 Activity Feedback Sheet**

1. How the student found the activity (put a cross on lines)

<table>
<thead>
<tr>
<th>NAME</th>
<th>STUDENTS’ REACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boring --------------- Interesting</td>
</tr>
<tr>
<td></td>
<td>Difficult ------------ Easy</td>
</tr>
<tr>
<td></td>
<td>Not learning -------- Learning</td>
</tr>
</tbody>
</table>

|      | Boring --------------- Interesting |
|      | Difficult ------------ Easy |
|      | Not learning -------- Learning |

2. How did you feel about trialling the activity?

Mark the line with an X: Unconfident ------------ Very confident

3. Do you think the student was engaged in the activity? Explain.

________________________________________________________________________

4. What do you think the student learnt from the activity?

________________________________________________________________________

5. Do you think the student has gained an understanding of the concept being taught? Explain.

________________________________________________________________________

6. What do you think of the activity?

________________________________________________________________________

7. What are your suggestions for improving the activity?

________________________________________________________________________

________________________________________________________________________

8. What else do you suggest could be done to help students who have trouble with this activity?

________________________________________________________________________
**ACTIVITY MS4**

[Computation Strategies for Multiplication-Compensation]

**Materials:** Pen, paper, attached resources (worksheets)

**Directions:**

1. **Special Multiples:** There are numbers which are easy to multiply because of their relationship to each other and to 10 and 100. Discuss what these may be with students. Try to elicit the following:
   
   (a) 1, 2, 4 & 8 which come from doubles, i.e. $4 \times 22 = 88$
   
   (b) 10 and multiples of 10, e.g. $10 \times 56$ and $3 \times 40$.
   
   (c) 5 because it is $\frac{1}{2}$ of 10: $5 \times 23 = \frac{1}{2} (10 \times 23) = \frac{1}{2} 230 = 115$
   
   (d) 25 because it is $\frac{1}{4}$ of 100: $\frac{1}{4} (100 \times 27) = \frac{1}{4} 2700 = 625$ or $6\frac{1}{4} 100$’s
   
   (e) 50 because it is $\frac{1}{2}$ of 100: $\frac{1}{2} (100 \times 39) = \frac{1}{2} 3900 = 1950$ or $19\frac{1}{2} 100$’s
   
   (f) Examples like 35 because these are $3\frac{1}{2}$ 10’s: $6 \times 35 = 6 \times 30 + \frac{1}{2} 6 \times 10 = 180 + 30 = 210$

2. **Effect of change.** State: *Draw a diagram for 6×8*

   Draw $5 \times 10$ and $6 \times 10$. Look at the changes. Assist students to see relationships when something is made larger/smaller.

   $5 \times 8$ is smaller than $6 \times 8$ by 1 row. so the difference is 1×8 or one 8. So $6 \times 8 = 5 \times 8 + 8$

   $6 \times 10$ is larger than $6 \times 8$ by 2 columns so the difference is $6 \times 2$ or two 6’s. So $6 \times 8 = 6 \times 10 - 6 - 6$.

   Ask the students to look at larger numbers.

   $7 \times 22$ is smaller than $7 \times 25$ by 3 columns that is, three 7’s. So $7 \times 22 = 7 \times 25 - 7 - 7 - 7$

   $8 \times 56$ is smaller than $10 \times 56$ by 2 rows, that is, two 56’s. So $8 \times 56 = 10 \times 56 - 56 - 56$

3. **Complete Worksheet 4.1**
4. **Compensation Strategy:** This strategy relies on your good number sense to see if there is an easier way as examples below show. State: *There are 2 steps – finding an easy way to do it followed by compensation.*

   (a) \(6 \times 53:\)
   
   Step 1: easy example – \(5 \times 53 = \frac{1}{2} (10 \times 53) = 265\)
   
   Step 2: compensation – need to add another 53, i.e. \(6 \times 53 = 265 + 53 = 318\).

   (b) \(9 \times 67:\)
   
   Step 1: easy example – \(10 \times 67 = 670\)
   
   Step 2: compensation – one too many 67’s, i.e., \(9 \times 67 = 670 – 67 = 603\)

   (c) \(4 \times 72:\)
   
   Step 1: easy example – \(5 \times 72 = \frac{1}{2} 720 = 360\)
   
   Step 2: compensation – one too many 72’s, i.e., \(4 \times 72 = 360 – 72 = 288\)

   (d) \(8 \times 39:\)
   
   Step 1: easy example – \(8 \times 40 = 320\)
   
   Step 2: compensation – one too many 8’s, i.e., \(8 \times 39 = 320 – 8 = 312\)

   (e) \(7 \times 24:\)
   
   Step 1: easy example – \(7 \times 25 = 175\)
   
   Step 2: compensation – one too many 7’s, i.e., \(7 \times 24 = 175 – 7 = 168\)

5. **Deadly Thinking:** Discuss with the students: *Compensation works on finding easier multiplication. We know the 1, 2, 4 and 8 doublings; the 10 and 5 relationships; the 100, 50 and 25 relationships. So we need to get close to these. This requires swift and deadly thinking.* Say: *Look at example, \(6 \times 38\). What is this close to?* Discuss. Elicit some of the following:

   (a) \(5 \times 38:\)
   
   \(5 \times 38 = \frac{1}{2} (10 \times 38) = \frac{1}{2} 380 = 190\)
   
   \(6 \times 38 = 5 \times 38 + 38 = 190 + 38 = 228\)

   (b) \(6 \times 40:\)
   
   \(6 \times 38 = 6 \times 40 – two 6’s = 240 – 12 = 228\)

   (c) \(6 \times 35:\)
   
   \(6 \times 35 = 6 \times 3 \frac{1}{2} 10’s = 180 + 30 = 210\)
   
   \(6 \times 38 = 6 \times 35 + 3 6’s = 210 + 18 = 228\)

   Discuss different methods for \(8 \times 53\).

6. Complete Worksheet 4.2.
7. **Working out which method:** State: We now have 3 strategies: separation, sequencing and compensation. What we use is up to us. Let’s look at example 6 × 287. Go through the three methods.

(a) **Separation:**

\[
\begin{array}{c}
287 \\
\times \ 6 \\
\hline
42 \ (6 \times 7) \\
480 \ (6 \times 80) \\
1200 \ (6 \times 200) \\
\hline
1722
\end{array}
\]

(b) **Sequencing:**

\[
\begin{array}{c}
287 \\
\times \ 6 \\
\hline
574 \ (2 \times 287) \\
1148 \ (4 \times 287) \\
\hline
1722
\end{array}
\]

(c) **Compensation:** Try 6×300=1800. This is 13 6’s too much.

\[
\begin{array}{c}
13 \\
\times \ 6 \\
\hline
60 \\
78
\end{array}
\]

6 × 287 = 1800

\[
\begin{array}{c}
-78 \\
\hline
1722
\end{array}
\]

Ask students to think of ways to multiply 8 × 68.

8. **Complete Worksheets 4.3 and 4.4**
**MS4 – Worksheet 4.1**
Find the following differences. The first has been done for you.

<table>
<thead>
<tr>
<th>Example</th>
<th>Drawings</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 3×38; 3×40</td>
<td><img src="image" alt="Drawings" /></td>
<td>two 3’s</td>
</tr>
<tr>
<td>2. 6×49; 6×50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 8×67; 8×70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 6×64; 5×64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. 10×73; 8×73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. 4×72; 4×70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. 9×28; 9×27</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**MS4 – Worksheet 4.2**

Try to do some deadly thinking to find ways of *compensating*. The first has been done for you.

<table>
<thead>
<tr>
<th>Example</th>
<th>Ways</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 4×56</td>
<td>4×55 + 4, 4×60 −16, double 16, 5×56 −56</td>
<td>240 −16 226</td>
</tr>
<tr>
<td>2. 6×38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. 7×84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 8×67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. 3×152</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. 9×271</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. 7×364</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**MS4 – Worksheet 4.3**

Complete the following. The first one is done for you.

<table>
<thead>
<tr>
<th>Example</th>
<th>Separation</th>
<th>Sequencing</th>
<th>Compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.  5×27</td>
<td><img src="image" alt="5×27 Separation" /></td>
<td><img src="image" alt="5×27 Sequencing" /></td>
<td><img src="image" alt="5×27 Compensation" /></td>
</tr>
<tr>
<td></td>
<td>20 7</td>
<td>27</td>
<td>27</td>
</tr>
</tbody>
</table>
|         | 27  
|         | ×5  
|         | 35 (5×7) 
|         | 100 (5×20) 
|         | 135       | 27  
|         | 5          | 5×30=150  
|         |            | 5×27=150   |
| 2.  6×38 | ![6×38 Separation](image) | ![6×38 Sequencing](image) | ![6×38 Compensation](image) |
| 3.  7×84 | ![7×84 Separation](image) | ![7×84 Sequencing](image) | ![7×84 Compensation](image) |
| 4.  8×67 | ![8×67 Separation](image) | ![8×67 Sequencing](image) | ![8×67 Compensation](image) |
| 5.  3×152 | ![3×152 Separation](image) | ![3×152 Sequencing](image) | ![3×152 Compensation](image) |
| 6.  9×271 | ![9×271 Separation](image) | ![9×271 Sequencing](image) | ![9×271 Compensation](image) |
| 7.  7×364 | ![7×364 Separation](image) | ![7×364 Sequencing](image) | ![7×364 Compensation](image) |
**MS4 – Worksheet 4.4**

Complete the following.

What did the waiter say when asked by the impatient customer if his pizza would be long?

1. 28 \[ \times 4 \] D
2. 36 \[ \times 7 \] W
3. 45 \[ \times 5 \] R
4. 49 \[ \times 6 \] N
5. 54 \[ \times 3 \] E
6. 23 \[ \times 8 \] I
7. 108 \[ \times 9 \] S
8. 164 \[ \times 7 \] L
9. 217 \[ \times 9 \] T
10. 349 \[ \times 6 \] O
11. 614 \[ \times 8 \] U
12. 283 \[ \times 5 \] B

---

294 2094 972 184 225 184 1953 252 184 1148 1148

1415 162 225 2094 4912 294 112
**MS4 Activity Feedback Sheet**

1. How the student found the activity (put a cross on lines)

<table>
<thead>
<tr>
<th>NAME</th>
<th>STUDENTS’ REACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boring</td>
</tr>
<tr>
<td></td>
<td>Interesting</td>
</tr>
<tr>
<td></td>
<td>Difficult</td>
</tr>
<tr>
<td></td>
<td>Easy</td>
</tr>
<tr>
<td></td>
<td>Not learning</td>
</tr>
<tr>
<td></td>
<td>Learning</td>
</tr>
</tbody>
</table>

2. How did you feel about trialling the activity?  
   Mark the line with an X: Unconfident Very confident

3. Do you think the student was engaged in the activity? Explain.

4. What do you think the student learnt from the activity?

5. Do you think the student has gained an understanding of the concept being taught? Explain.

6. What do you think of the activity?

7. What are your suggestions for improving the activity?

8. What else do you suggest could be done to help students who have trouble with this activity?