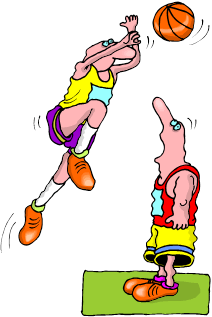
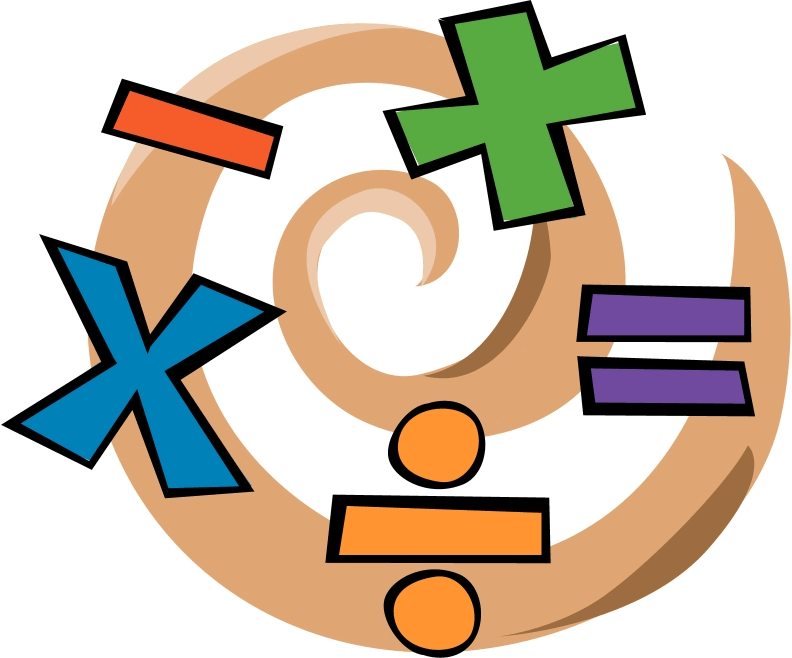
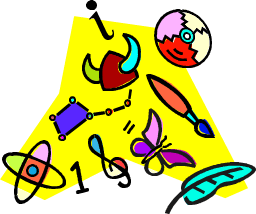
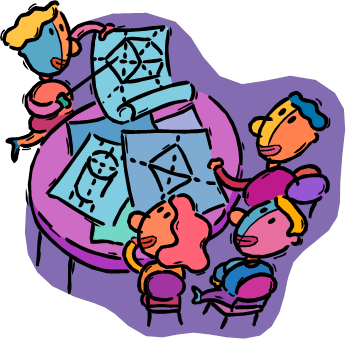
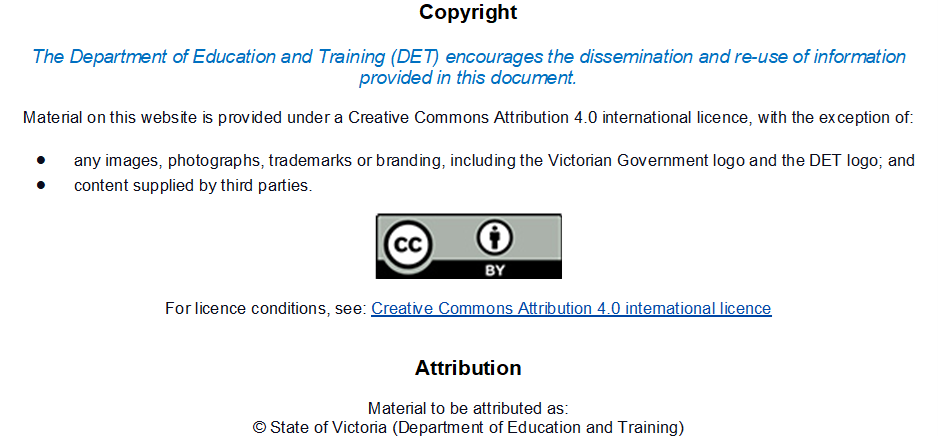
**Mathematics**



How can I organise whole numbers so it is easier to solve problems?



**Mathematics**

**Introduction to** How can I organise whole numbers so it is easier to solve problems?

**Welcome to Mathematics.**

The theme of mathematics is ***Maths skills for your world****.*

We hope you like the booklet and enjoy your learning

|  |  |
| --- | --- |
| **What you will need** | * This booklet, pen and paper * A computer is useful if you have one, because there are interactives in some lessons. * A calculator is sometimes used and is useful to check your answers. |
| **The activities** | Each booklet contains a variety of activities:   * Skills exercises * Investigations * Interactives and games * A skills test * A reflection |
| **When to use your calculator** | Most of the time you **won’t** need your calculator.  The maths activities develop skills; ways of working with numbers, mental arithmetic, estimating and using times tables.  Only use your calculator when it’s part of the activity. |
| **Asking for help…** | There may be times when you are not sure about an example or an exercise.  When this happens, know whom to ask for help:   * Your supervisor or parent. * Your teacher can answer your questions and adjust the work to best suit you. |

**Mathematics**

How can I organise whole numbers so it is easier to solve problems?

|  |
| --- |
| The activities in this booklet will help us to answer the question:  ***“How can I show the ways whole numbers are related?"***  **Learning Intentions:**  **what you will be learning**   * Think about where you have used maths * Revise some number skills:   + - Count by twos, fives, tens and elevens     - Mental strategies for adding and subtracting     - Estimate and round off distances travelled     - Recall multiplication and division facts. Relate them to number stories.     - Develop strategies for multiplying numbers * Investigate:   + - Patterns in multiples     - Prime and composite numbers     - Square and triangular numbers     - Number patterns |

**Mathematics**

The topics in this booklet

|  |  |
| --- | --- |
| **Learning Tasks** | |
| **Task 1** | **Why maths is useful**   * describe how we use numbers in every day situations. |
| **Task 2** | **Estimate distances on holiday road trips**   * warm up: add and subtract tens * round distances to the nearest 10, 50 or 100 kilometres * practise efficient mental strategies with tens and ones to solve simple problems. |
| **Task 3** | **Revise counting by groups**   * revise multiplication as grouping and division as sharing * show that multiplication can be represented with a grid * use number sentences to create number stories. |
| **Task 4** | **Revise counting larger groups**   * split groups into tens and ones for the purpose of easier mental calculation * multiply numbers using grids and area. |
| **Task 5** | **Use your calculator and reflect**   * complete the assessment task * tell us what you have learnt in maths * use your calculator to create skip counting patterns. |

**Mathematics**

The topics in this booklet

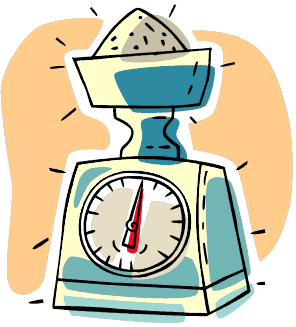
|  |  |
| --- | --- |
| **Learning Tasks** | |
| **Task 6** | **Revise counting groups of ten**   * warm-up: recall multiplication facts * multiply by splitting numbers into tens and ones * practise your skills with an interactive game. |
| **Task 7** | **Number patterns, multiples and factors**   * investigate multiples of 2, 5 and 10 * explore ways of finding factors of numbers * investigate prime numbers and composite numbers * discover the prime numbers up to 13. |
| **Task 8** | **Special numbers**   * use Factor Trees to split a number into its factors * use multiples and factors to find unknown numbers * investigate square numbers and triangular numbers. |
| **Task 9** | **Number patterns**   * explore number patterns formed by making shapes * investigate patterns in a sequence of numbers * find the rule and predict the next number |
| **Task 10** | **Progress Assessment**   * **complete** the assessment and **send** it to your teacher * tell us what you have learnt and how you have worked in Maths * SEND in the tasks listed in the checklist. |

**Learning Intention:**

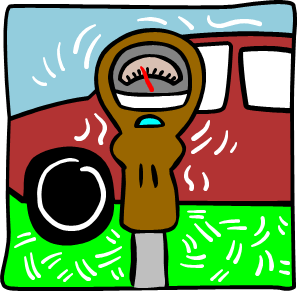
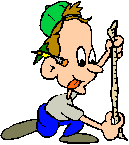
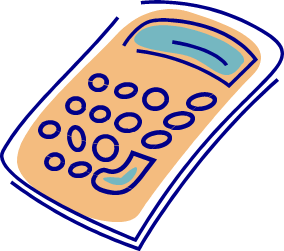
Investigate everyday situations that involve number or mathematics.

# Task 1 Maths in your world

**Think** about the Maths you have used since you got up this morning. Discuss your ideas with your supervisor.



**Tick** the maths you have used in this booklet:

* Checked the time
* Poured something to drink
* Read a timetable or a meter
* Estimated how much time it would take you to walk somewhere
* Compared prices
* Played a game
* Noticed geometric shapes in buildings around you
* ****Measured or weighed something
* Planned for a holiday
* Estimated the length of something; estimated a distance
* Added or subtracted numbers or decimals
* Used fractions or decimals
* Used your calculator to work something out
* Cooked or made something
* Worked in the garden
* Organised a party

**Explore these websites for more ideas:**

<http://www2.ed.gov/pubs/parents/Math/mathhome.html>

Follow the links to discover how Maths is used every day:

<http://etwinmaths.blogspot.com.au/>

Find ONE interesting example of how Maths is used in everyday life and share it with your supervisor or parent.

**Activity 1**

**Where have you used maths?**

Explain the maths you see or you use in everyday life. Include drawings or pictures.

I **estimated**:

I **measured**:

I **noticed** these geometric shapes……

I **compared** and chose the best deal:

I used **my** **calculator to:**

I used **fractions or decimals to:**

# C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\warmup.gifTask 2 Estimating to work things out

**Learning Intention:** Select and apply efficient mental strategies for calculation.

**Warm-up exercise**: adding or subtracting tens.

|  |  |  |
| --- | --- | --- |
| **Adding tens** |  | **Subtracting tens** |
| **110** + **40**  means **11** tens + **4** tens  equals (**11** + **4**) tens  equals **15** tens or 150 |  | **170** – **50**  means **17** tens − **5** tens  equals (**17** – **5**) tens  equals **12** tens or 120 |
| The number sentence is  110 + 40 = 150 |  | The number sentence is  170 – 50 = 120 |

|  |  |
| --- | --- |
| C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\exerrcise1.gif |  |
| **Activity 1: Add or subtract tens** |

Optical illusion: Decode the message and discover a special challenge.

Answer each question below. Match your answers with the correct letters and spell out the message. (Colour me if you can)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\illus3.gif | **U** | 150 + 30 = | **M** | 270 – 50 = | **A** | 190 + 70 = |
| **F** | 210 – 40 = | **R** | 140 + 50 = | **O** | 180 + 20 = |
| **L** | 220 + 50 = | **E** | 220 – 60 = | **C** | 290 – 170 = |
| **N** | 140 – 30 = | **I** | 210 + 70 = | **Y** | 280 – 130 = |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 120 | 200 | 270 | 200 | 180 | 190 |  | 220 | 160 |  |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | 280 | 170 |  | 150 | 200 | 180 |  | 120 | 260 | 110 |  |

# On holiday…..estimating how far we travel

**Learning Intention:** Select and apply efficient mental strategies for calculating in a real world context.



Holidaying on Taber Island; there’s a lot to see and do. Tourists can travel by road, or by boat along the river.

Hillside

Windy

Bluff

Millar Bay

Seal Point

Treasure Cove

River

Falls

Sandy

Wells

Green’s Beach

Sailor’s

Hollow

Lighthouse

Ridge

Road’s End

Shark

Reef

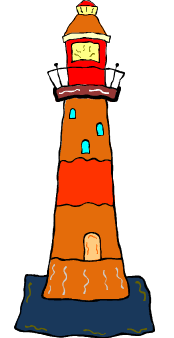
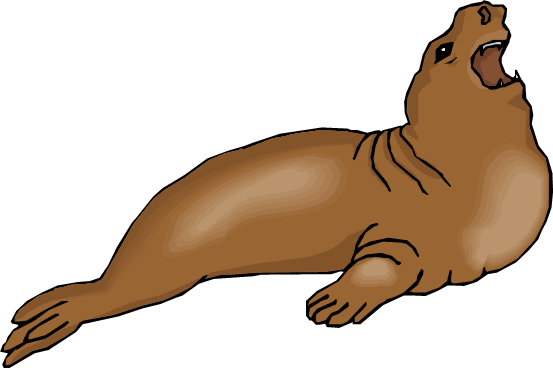
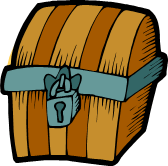
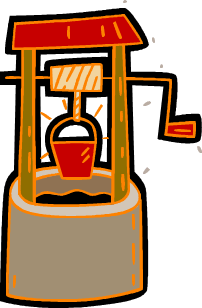
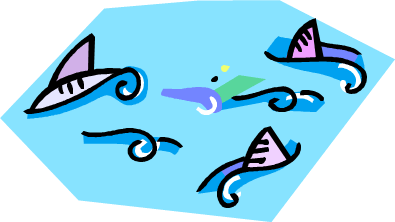
Valetown

West

Junction

Drake River

Drake River



41 km

31 km

36 km

24 km

34 km

107 km

117 km

119 km

60 km

58 km

133 km

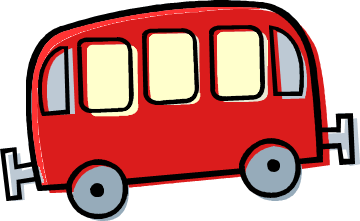
123 km

121 km

32 km

49 km

Taber Island



|  |  |
| --- | --- |
| ***Description: j0229369*** |  |
| **Activity 2: Get to know Taber Island** |
|  |

**Question 1**

Fill in the missing distances in the table below. Round them to the nearest 10 km. The first two are done for you.

|  |  |  |  |
| --- | --- | --- | --- |
| **Distance between…** | | **Round to the nearest 10 km** | |
| Seal Point & Hillside | 41 km | 41 is between  40 and 50  It is closest to 40 km | **41** |
| River Falls and Valetown | 121 km | 121 is between  120 and 130  It is closest to 120 km | **121** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Distance between…** | | **Round to the nearest 10 km** | |
| Sandy Wells and Road’s End | ………… |  | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\rulers\ruler tens.gif |
| Millar Bay and River Falls along the road | ………… |  | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\rulers\ruler tens.gif |
| Treasure Cove and River Falls along the river | ………… |  | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\rulers\ruler tens.gif |
| West Junction and Hillside | ………… |  | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\rulers\ruler tens.gif |

**Question 2**

Rounding to the nearest 5 kilometres. Fill in the missing distances in the table below. The first one is done for you.

|  |  |  |  |
| --- | --- | --- | --- |
| **Distance between…** | | **Round to the nearest 5 km** | |
| Treasure Cove and River Falls | 107 km | 107 is between  105 and 110  It is closest to 105 km | **107** |
| Windy Bluff and Valetown | ………… |  | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\rulers\ruler tens.gif |
| Shark Reef and West Junction | ………… |  | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\rulers\ruler tens.gif |
| River Falls and West Junction | ………… |  | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\rulers\ruler tens.gif |

**Day trips around the island**

We can use mental strategies to add up the distances we travel.

|  |  |  |  |
| --- | --- | --- | --- |
| ***Add to ten strategy…***  Lighthouse  Ridge  Shark  Reef  West  Junction  36 km  24 km  A trip from **Shark Reef** through **West Junction** to **Lighthouse Ridge** is:  **West Junction:**  36km = 30 + 6  **Lighthouse Ridge** 24km = 20 + 4  **Total**: 50 +10 = 60 km. | | | |
|  |  |  |  | |

**Question 3** Mental arithmetic practice.

Use the ***add to ten*** strategy to work out the distances of these day trips.

|  |  |  |
| --- | --- | --- |
| Start at **Treasure Cove:** |  | Add to tens number facts  1 and 9  2 and 8  3 and 7  4 and 6  5 and 5 |
| to **West Junction** ………. = ………..+ ………  to **Shark Reef .**………. = ………. + ….…..  **Total**  = ...……+ ……… = …………… |
|  |
|  |

|  |
| --- |
| Start at **Seal Point**: |
| to **Hillside** ………. = ……….+ ………  to **Junction** **Reef** ………. = ………. + ….…..  **Total**  = ..……..+ ……… = …………… |

|  |  |
| --- | --- |
| Start at **Treasure Cove,** go along **Drake River** |  |
| to River Falls ………. = ……….+ ………  to Millar Bay ………. = ……….+ ………  **Total**  = ..……..+ ……… = …………… |  |

|  |  |
| --- | --- |
| Start at : **Green’s Beach** |  |
| to **Hillside** ………. = ……….+ ……….  to **West Junction** ………. = ……….+ ………  **Total**  = ..……..+ ……… = …………… |  |

***Distance travelled…..tens and ones strategy…***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A trip from Windy Bluff through Valetown to River Falls  is 32 km plus 121 km  Split each number into  tens and ones | | | | | |  | Windy  Bluff  River  Falls    Valetown  121 km  32 km |
|  | **Tens** | **Ones** | | |  |
|  | 3 | 2 | | |  |
|  | 1 2 | 1 | | |  |
| 🡭  **3 tens** plus **12 tens** | | | 🡬2 + 1 = 3 | | |  |
| equals **15 tens** or **150** | | | |  | |  |
| The total distance is **150** + **3** = 153 km | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A trip from Hillside through West Junction to River Falls  is **119 km** plus **117 km**  Split each number into  tens and ones | | | | | |  | Hillside  River  Falls    West  Junction  117 km  119 km | | | | | |
|  | | **Tens** | **Ones** | |  |  |
|  | | **1 1** | 9 | |  |  |
|  | | **1 1** | 7 | |  |  |
|  | |  |  | |  |  |
| **11 tens** plus **11 tens**  **22 tens** or **220** | | | | 🡬  9 + **7**  9 + **1 + 6**  10 + 6 | | |
|  | | | | | |
|  | | | | | |
|  | | | |
|  | | | |  | | |  | | | | | |
| The total distance is  **22 tens** plus **1 ten** plus **6**  **23 tens** plus 6  **230** plus 6  **236** km | | | | | | | |  | **Tens** | | **Ones** |  |
|  | **2 2** | | 0 |  |
|  | **1** | | 0 |  |
|  |  | | 6 |  |
|  | **2 3** | | 6 |  |
|  |  | |  |  |
| ***Description: j0229369*** |  | | | | | | | | |
| **Activity 2 continued…….** | | | | | | | | |
|  | | | | | | | | |

**Question 4** Mental arithmetic practice.

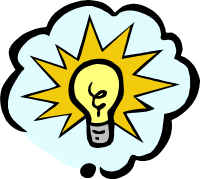
Use the *tens and ones* strategy to work the distances of these day trips.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| From **Shark Reef** through W**est Junction** to **River Falls:** | | | | | | |
|  | Distance travelled | ………. plus ………..  ………. tens plus ……….. ones |  | tens | ones |  |
|  |  |  |  |
|  | |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| From **Millar Bay** by road through **River Falls** to **Sandy Wel**l: | | | | | | |
|  | Distance travelled | ………. plus ………..  ………. tens plus ……….. ones |  | tens | ones |  |
|  |  |  |  |
|  | |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| From **Treasure Cove** through **West Junction** to **Hillside** | | | | | | |
|  | Distance travelled | ………. plus ………..  ………. **tens**  plus ……….. ones |  | **tens** | **ones** |  |
|  |  |  |  |
|  | |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| From **Sailor’s Hollow** through **River Falls** to **Millar Bay** by road | | | | | | |
|  | Distance travelled | ………. plus ………..  ………. **tens**  plus ……….. ones |  | **tens** | **ones** |  |
|  |  |  |  |
|  | |  |  |  |  |  |



**Challenge question**

Use mental strategies to work out the distance from **Green’s Beach** to **Lighthouse Ridge** through **Hillside** and **West Junction.**

# Touring Australia…..estimating how far we travel

Melbourne

Horsham

300 km

Adelaide

436 km

516 km



Broken Hill

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| It’s 436 km to travel from Horsham to Adelaide.  Find the approximate distance. | | | | |
|  | 400  500  450  425  475  436 | | |  |
| 🡭  What’s the nearest hundred?  436 is between 400 and 500  It is closer to 400 | |  | 🡬  What’s the nearest fifty?  436 is between 400 and 450  It is closer to 450 | |

|  |  |  |
| --- | --- | --- |
| What’s the nearest ten?  436 is between 430 and 440  It is closer to 440 | 430  440  435  436 |  |

|  |  |
| --- | --- |
| ***Description: j0229369*** |  |
| **Activity 3: Rounding distances** |
|  |

**Learning Intention:** Select and apply efficient mental and written strategies.

**Question 1**

Perth

Bunbury

Albany

Esperance

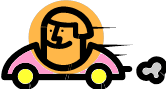
Coolgardie

182 km

368 km

479 km

372 km



Read off the distances travelled in the diagram.

Use the rulers shown to help you find the nearest distances.

Complete the missing parts of the tables below.

|  |  |  |
| --- | --- | --- |
| The distance from Perth to Bunbury is ………. km | | |
| Mark the distance on each ruler below | | |
| 100  200  150  125  175 |  | 180  190  185 |
| The nearest hundred is ……… km  The nearest fifty is ……………. km  The nearest ten is …………...… km | | |

|  |  |  |
| --- | --- | --- |
| The distance from Albany to Esperance is ………. km | | |
| Mark the distance on each ruler below | | |
| 400  500  450  425  475 |  | 470  480  475 |
| The nearest hundred is ………… km  The nearest fifty is …………….… km  The nearest ten is ……………..… km | | |

|  |  |  |
| --- | --- | --- |
| The distance from Bunbury to Albany is ………. km | | |
| Mark the distance on each ruler below | | |
| Hundreds ruler |  | Tens ruler |
| The nearest hundred is ……… km  The nearest fifty is ……… km  The nearest ten is ……… km | | |

**Holidaying in the Top End: estimate how far we’ll drive.**



*Notice that 315 km is halfway between 310 and 320.*

*When a distance is halfway we* ***round up*** *to the next ten.*

*315 rounds to 320*

Darwin

Katherine

Kununurra

512 km

315 km



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Distance between towns | | Nearest ten | | | Nearest hundred | | |
| Darwin to Katherine 315 km | | 320 km | | | 300 km | | |
| Katherine to Kununurra 512 km | | 510 km | | | 500 km | | |
|  |  |  | 830 km |  |  | 800 km |  |
|  |  | 🡬 🡭  Estimated distance | | | | | |

Rounding to the nearest ten km, we travelled about 830 km.

Rounding to the nearest hundred km, we travelled about 800 km.

*Add the rounded distances mentally.*

*3 hundred plus 5 hundred equals*

*8 hundred; 800*

|  |  |
| --- | --- |
| ***Description: j0229369*** |  |
| **Activity 4: Estimate and add** |
|  |

**Question 1**

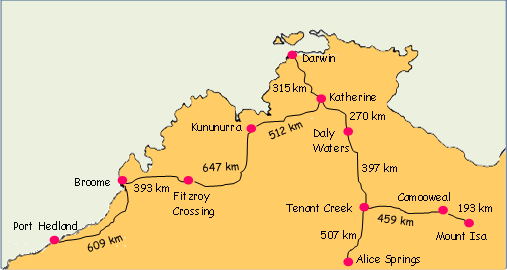
Read distances off the map below, then fill in the missing parts for each trip.

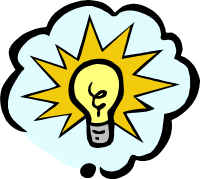
From Port Hedland to Fitzroy Crossing

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Distance between towns | | | Nearest ten | | | Nearest hundred | | |
| Port Hedland to Broome ……………… | | | ……………… | | | ……………… | | |
| Broome to Fitzroy Crossing ……………… | | | ……………… | | | ……………… | | |
|  | Estimated distance → | |  |  |  |  |  |  |
|  | |  |  | | | | | |

From Katherine to Alice Springs

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Distance between towns | | | Nearest ten | | | Nearest hundred | | |
| Katherine to Daly Waters ……………… | | | ……………… | | | ……………… | | |
| Daly Waters to Tenant Creek ……………… | | | ……………… | | | ……………… | | |
| Tenant Creek to Alice Springs ……………… | | | ……………… | | | ……………… | | |
|  | Estimated distance → | |  |  |  |  |  |  |
|  | |  |  | | | | | |



****

**Challenge question**

How much petrol would you need?

Use your estimations to the nearest hundred in this problem.

|  |  |
| --- | --- |
| 1. About how much fuel would you need to travel from Port Hedland to Fitzroy Crossing? 2. How much would it cost?   **Think…**  To answer these questions will you need to add, subtract, multiply or divide?  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\essQ.gif | **Average fuel consumption**  Around town  *12 litres per 100 km*  On the highway  9 litres per 100 km  **Average fuel cost**  *$1.50 per litre* |

# Task 3 Grouping and sharing

**Learning Intention:** Select and apply efficient mental and written strategies

|  |  |
| --- | --- |
| C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\exerrcise1.gif |  |
| **Activity 1:**  **Counting by twos, fives, tens and elevens** |



Warm up exercise:

Number facts of twos, fives and tens.

.

**Question 1**

Practise counting by…

|  |  |  |
| --- | --- | --- |
| twos up to 30 | fives up to 60 | tens up to 120 |

**Question 2**

Count backwards….

|  |  |  |
| --- | --- | --- |
| from 30 by twos | from 60 by fives | from 120 by tens |

**Question 3**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **The elevens pattern**  Shade every **11th** number in the grid.  What pattern do you notice up to 99?  What pattern follows after 99?  Use the pattern after 99 to help you count by elevens up to 154. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 |
| 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
|  | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 |
|  | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 |

**Question 4**

Challenge counts…

|  |  |
| --- | --- |
| Count by twos up to 100  Count by fives up 150  Count by tens up to 1000  Count by elevens up to 198 | Count backwards by twos from 100  Count backwards by fives from 150  Count backwards by tens from 1000  call out 2Count backwards by elevens from 198 |

Practise out loud. Ask your supervisor or parent to hear you.

# Ways of grouping



Grouping and sharing reminds us of what happens when we **multiply** or **divide**. For example, a bowl of 12 chocolates can be grouped in different ways.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Three groups with 4 chocolates in each group. | |  | Four groups with 3 chocolates in each group. | |  | Six groups with 2 chocolates in each group. |  |
| C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  Three groups of 4 is the same as 3 × 4 | |  | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  Four groups of 3 is the same as 4 × 3 | |  | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  Six groups of 2 is the same as 6 × 2 |  |
|  | |  |  |  |
|  | | | |  |  |  |
|  | Two groups with 6 chocolates in each group. | | |  |  |  |
| C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gifC:\Users\CFord\Documents\MY Folders\CurricDev2012\images\chocolate.gif  Two groups of 6 is the same as 2 × 6 | | |
|  |  |  |  |



*The multiplication sign (* **X***) means ‘****groups of*** *’*

*3 × 4 reads 3 times 4 6 × 2 reads 6 times 2*

*means 3 groups of 4 means 6 groups of 2*

|  |  |
| --- | --- |
| ***j0229369*** |  |
| **Activity 2: Groups and multiplication facts** |
|  |

**Question 1**

Use the grids below to shade in each collection of groups. Then write the multiplication fact. The first one is done for you.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Shade  3 groups of 5  Each row is one group.  The total of all groups is 15 |  |  |  |  |  |  |  |  |  | Shade  6 groups of 7  (rows) |  |  |  |  |  |  |  |  |
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| Multiplication fact: 3 × 5 = 15 | | | | | | | | |  | Multiplication fact: …………………….. | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Shade  4 groups of 8  (rows) |  |  |  |  |  |  |  |  |  | Shade  7 groups of 4  (rows) |  |  |  |  |  |  |  |  |
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| Multiplication fact: …………………….. | | | | | | | | |  | Multiplication fact: …………………….. | | | | | | | | |

**Question 2** Shade a section of the grid to show each multiplication fact.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 × 2  11 × 3  7 × 4  3 × 9 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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# Ways of sharing



**Multiplication** tells us how we **group** things.

**Division** tells us how we **share** them **equally.**

Let’s see an example....

the different ways to share 30 coins

.

|  |  |  |
| --- | --- | --- |
| There are different ways we can share 30 coins equally. | | |
| **Grouping**  3 groups of 10 coins  gives 30 coins  3 × 10 = 30 |  | **Sharing**  30 shared between 3  gives 10 coins each  30 ÷ 3 = 10  *The division sign means ‘shared between’* |

|  |  |  |
| --- | --- | --- |
| **Grouping**  10 groups of 3 coins  gives 30 coins  10 × 3 = 30 |  | **Sharing**  30 coins shared between 10  gives 3 coins each  30 ÷ 10 = 3 |

|  |  |
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| ***j0229369*** |  |
| **Activity 3: Divide into equal groups** |
|  |

Complete the number sentences next to the diagrams below.

The first one is done for you.

**Question 1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Grouping**  2 groups of 9  gives 18 | | |  | | **Sharing**  18 shared between 2  gives 9 each | | |
|  | Multiplication fact  2 × 9 = 18 |  |  | Division fact  18 ÷ 2 = 9 |  |
|  |  |  |  | |  |  |  |
| **Grouping**  …….. groups of ……..  equals …….. | | |  | **Sharing**  …….. shared between ……..  equals…….. each | | | |
|  | Multiplication fact  …………………… |  |  | | Division fact  …………………… |  |
|  |  |  |  |  | |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Grouping**  …….. groups of ……..  equals …….. | | |  | **Sharing**  …….. shared between ……..  equals…….. each | | |
|  | Multiplication fact  …………………… |  |  | Division fact  …………………… |  |
|  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Grouping**  …….. groups of ……..  equals …….. | | |  | **Sharing**  …….. shared between ……..  equals …….. each | | |
|  | Multiplication fact  …………………… |  |  | Division fact  …………………… |  |
|  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Grouping**  …….. groups of ……..  equals …….. | | |  | **Sharing**  …….. shared between ……..  equals …….. each | | |
|  | Multiplication fact  …………………… |  |  | Division fact  …………………… |  |
|  |  |  |  |  |  |  |

# Take three numbers “Fact Families”.

Numbers are often ‘seen together’. These are ‘fact families’.

Take three numbers…..2, 9 and 18

With these numbers we can make

* a multiplication fact
* a multiplication turnaround
* two division facts
* some number stories

CG16

|  |  |
| --- | --- |
| A multiplication fact  **9 groups of 2 = 18 in total**  9 × 2 = 18  A division fact  **18 shared between 2 = 9 each**  18 ÷ 2 = 9  **2, 9, 18** | A multiplication turnaround  **2 groups of 9 = 18 in total**  2 × 9 = 18  Another division fact  **18 shared between 9 = 2 each**  18 ÷ 9 = 2 |
| A multiplication number story:  *There were 9 people for lunch. Each person ate 2 sausages. The total number of sausages eaten was 9 × 2 = 18* | A division number story:  *A box of 18 chocolates was shared between 9 people.*  *Each person had 18 ÷ 9 = 2 chocolates*. |

|  |  |
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| ***j0229369*** |  |
| **Activity 4: Take three numbers** |
|  |

Complete the number facts for the three numbers in each box below.

Think of a multiplication story and a division story.

|  |  |
| --- | --- |
| A multiplication fact    A division fact    **3, 5, 15** | A multiplication turnaround  Another division fact |
| A multiplication number story: | A division number story: |

|  |  |
| --- | --- |
| A multiplication fact    A division fact    **7, 10, 70** | A multiplication turnaround  Another division fact |
| A multiplication number story: | A division number story: |

|  |  |
| --- | --- |
| A multiplication fact    A division fact    **6, 11, 66** | A multiplication turnaround  Another division fact |
| A multiplication number story: | A division number story: |

|  |  |
| --- | --- |
| A multiplication fact    A division fact    **5, 8, 40** | A multiplication turnaround  Another division fact |
| A multiplication number story: | A division number story: |

**Task 4 Counting larger groups**

We can use our skip count skills to count larger groups.



**Example 1**

Let’s work out how many there are in **2 groups** of **15.**

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| **15** | | | | | | | | | | | | | | | | | | | | | | | |  | |
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|  |  |  |  |  |  |  |  |  |  |  | | |  | |  | |  | |  |  | | Each row is a **group.**  There are **15 in each group.** | | | |
|  | | | | | | | | | | | | | | | | | | | |  | |
| **10** | | | | | | | | | | | **5** | | | | | | | | | | | |  | | We can split each row into smaller groups making it easier to work out. |
|  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | | |
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| --- | --- | --- | --- | --- | --- | --- | --- |
| **2 groups of 15** | equals | **2 groups of 10** | | | plus | **2 groups of 5** | |
|  |  | **2 × 10** | | plus | | **2 × 5** | |
|  |  | **20** | | plus | | **10** | |
|  |  |  | **20** plus **10** = 30 | | | |  |

Complete the answer: 2 × 15 = 30

Colour the best combinations for mentally calculating:

**2 x 18**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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**4 X 24**

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| ***Description: j0229369*** | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Activity 1:**  **Multiply by splitting numbers into tens and ones** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Question 1**

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| We have **5 groups** (rows) of **13**  **5 groups** of **13** means 5 × 13 | | | | | | | | | | | | | | |  | Splitting **13** into 1**0** plus **3** makes it easier to work out. | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | |  | | 10 3 | | | | | | | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Fill in the missing parts | **13** can be split into **10** plus **3**  5 × 13 equals  **5 groups** of **10** plus **5 groups** of **3**  ……. × ……. plus ……. × …….  …….. plus ………  The answer: 5 × 13 = ………… |

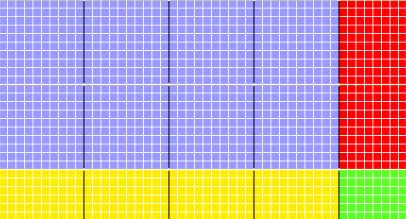
**Question 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| We have 2 groups (rows) with **19** in each **group** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 10 | | | | | | | | | | | |  | 9 | | | | | | | | | |
|  | |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |
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|  |  |
| --- | --- |
| Fill in the missing parts: | **19** can be split into **10** plus **9**  2 × 19 equals  ……. **groups of 10** plus ……. **groups of 9**  ……. × ….. plus ……. × …….  …….. plus ………  The answer: 2 × 19 = ………… |

**Multiplying using areas**



We can combine rows and columns into areas.

Splitting large areas into smaller areas helps us work out multiplications.

Let’s see an example…

.

Find an answer to 5 × 24 using areas.

|  |  |
| --- | --- |
| We can show 5 × 24 as  5 rows of 24 | Instead of rows, we can show 5 × 24 as an **area** 24 wide and 5 long. |
| 24  5 |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |

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| --- | --- | --- | --- | --- | --- |
| Split the width into tens and ones: 24 = 10 + 10 + 4  Work out each area.  Add up the areas | | | 10  10  4  5  **5 × 10**  **= 50**  **5 × 10**  **= 50**  **5 × 4**  **= 20**  Adding up in your head…  5 tens plus 5 tens plus 2 tens  = (5 + 5 + 2) tens  = 12 tens or 120 | | |
| 50  50  + 20 | | |
|  | 120 |  |
|  |  |  |
|  | | | | | |
| Our final answer is 5 × 24 = 120 | | | |  | |
| ***Description: j0229369*** |  | | | |
| **Activity 2: Multiply using area** | | | |
|  | | | |

**Question 1**

Work out each multiplication below by using the smaller areas.

|  |  |  |
| --- | --- | --- |
| Work out each smaller area, then add up the areas.  Complete the number sentence: | 32  10  10  10  2  2 | |
| 2 × 32 = | |  |

|  |  |
| --- | --- |
| Work out each smaller area, then add up the areas.  Complete the number sentence: | 26  5  10  10  6 |
| 5 × 26 = |

|  |  |
| --- | --- |
| Work out each smaller area, then add up the areas.  Complete the number sentence: | 23  10  10  10  3 |
| 10 × 23 = |
|  |

**Question 2**

Work out each multiplication below by

* splitting each area into smaller areas.
* work out the smaller areas, then add them up

|  |  |
| --- | --- |
| Split the width into tens and ones  27  5 | Complete the number sentence. |
| 5 × 27 = |

|  |  |
| --- | --- |
| Split the width into tens and ones  46  2 | |
|
| Complete the number sentence. |  | |
| 2 × 46 = |

|  |
| --- |
| Split the width into tens and ones  38  10 |
|

|  |  |
| --- | --- |
| Complete the number sentence. |  |
| 10 × 38 = |

**Multiplying without a diagram**

Work out multiplication ***without a diagram***.

The strategy is to split numbers into **tens** and **ones**.

Here is an example:

|  |  |  |  |
| --- | --- | --- | --- |
| Find 2 × 38 by splitting 38 into tens and ones  **38** equals **3 tens** and **8 ones**  2 × 38 becomes **2 × 3 tens** plus **2 × 8 ones**  **6 tens** plus **16 ones**  **60**  plus 1**6** |  | | |
|  |  |  |
| 60  + 16 |  |
|  | 76 |  |
| The final answer is 2 × 38 = 76 |  |  |  |
|  |

|  |  |
| --- | --- |
| ***Description: j0229369*** |  |
| **Activity 3: Multiply without a diagram** |
|  |

**Question 1**

Complete the following multiplication by splitting numbers into **tens** and **ones:**

|  |
| --- |
| **2 × 43** becomes 2 × …… **tens**  plus 2 × …… **ones**  equals …… **tens**  plus …… **ones**  equals ……… plus ………  equals ……… |

|  |
| --- |
| **5 × 18** becomes 5 × …… **tens**  plus 5 × …… **ones**  equals …… **tens**  plus …… o**nes**  equals ……… plus ………  equals ……… |

|  |
| --- |
| **5 × 29** becomes …… × …… **tens**  plus …… × ……**ones**  equals …… **tens**  plus ……**ones**  equals ……… plus ………  equals ……… |

|  |
| --- |
| **2 × 37** becomes …… × …… **tens**  plus …… × ……**ones**  equals …… **tens**  plus ……o**nes**  equals ……… plus ………  equals ……… |

|  |
| --- |
| **5 × 57** becomes …… × …… **tens**  plus …… × ……**ones**  equals …… **tens** plus ……**ones**  equals ……… plus ………  equals ……… |

|  |
| --- |
| **2 × 64** becomes …… × …… **tens**  plus …… × ……**ones**  equals …… **tens** plus ……**ones**  equals ……… plus ………  equals ……… |

# Task 5

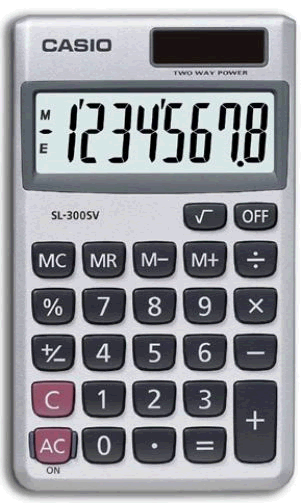
* Look at the functions on your calculator
* Do a mini-test of the work so far
* Complete a reflection on what you learned in this booklet.

# Skip counting on your calculator

|  |  |
| --- | --- |
| You can **skip count** on your calculator.  Most calculators will skip count in the same way. | **calc4** |

**Check the functions on your calculator**

Most calculators have the following functions



Add

Subtract

Multiply

Divide

Memory buttons

Equals

Square root

**To count up by fours**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Start the first number at 4 | | | | **4**  **=** |
| Count on by fours | **+**  **4**  **=**  **8**  **=**  **12**  **=**  **16** | | | |
| Each time you press | | **=** | the calculator adds 4 to the answer: | |
| 4, 8, 12, 16, and so on | | | | |

**To count down by twos**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Start with a number, say 50 | | | | **50**  **=** |
| Count on by twos | **−**  **2**  **=**  **48**  **=**  **46**  **=**  **44** | | | |
| Each time you press | | **=** | the calculator takes away 2 from the | |
| answer: 50, 48, 46, 44, and so on | | | | |

|  |  |
| --- | --- |
| ***j0229369*** |  |
| **Activity 1: Skip count with your calculator** |
|  |

**Question 1**

Skip count on your calculator to fill in the missing numbers below:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Count by sixes | 6 |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Count by sevens |  |  | 21 |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Count by nines |  |  |  |  | 45 |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Count by elevens |  |  |  | 44 |  |  |  |  |

**Question 2**

Mixed skip counts

(a) Start at 60 and count down by threes

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 60 |  |  | 51 |  |  |  |  |

(b) Start at 5 and count up by twos

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 5 |  |  | 11 |  |  |  |  |

(c) Start at 86 and count down by fours

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 86 |  |  |  | 70 |  |  |  |

(d) Start at 3 and count up by fives

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 3 |  |  |  |  | 28 |  |  |

(e) Start at 64 and count down by fives

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 64 |  |  |  | 44 |  |  |  |

(f) Start at 95 and count down by sixes

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 95 |  | 83 |  |  |  |  |  |

# Your reflection and test

|  |  |
| --- | --- |
| **Reflection time .**  Use the tasks that follow to show  • how you went with the activities  • some of the skills you learned. | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\refl2.gif |

**Why is it important to complete the reflections?**



The reflection is your opportunity to show your teacher how well you have understood the concept being taught.

Your reflection should show that you UNDERSTAND the concepts.

|  |  |
| --- | --- |
| C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\refl2.gif | **C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\essQ.gifReflection Time**  Fill out this sheet.  Review the main ideas in this topic.  Tell your teacher how you went; recall something that you learned. |

**Reflection**

|  |  |  |  |
| --- | --- | --- | --- |
| **Task 1** | * Recalling when you have used maths or seen someone else use maths. | | |
|  | Tick the box that best fits what you learned. | Explain one example of how you used maths in your everyday life. |  |
|  | 🞎 I understood all of it  🞎 I understood most of it  🞎 I needed a bit of help  🞎 I found it difficult |  |  |
|  |  | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Task 2** | * Estimating and rounding distances travelled. * Mental strategies for adding and subtracting. | | |
|  | Tick the box that best fits what you learned. | Choose any rounding, addition or subtraction problem from task 2. Explain how you solved that problem. |  |
|  | 🞎 I understood all of it  🞎 I understood most of it  🞎 I needed a bit of help  🞎 I found it difficult |  |
|  |  | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Tasks 3 & 4** | * Multiplication and division facts. * Multiplying numbers using area. * Multiplying numbers by splitting into tens and ones. | | |
|  | Tick the box that best fits what you learned. | Choose one problem from tasks 3 or 4. Explain HOW you solved it. |  |
|  | 🞎 I understood all of it.  🞎 I understood most of it.  🞎 I needed a bit of help.  🞎 I found it difficult . |  |  |
|  |  | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Task 5** | * Skip counting on your calculator. | | |
|  | Tick the box that best fits what you learned. | Create a challenging ‘skip counting’ pattern on your calculator. Write ten numbers from your pattern: |  |
|  | 🞎 I understood all of it  🞎 I understood most of it  🞎 I needed a bit of help  🞎 I found it difficult |  |
|  |  | |  |

|  |  |
| --- | --- |
| **Task 5 Test** | You will be completing a test.  The test covers the maths activities we have done in this booklet. |

* This test will enable your teacher to see how well you have understood the work and whether you need any additional help in a particular area.

# C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\test.gifPlease complete the exercises on these pages. Show your working out wherever possible.

# You can use your notes to help you with these exercises, but no other assistance.

**Activity 1 Estimating and mental strategies**

|  |  |
| --- | --- |
| **C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\island\sendQ.gif** |  |

Part of Taber Island is shown in the diagram. Use the map in the following questions

|  |  |
| --- | --- |
| **(a)** | Fill in the missing distances in the table below.  Round distances to the nearest 5 km and to the nearest 10 km. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Distance between…** | | **Round to the nearest 10 km** | **Round to the nearest 5 km** |
| Sailor’s Hollow and River Falls | ………………………. | ………………………. | ………………………. |
| River Falls and Millar Bay along the road | ………………………. | ………………………. | ………………………. |

|  |  |
| --- | --- |
| **(b)** | Use a mental strategy to work the distances of these day trips. |

|  |
| --- |
| From Sailor’s Hollow through River Falls to Valetown.  What strategy will you use? |

|  |
| --- |
| From Millar bay to River Falls by road, then back to Millar Bay along the river.  What strategy will you use? |

|  |  |  |
| --- | --- | --- |
| **(c)** | Holiday driving interstate, we drove from Bathurst to Charleville.  The map shows where we went and the distances travelled.  Read distances off the map to fill in the missing parts for the trip. | Bathurst  Cunnumulla  369 km  Nyngan  460 km  200 km  Charleville |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Distance between towns | | Nearest ten | | | Nearest hundred | | |
| Bathurst to Nyngan ……………… | | ……………… | | | ……………… | | |
| Nyngan to Cunnumulla ……………… | | ……………… | | | ……………… | | |
| Cunnumulla to Charleville ……………… | | ……………… | | | ……………… | | |
|  | Estimated distance → |  |  |  |  |  |  |

**Activity 2 Number skills**

**(a) Take three numbers:**

Complete the number facts for the three numbers in each box below.

Think of a multiplication story and a division story.

|  |  |
| --- | --- |
| A multiplication fact    A division fact    **10, 8, 80** | A multiplication turnaround  Another division fact |
| A multiplication number story: | A division number story: |

**(b) Multiply using areas:**

|  |
| --- |
| Work out each smaller area, then add up the areas.  Complete the number sentence: 5 × 38 = ……….. |
| 38  5  10  10  8  10 |

|  |  |  |
| --- | --- | --- |
| **(c)** Complete the following multiplications by splitting numbers into tens and ones. | | |
|  | 2 × 89 becomes 2 × …… **tens**  plus 2 × ……**ones**  equals …… **tens** plus ……**ones**  equals ……… |  |
|  | | |
|  | 5 × 76 becomes 5 × …… **tens** plus 5 × ……**ones**  equals …… **tens**  plus ……**ones**  equals ……… |  |
|  | | |

**Activity 3 Calculator skills**

|  |  |
| --- | --- |
| **(a)** | Skip count on your calculator to fill in the missing numbers below: |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Count by fours |  |  | 32 |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Count by elevens |  |  |  |  | 99 |  |  |  |

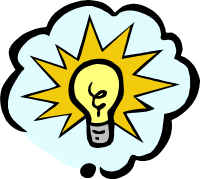
|  |  |
| --- | --- |
| **(b)** | Mixed skip counts. |

(i) Start at 70 and count down by sixes

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 70 |  |  |  | 46 |  |  |  |

(ii) Start at 32 and count up by fives

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 32 |  |  | 47 |  |  |  |  |

****

**Challenge counts:**

(i) Start at 875 and count down by 63.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 875 |  |  |  |  |  |  |  |

(ii) Start at 85 and count up by 107.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 85 |  |  |  |  |  |  |  |

# Task 6

**Learning Intention:** Select and apply efficient mental and written strategies. 

|  |  |
| --- | --- |
| C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\exerrcise1.gif |  |
| **Activity 1: Number facts recall** |

Do each multiplication in your head (skip count if you need to).

Rule a straight line to the correct answer.

Write the correct letter above each number. The first one is done for you

|  |  |  |
| --- | --- | --- |
|  | 8  K  2  O  13  R  16  C  10  S  6  O  14  F  7  R  3  U  9  I  12  E  15  E  5  W  17  T  1  Y  11  P  4  R |  |
|  |  |  |
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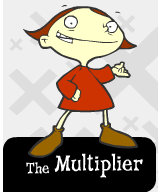
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | 2 | 3 | 4 |  | 5 | 6 | 7 | 8 |  | 9 | 10 |  | 11 | 12 | 13 | 14 | 15 | 16 | 17 |

**Applying your skills**

Let’s apply what we’ve learned to multiply tens and ones.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Example 1** | |  | **Example 2** | |
| 36 × 5  (30 + 6) × 5  (30 × 5) plus (6 × 5)  (3 **tens** × 5) plus (6 **ones** × 5) | |  | 87 × 2  (80 + 7) × 2  (80 × 2) plus (7 × 2)  (8 **tens** × 2) plus (7 **ones** × 2) | |
| 15 **tens**  plus 30 **ones**  15 **tens** plus 3 **tens**  equals 18 **tens** or 180 | 150  + 30 |  | 16 **tens**  plus 14 **ones**  160 plus 10 plus 4  equals 174 | 160  + 10  + 4 |
| 180 |
|  |  | 174 |
|  |

|  |  |  |
| --- | --- | --- |
| Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\cd4.gif |  | ***Description: j0229369*** |
| **Activity 2:**  **Group and multiply to find the hidden message** |



Try the The-Multiplier interactive to help you find the hidden message on the next page**.**

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\multiplier\1.gif | 2. | Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\multiplier\2.gif |
| Type in a multiplication from *Find the Hidden Message* below.  Click Solve. | |
|  | | Drag the arrow to split the length into tens and ones. | |

**You can find ”The Multiplier” at this website:**

http://www.scootle.edu.au/ec/pin/HYXLOM?userid=138808

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3. | Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\multiplier\3.gif | | | 4. | Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\multiplier\4.gif | |
| Work out each area. | | | | Add the tens  150 + 30 = 15 tens + 3 tens  = (15 + 3) tens  = 18 tens = 180  Press ENTER to check your answer. | | |
| 30 × 5 = 3 tens × 5  = 15 tens = 150 | | | 6 × 5 = 30 |
| Press ENTER. | | | |
|  | | | |
|  | | **Find the hidden message** | | | |

|  |  |
| --- | --- |
| 1. | Use ***The Multiplier*** to work out each multiplication below.  **OR** Fill in in the missing parts below to find the answers. |
| 2. | Match your answers with the correct letters below and spell out the message. |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 134 | 370 | 265 | 186 | 142 | 305 |  | 92 |  | 190 | 68 | 115 | 115 | 305 | 142 |

|  |  |  |
| --- | --- | --- |
| N **23 × 5**  (……. + …….) × 5  (……. × 5) plus (……. × 5)  (…….) plus (…….)  equals ……. |  | R **71 × 2**  (……. + …….) × 2  (……. × 2) plus (……. × 2)  (…….) plus (…….)  equals ……. |
|  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| U **53 × 5**  (……. + …….) × 5  (……. × 5) plus (……. × 5)  (…….) plus (…….)  equals ……. |  | | I **34 × 2**  (……. + …….) × 2  (……. × 2) plus (……. × 2)  (…….) plus (…….)  equals ……. | |
|  | |
| E **61 × 5**  (……. + …….) × 5  (……. × 5) plus (……. × 5)  (…….) plus (…….)  equals ……. |  | | A **46 × 2**  (……. + …….) × 2  (……. × 2) plus (……. × 2)  (…….) plus (…….)  equals ……. | |
|  | |
| O **74 × 5**  (……. + …….) × 5  (……. × 5) plus (……. × 5)  (…….) plus (…….)  equals ……. |  | | Y **67 × 2**  (……. + …….) × 2  (……. × 2) plus (……. × 2)  (…….) plus (…….)  equals ……. | |
|  | |
| W **38 × 5**  (……. + …….) × 5  (……. × 5) plus (……. × 5)  (…….) plus (…….)  equals ……. | |  | | **93 × 2**  (……. + …….) × 2  (……. × 2) plus (……. × 2)  (…….) plus (…….)  equals ……. | |
|  | |

# Task 7 Number patterns, Multiples and Factors

**Learning Intention:** Identify and describe properties of composite numbers, multiples, prime numbers and factors.

Numbers that have been multiplied by 2 are multiples of 2

12 is a multiple of 2 because 6 × 2 = 12

26 is a multiple of 2 because 13 × 2 = 26

Numbers that have been multiplied by 5 are multiples of 5

15 is a multiple of 5 because 3 × 5 = 15

120 is a multiple of 5 because 24 × 5 = 120

Numbers that have been multiplied by 10 are multiples of 10

130 is a multiple of 10 because 13 × 10 = 130

What are **multiples**? (***mul-tuh-puls***)

Let’s look at multiples of 2, 5 or 10

Description: CG16

How can we tell if a number is a multiple of 2?...

Or a multiple of 5?

By looking at the number pattern in the last digit.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Multiples of 2** | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 |  |
|  |  |  |  |
| **The** **twos pattern**.  The numbers end in 2, 4, 6, 8, 0 and then repeat.  Numbers that end in these digits are **multiples of 2**.  Examples include 34, 50, 76, 138, and so on. | | | |

|  |  |
| --- | --- |
| ***Description: j0229369*** |  |
| **Activity 1: Patterns in multiples** |
|  |

**Question1**

We’ve seen the pattern in multiples of 2. Now look for the pattern in multiples of 5 and multiples of 10.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Multiples of 2** | 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Multiples of 5** | 5, 10, 15, 20, 25, 30, 35, 40, 45, 50 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Multiples of 10** | 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 |  |

Complete the following sentences

Multiples of 2 end in ………………………………………………………………..

Multiples of 5 end in ………………………………………………………………..

Multiples of 10 end in ………………………………………………………………

**Question 2**

Look at the multiples above to find.

(a) the smallest number that is a multiple of 2 and of 5 ………………

(b) two numbers that are multiples of 5 and of 10 ………. and ……….

**Question 3**

Use the patterns found in Question 1 to predict if a number is a multiple of 2, 5 or 10.

Circle the correct choice below and explain why. The first one is done for you.

|  |
| --- |
| Is 24 a multiple of 5?  Yes or No because ***multiples of 5 end in 0 or 5, and 24 does not end in either.*** |

|  |
| --- |
| Is 16 a multiple of 5?  Yes or No because…………………………………………………………………. |

|  |
| --- |
| Is 15 a multiple of 2?  Yes or No because…………………………………………………………………. |

|  |
| --- |
| Is 35 a multiple of 10?  Yes or No because…………………………………………………………………. |

|  |
| --- |
| Is 40 a multiple of 5?  Yes or No because…………………………………………………………………. |

# Factors

|  |  |
| --- | --- |
| What are **factors**?  Factors are the numbers you multiply together to get another number.  To find factors we can use times tables, or we can skip count. | Description: Factor  2 and 3 are **factors** of 6  because 2 × 3 = 6 |

Remember, multiples of 2 end in 0, 2, 4, 6 or 8

**For example** Find two factors of 26

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 26 is a multiple of 2 because it ends in 6.  Count by twos till you reach 26 | | | | | | | | | | | | | | | |
|  |  | | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | | 18 | 20 | 22 | 24 | 26 |
|  | | We count 13 times to reach 26. 13 × 2 = 26  Two factors of 26 are 13 and 2. | | | | | | | | | | | | | |
| ***Description: j0229369*** | | |  | | | | | | | | |
| **Activity 2: Finding factors** | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | (a) | Circle the correct choice.  85 is a multiple of | 2 |  | 5 |  | 10 |  |
|  |  |  | | | | | | |
|  | (b) | Skip count to find two factors of 85.  Complete the sentence: 85 = …….. × …….. | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2. | (a) | Circle the correct choice.  34 is a multiple of | 2 |  | 5 |  | 10 |  |
|  |  |  | | | | | | |
|  | (b) | Skip count to find two factors of 34.  Complete the sentence: 34 = …….. × …….. | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3. | (a) | Circle the correct choice.  95 is a multiple of | 2 |  | 5 |  | 10 |  |
|  |  |  | | | | | | |
|  | (b) | Skip count to find two factors of 95.  Complete the sentence: 95 = …….. × …….. | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4. | (a) | Choose the largest factor of 90. | 2 |  | 5 |  | 10 |  |
|  |  |  | | | | | | |
|  | (b) | Use your choice above to find two factors of 90.  Complete the sentence: 90 = …….. × …….. | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5. | (a) | Choose the smallest factor of 30. | 2 |  | 5 |  | 10 |  |
|  |  |  | | | | | | |
|  | (b) | Use your choice above to find two factors of 30.  Complete the sentence: 30 = …….. × …….. | | | | | | |

# Investigate Prime and Composite Numbers



We have seen that factors are the numbers you multiply together to get another number.

|  |  |  |
| --- | --- | --- |
|  |  |  |
| Description: Factor |  | **2**  **5**  **10** |
| 2 and 3 are **factors** of 6  because 2 × 3 = 6 |  | 2 and 5 are **factors** of 10  because 2 × 5 = 10 |
|  |  |  |

We can show factors of numbers by shading in rectangles on a grid.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Six can be shown as a 2 × 3 rectangle  or a 1 × 6 rectangle   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  | |  |  |  |  |  | 6 = 2 × 3 |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  | |  |  | 6 = 1 × 6 |  |  |  |  |  | |  | Five can only be shown as a  1 × 5 rectangle   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  | |  |  |  |  |  |  |  | |  |  | 5 = 1 × 5 |  |  |  |  | |
|  | 1 and 5 are **factors** of 5 because 1 × 5 = 5  The number 5 has two factors: 1 and 5 |
| 2 and 3 are **factors** of 6 because 2 × 3 = 6  1 and 6 are **factors** of 6 because 1 × 6 = 6  The number 6 has four factors:  1, 2, 3, and 6  The number 6 is a **Composite Number** because it has **more than two factors**. |  |
|  | The number 5 is a  **Prime Number** because it only has **two factors**:  itself and one. |
|  |  |



Prime numbers have only two factors: themselves and one.

Composite numbers have more than two factors.

|  |  |
| --- | --- |
| Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\find.gif |  |
| **Activity 3:**  **Investigate Prime and Composite Numbers** |

Shade rectangles in the grid on the next page to find the factors of numbers from 2 to 13. Record the factors you find in the table below. Two of them are done for you.

|  |  |  |  |
| --- | --- | --- | --- |
| **Number** | **Rectangles shaded** | **Factors found** | **Tick whether prime or composite** |
| **2** |  |  | 🞎 Prime 🞎 Composite |
| **3** |  |  | 🞎 Prime 🞎 Composite |
| **4** |  |  | 🞎 Prime 🞎 Composite |
| **5** | 1 × 5 | 1 and 5 | 🗹 Prime 🞎 Composite |
| **6** | 2 × 3  1 × 6 | 1, 2, 3 and 6 | 🞎 Prime 🗹 Composite |
| **7** |  |  | 🞎 Prime 🞎 Composite |
| **8** |  |  | 🞎 Prime 🞎 Composite |
| **9** |  |  | 🞎 Prime 🞎 Composite |
| **10** |  |  | 🞎 Prime 🞎 Composite |
| **11** |  |  | 🞎 Prime 🞎 Composite |
| **12** |  |  | 🞎 Prime 🞎 Composite |
| **13** |  |  | 🞎 Prime 🞎 Composite |

|  |
| --- |
| List the prime numbers you have found: |

**Shading Grid**

Shade rectangles to find factors of numbers from 2 to 13.

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# Task 8 Factor Trees

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| --- | --- |
| In the task 7 investigation you found prime numbers up to 13.  Remember, prime numbers have only two factors, themselves and one.  For example, 5 is a prime number because it can only be written as 5 × 1  8 is **not** a prime number because it has more than two factors.  We can write 8 as 8 = 4 × 2 or 8 = 8 × 1  We can also write 8 as 8 = 2 × 2 × 2 | Prime numbers up to 13  2 = 2 × 1  3 = 3 × 1  5 = 5 × 1  7 = 7 × 1  11 = 11 × 1  13 = 13 × 1 |
| ↑  In this sentence the number 8 is made up of only prime numbers. | |

To break down a number into its prime factors we use a diagram called a **factor tree**. Let’s see an example.

|  |
| --- |
| **Example** A factor tree for the number 20  **×**  **×**  *20 = 2 × 10*  *10 = 2 × 5*  *20 = 2 × 2 × 5*  Break 20 into two factors.  Break 10 into two factors  Multiply the prime factors  When a number is broken down into its prime factors we say it is a ‘product of its prime factors’. |

|  |  |
| --- | --- |
| ***Description: j0229369*** | Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\factortree2.gif |
| **Activity 1: Factor trees** |
|  |

**Learning Intention:**

Find the prime factors of composite numbers.

**Question 1**

Fill in the missing parts of these factor trees.

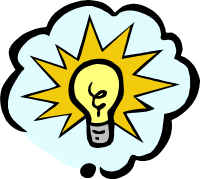
|  |  |
| --- | --- |
| **×**  **×** | **×**  **×** |
| Product of prime factors:  8 = ……… × ……… × ……… | Product of prime factors:  50 = ……… × ……… × ……… |

|  |  |
| --- | --- |
| **×**  **×**  **×** | **×**  **×**  **×**  **×** |
| Product of prime factors:  24 = ……… × ……… × ……… × ……… | Product of prime factors:  80 = ……… × ……… × ……… × ……… × ……… |
| **×**  **×**  **×** |  |
| Product of prime factors:  36 = ……….… × ……….… × ……….… × ……….… |  |

**Question 2**

Draw your own factor trees for the following numbers.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (a) | A factor tree for the number 30  30 = ……….… × …….…… × ……….… |  | | |
| (b) | A factor tree for the number 60  60 = ……….… × ……….…× ……….…× ……….… | |  | |
| (c) | A factor tree for the number 100  100 = ……….… × ……….…× ……….… × ……….… | | |  |

****

**Challenge question**

|  |  |
| --- | --- |
| Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\essQ.gif |  |
| **Who am I? Find the unknown number** |
|  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Who am I?**  Use your knowledge of multiples and factors to find the identity of this number. | | | |
| I am a multiple of 2.  I am between 10 and 30.  The number before me and the number after me add up to 44.  I am ……………. |  | My factor tree looks like… | |
|  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Who am I?**  Use your knowledge of multiples and factors to find the identity of this number. | | | |
| I am a multiple of 5.  I am between 80 and 100.  The number before me and the number after me add up to 170.  I am ……………. |  | My factor tree looks like… | |
|  |  |  |

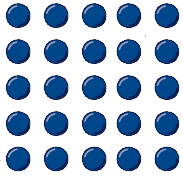
|  |
| --- |
| Special numbers: Square and Triangular |



Task 7 investigated prime numbers.

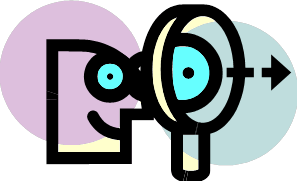
Let’s continue our investigation of special numbers.

# Square Numbers



**What are square numbers?**

Square numbers are found from patterns of dots that form a square. Let’s investigate them.



|  |  |
| --- | --- |
|  |  |
| **Activity 2: Investigate square numbers** |
|  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\sqnos2.gif | Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\sqnos2.gif | Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\sqnos2.gif |  |
|  | We start with one dot. | The smallest square has 2 rows and 2 columns.  It contains 4 dots. |  |
|  | The next smallest square has 3 rows and 3 columns.  It contains 9 dots. |  |
|  |  |  |

**Question 1**

Continue the pattern. Draw the next three square numbers.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 4 rows and 4 columns | 5 rows and 5 columns | 6 rows and 6 columns |  |

|  |  |  |
| --- | --- | --- |
|  | Count the dots in each square number.  Fill in the missing square numbers.  1, 4, 9 , ……..…., ……..…., ……..…., |  |

**Question 2**

What pattern do square numbers follow?

Follow the pattern and predict the missing square numbers.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 4 |  | 9 |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
|  | +3 | +5 |  |  |  |  |  |

A **SQUARE** number can always be organised into the same number of rows and columns to form a **square**. The small 42 is a mathematical symbol for multiplying a number by itself “4 rows and 4 columns”.

Complete the pattern for square numbers:

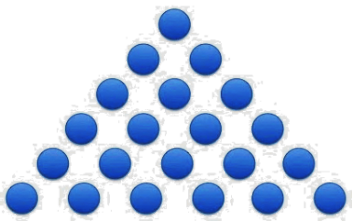
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2 x 2 = | 22 | =4 |  |  |  |  |
| 3 x 3 = | 32 | =9 |  |  |  |
| 4 x 4 = | 42 | =16 |  |  |  |
|  |  |  |  |  |  |
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Use a calculator to check your answers.

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| **Activity 3:**  **Triangular Numbers** |

# Triangular Numbers



**What are triangular numbers?**

Triangular numbers can be organised to form a triangle.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\triang.gif | Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\triang.gif | Description: C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\triang.gif |  |
|  | We start with one dot. | The smallest triangle has 2 rows.  It contains 3 dots. |  |
|  | The next smallest triangle has 3 rows.  It contains 6 dots. |  |
|  |  |  |
|  |  |  |  |

**Question 1**

Continue the pattern to draw the next three triangular numbers.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Triangle with 4 rows | Triangle with 5 rows | Triangle with 6 rows |  |

|  |  |  |
| --- | --- | --- |
|  | Count the dots in each triangular number.  Fill in the missing triangular numbers.  1, 3, 6 , ………..., ……..…., ……..…., |  |

**Question 2**

What pattern do triangular numbers follow?

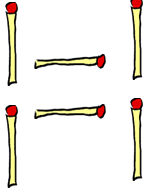
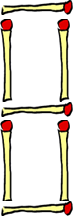
Follow the pattern and predict the missing triangular numbers.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 3 |  | 6 |  |  |  |  |  |  |  |  |  |

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|  |  |  |  |  |  |  |  |
|  | +2 | +3 |  |  |  |  |  |

# Task 9 Exploring patterns

|  |  |
| --- | --- |
| Patterns occur in many things around us, and also in nature  In this task we’ll explore number sequences created by patterns. |  |



# Matchstick patterns

There’s a pattern in these matchstick squares.

|  |  |  |
| --- | --- | --- |
|  |  |  |
| It takes 4 matchsticks to make the first square. | To add on another square we only need 3 matchsticks. | When we add on a square we only need 3 matchsticks. |

Let’s see what pattern we have…

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of squares | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | |
| Number of matchsticks | | 4 | | 7 | | 10 | | 13 | | 16 | | 19 | | |
|  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | |  | |  |
|  |  | | +3 | | +3 | | +3 | | +3 | | +3 | |  |

When we add another square we use an extra 3 matchsticks.

By adding on 3 each time we can predict how many matchsticks we need.

For 5 squares we need 16 matchsticks.

For 6 squares we need 19 matchsticks …… and so on.

|  |  |
| --- | --- |
| ***Description: j0229369*** |  |
| **Activity 1: Matchstick patterns** |
|  |

**Question 1**

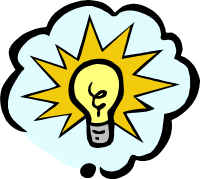
Draw the next shape in this matchstick pattern. Record how many matchsticks are used in each shape.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| 3 matchsticks | …………….  matchsticks | …………….  matchsticks | …………….  matchsticks |

Look for the pattern.

Predict how many matchsticks are needed for 4 triangles, 5 triangles and 6 triangles.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of triangles | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | |
| Number of matchsticks | | 3 | |  | |  | |  | |  | |  | | |
|  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | |  | |  |
|  |  | | +…….. | | +…….. | | +…….. | | +…….. | | +…….. | |  |

****

**Challenge question**

Continue the pattern. How many matchsticks would be needed

for 10 triangles ………………………………………………………….

for 25 triangles …………………………………………………………. ?

**Question 2**

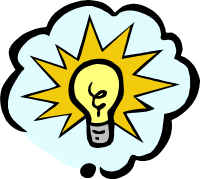
Draw the next shape in this matchstick pattern. Record how many matchsticks are used in each shape.

|  |  |  |
| --- | --- | --- |
|  |  |  |
| 6  matchsticks | …………….  matchsticks | …………….  matchsticks |

Look for the pattern.

Predict how many matchsticks are needed for 4 triangles, 5 triangles and 6 triangles.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of hexagons | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | |
| Number of matchsticks | | 6 | |  | |  | |  | |  | |  | | |
|  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | |  | |  |
|  |  | | +…….. | | +…….. | | +…….. | | +…….. | | +…….. | |  |

****

**Challenge question**

Continue the pattern. How many matchsticks would be needed

for 8 hexagons ………………………………………………………….

for 10 hexagons ………………………………………………………….

for 15 hexagons …………………………………………………………. ?

# Exploring number patterns



We’ve seen how repeating shapes can create a sequence of numbers.

Let’s now look at other sequences of numbers.

We can find the rule to predict the next number.

**Counting patterns with a number grid**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Example 1**  Adding a constant amount.  33  38  43  +5  +5  We add 5 to get the next number in the sequence. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | **33** | 34 | 35 | 36 | 37 | **38** | 39 | 40 |
| 41 | 42 | **43** | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|  | | | | | | | | | |
| The rule is ***add 5 to get the next number*** | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Example 2**  Subtracting a constant amount.  46  40  34  −6  −6  We subtract 6 to get the next number in the sequence. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | **34** | 35 | 36 | 37 | 38 | 39 | **40** |
| 41 | 42 | 43 | 44 | 45 | **46** | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|  | | | | | | | | | |
| The rule is ***subtract (take away) 6 to get the next number*** | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Example 3**  Adding a changing amount.  12  13  16  +1  +3  21  +5  We add the next odd number to create this sequence. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | **12** | **13** | 14 | 15 | **16** | 17 | 18 | 19 | 20 |
| **21** | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|  | | | | | | | | | |
| The rule is ***add the next odd number*** | | | | | | | | | | |

|  |  |
| --- | --- |
| ***Description: j0229369*** |  |
| **Activity 3: Number patterns** |
|  |

See if you can find the number patterns in the grids below.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| What’s the pattern in this sequence?  18, 21, 24, 27  The rule is:  …………………..………..…...... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | **18** | 19 | 20 |
| **21** | 22 | 23 | **24** | 25 | 26 | **27** | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| What’s the pattern in this sequence?  58, 49,40, 31  The rule is:  …………………..………..…...... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| **31** | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | **40** |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | **49** | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | **58** | 59 | 60 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| What’s the pattern in this sequence?  1, 2, 4, 8  The rule is:  …………………..………..…...... | **1** | **2** | 3 | **4** | 5 | 6 | 7 | **8** | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| What’s the pattern in this sequence?  12, 14, 18, 24  The rule is:  …………………..………..…...... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | **12** | 13 | **14** | 15 | 16 | 17 | **18** | 19 | 20 |
| 21 | 22 | 23 | **24** | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| What’s the pattern in this sequence?  55, 49, 43, 37  The rule is:  …………………..………..…...... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | **37** | 38 | 39 | 40 |
| 41 | 42 | **43** | 44 | 45 | 46 | 47 | 48 | **49** | 50 |
| 51 | 52 | 53 | 54 | **55** | 56 | 57 | 58 | 59 | 60 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| What’s the pattern in this sequence?  2, 8, 14, 20  The rule is:  …………………..………..…...... | 1 | **2** | 3 | 4 | 5 | 6 | 7 | **8** | 9 | 10 |
| 11 | 12 | 13 | **14** | 15 | 16 | 17 | 18 | 19 | **20** |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |

# Task 10

# Time for a skills check-up and

# reflection



We finish the booklet with a skills check-up and a reflection on what you have learned.

|  |  |
| --- | --- |
| Reflection time  Turn to the pages which follow and write:  • how you went with the activities  • some of the skills you learned. | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\refl2.gif |

|  |  |
| --- | --- |
| The test  Turn to the pages after Reflection time and do the test.  This test covers the activities you did in the second half of this booklet. | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\test.gif |

|  |  |
| --- | --- |
| C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\refl2.gif | C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\essQ.gifReflection Time  Fill out this sheet.  Think back over the topic.  Tell your teacher how you went and recall something that you learned.  A thoughtful reflection reveals your understanding of the topic. |

**Reflection**

|  |  |  |  |
| --- | --- | --- | --- |
| **Task 6** | * Multiplication skills | | |
|  | Tick the box that best fits what you learned. | Explain one useful strategy for multiplying. |  |
|  | 🞎 I understood all of it  🞎 I understood most of it  🞎 I needed a bit of help  🞎 I found it difficult |  |  |
|  |  | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Task 7** | * Multiples and factors. * Prime numbers and composite numbers. | | |
|  | Tick the box that best fits what you learned. | Color the **PRIME** numbers **RED.** Color the **COMPOSITE** numbers **GREEN**.   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 30 | | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | |  |
|  | 🞎 I understood all of it  🞎 I understood most of it  🞎 I needed a bit of help  🞎 I found it difficult |  |
|  |  | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Task 8** | * Factor trees. * Square numbers and triangular numbers | | |
|  | Tick the box that best fits what you learned. | Choose any **composite number** from 50 to 100 and create you own ‘factor tree’ for that number. |  |
|  | 🞎 I understood all of it  🞎 I understood most of it  🞎 I needed a bit of help  🞎 I found it difficult |  |
|  |  | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Task 9** | * Matchstick patterns. * Number patterns. | | |
|  | Tick the box that best fits what you learned. | Use the first **2 digits** of your birthdate to create an interesting number pattern: |  |
|  | 🞎 I understood all of it  🞎 I understood most of it  🞎 I needed a bit of help  🞎 I found it difficult |  |
|  |  | |  |

|  |  |
| --- | --- |
| **Task 10 test** | You will be completing a test.  The test covers the maths activities you have done in this booklet. |

* This test will enable your teacher to see how well you have understood the work and whether you need any additional help in a particular area.

# C:\Users\CFord\Documents\MY Folders\CurricDev2012\images\test.gifPlease complete the exercises on these pages. Show your working out wherever possible.

# You can use your notes to help you with these exercises, but no other assistance.

**Activity 1 Estimating and mental strategies**

**(a)** Strategies for multiplication. Complete the following questions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 83 × 5 |  |  | 97 × 2 |
| 83 × 5  (…..…. + …..….) × 5  (…..…. × 5) plus (…..…. × 5)  (…..….) plus (…..….)  equals …..…. | |  | 97 × 2  (……... + …..….) × 2  (…..…. × 2) plus (…... × 2)  (…..….) plus (…..….)  equals …..…. | |

**(b)** Factor trees

|  |  |
| --- | --- |
| Complete the following factor tree.  **×**  **×** | Draw your own factor tree. |
| Product of prime factors:  16 = ……… × ……… × ……… × ……… | Product of prime factors:  40 = |

Show the picture and the equation for the square number:

|  |  |  |
| --- | --- | --- |
|  | Picture (dots or grid) | Equation: |
| 25 |  |  |
| 49 |  |  |

**Activity 2 Number patterns**

**Question 1**

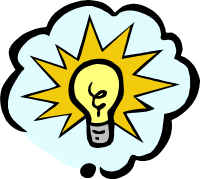
Draw the next shape in this matchstick pattern. Record how many matchsticks are used in each shape.

|  |  |  |
| --- | --- | --- |
|  |  |  |
| 6 matchsticks | …………….  matchsticks | …………….  matchsticks |

Look for the pattern.

Predict how many matchsticks are needed for 4 hexagons, 5 hexagons and 6 hexagons.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of hexagons | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | |
| Number of matchsticks | | 6 | |  | |  | |  | |  | |  | | |
|  | |  | |  | |  | |  | |  | |  | | |
|  |  | |  | |  | |  | |  | |  | |  |
|  |  | | +…….. | | +…….. | | +…….. | | +…….. | | +…….. | |  |

****

**Challenge question**

Continue the pattern. How many matchsticks would be needed

for 10 hexagons ………………………………………………………….

for 25 hexagons ………………………………………………………….

**Question 2**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| What’s the pattern in this sequence?  55, 53, 51, 49  The rule is:  …………………..………..…...... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | **49** | 50 |
| **51** | 52 | **53** | 54 | **55** | 56 | 57 | 58 | 59 | 60 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| What’s the pattern in this sequence?  13, 15, 19, 25  The rule is:  …………………..………..…...... | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | **13** | 14 | **15** | 16 | 17 | 18 | **19** | 20 |
| 21 | 22 | 23 | 24 | **25** | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Challenge pattern**  What’s the pattern in this sequence?  1, 4, 9, 16  The rule is:  …………………..………..…...... | **1** | 2 | 3 | **4** | 5 | 6 | 7 | 8 | **9** | 10 |
| 11 | 12 | 13 | 14 | 15 | **16** | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |

|  |  |  |
| --- | --- | --- |
| |  |  | | --- | --- | |  |  | |

**Student Self Assessment:** How well do I understand that I can re-organise whole numbers in different ways to make it easier to solve problems? **Colour** the statement that you think is **MOSTLY** true for you.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| This was tricky for me. | I did it, but I’m not sure how I worked the problems out. | I understood SOME of this work. | I know how to re-organise numbers to solve problems. | I can explain this to someone else. |

|  |
| --- |
| **THINKING ABOUT YOUR LEARNING**  **This is what I feel I have learnt well:**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**    **I still need help to understand:**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

|  |
| --- |
| **YOUR QUESTIONS OR COMMENTS** |
| **TEACHER’S COMMENTS**  **Some great things about your work were:**  **Things you can do to improve your learning:** |
|  |