# Coordinating groups

## Students able to coordinate groups...

are capable of double counting. This is particularly useful in multiplication and division tasks. Using a double count, the student is able to keep track of the multiple sequence at the same time as keeping track of the number of groups without relying on material or markers to represent the groups.

In response to the question, *There are twelve children in a room and four children at each table. How many tables are used?* a student needs to treat four as a unit (group) as well as coordinate the count of groups.

Students need to move from coordinating composite units to using multiplication and division as operations. At this level the student can immediately recall, or easily derive a wide range of multiplication and division facts. In doing this, the student uses multiplication and division as inverses of each other.

The idea of coordinating groups is also fundamental to place value. Students at this level are moving towards an understanding of using tens and hundreds as composite units. Significant opportunities to use regrouping of units, tens and hundreds, should be presented to the students.

Students need to move to using hundreds, tens and ones in standard decomposition and be able to count forwards and backwards by tens on and off the decade and by hundreds, on or off the hundred. Increasing or decreasing numbers by tens and hundreds supports the use of what the Dutch call *jump methods* to solve addition and subtraction tasks mentally. With this strategy, the student builds on one number by counting on by hundreds, then tens and finally units.

Using a collection-based strategy of separating both numbers into hundreds, tens and ones for an addition or subtraction task and then regrouping, is described as the *split method.* This strategy does not rely on incrementing and, where used successfully, shows that students have a part-whole knowledge of numbers to 1000.

The type of questions we pose will influence students' choice of the strategy they use. For a student to have a sound knowledge of place value, he or she needs to analyse a problem and, having a range of strategies to choose from, decide which would be the most appropriate.

Coordinating images and actions through a series of procedures is also important in spatial mathematics. Students' imagery will develop as they experiment with dynamic changes to shapes, patterns and objects. It also becomes fundamental to later geometry work.

Imagine a square pushed over to form a rhombus. The new shape can be described as having different angles from the first shape but keeping the same length sides. The opposite sides remain parallel and the diagonally opposite angles are still equal. Both the original square and the new rhombus have essentially the same properties with the exception that the square has all angles equal.

Coordinating images is also important to the development of measurement concepts. Students need to visualise how units can be joined together to form larger units or patterns of units. As well, students need to visualise how changing the size of the unit affects the quantity of units needed to measure an object and be able to explain this relationship.

# Index of activities

# Spin and multiply

## Where are they now?

Students are able to use skip counting or repeated addition to solve multiplication and division problems.

## Where to next?

Students are able to recall multiplication and division facts.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building multiplication and division through equal grouping: level 5

## BLM

Spin and multiply, page 320

## How?

Organise the students into small groups. Prepare a spinner or die displaying the numerals one to ten. Tell the students which multiple will be practised in this activity. Provide the students with a strip of paper on which to record five numbers from the nominated multiple sequence. Do not tell the students the multiple sequence. Allow the students to recall or determine the appropriate numbers to record. Have the students take turns to spin a number on the spinner. The student then multiplies the number by the nominated multiple. If the student has this number on the paper strip, he or she may cross it off. The winner is the first person to cross off all five numbers. Provide the group with a calculator to confirm any disputed answers.

## Variations

All students in the group may cross off the answer as it is spun.

Place numeral cards 1–10 into a box and draw out a numeral. This replaces the spinner.

## Why?

Students need to be able to recall or easily derive multiplication and division facts if they are to move to solving problems involving more than one step.

# Race around the world

## Where are they now?

The student is able to use skip counting or repeated addition to solve multiplication and division problems.

## Where to next?

The student recalls multiplication and division facts.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building multiplication and division through equal grouping: level 5

## BLM

Race around the world, page 321

## How?

Prepare an adequate supply of baseboards. Organise the students into pairs and provide them with two numeral dice and a marker for each player. Have the students place their markers on the starting position. Ask the students to take turns to roll the dice and multiply both numbers rolled to determine the total. The student then moves his or her marker to the first corresponding numeral on the baseboard. If the student is unable to move forward to a numeral, the marker is moved backwards to the first corresponding numeral or alternatively, misses a turn. The first player to reach the final number at the centre of the board wins.

## Variations

Once reaching the number at the centre of the board, the students continue playing and return from the centre number to the starting position.

Change the numerals on the baseboard to suit the multiples the students are currently working with.

## Why?

Recall of multiplication and division number facts are useful in solving problems involving more than one step. Students also need to be able to use multiplication and division as inverse operations.

# Una pizza per favore! (Pizza please!)

## Where are they now?

Students are able to use skip counting or repeated addition to solve multiplication and division problems.

## Where to next?

Students are able to recall multiplication and division facts.

Allowing the students to choose which multiple to work with, allows students of mixed ability to work together.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

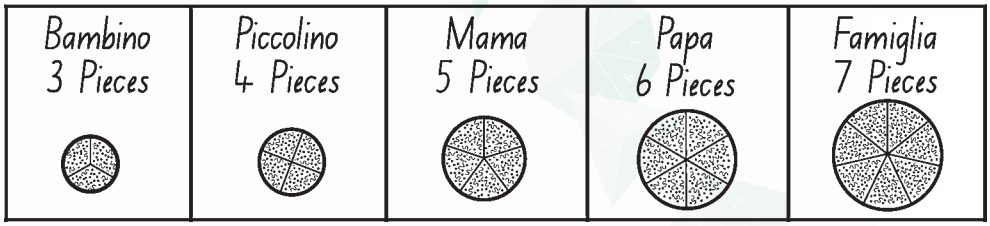
Building multiplication and division through equal grouping: level 5

## BLM

Una pizza per favore!, page 322

## How?

Organise the students into small groups and provide each group with a worksheet and a die. Have the students take turns to roll the die. The student then chooses a type of pizza from the menu board:




After choosing a type of pizza the student multiplies the number of pieces on the pizza by the number rolled to determine the total and records the answer on the worksheet. Encourage the students to work together until all of the boxes on the worksheet are completed.

## Variation

For students needing to use material to determine the totals, encourage them to use the diagrams at the top of the worksheet to assist their counting. Alternatively, provide six picture cards displaying the slices of pizza for each sized pizza.

## Why?

Students need to be able to recall or easily derive multiplication and division facts to move to problems involving more than one step.

# Chords

## Where are they now?

Students are able to use skip counting or repeated addition to solve multiplication and division problems.

## Where to next?

Students are able to recall multiplication and division facts.

TP

Two students may need to hold either end of the chord.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building multiplication and division through equal grouping: level 5

## How?

Prepare a length of chord or ribbon with ten knots tied at equal distances apart. Attach numeral cards 1–10 at each of the knots. Also, organise a set of numeral cards for the nominated multiple to be practised. Distribute the cards to the students and tell them which multiple will be practised. Call out a number between one and ten. The students multiply the called number by the nominated multiple and determine the total. The student with the corresponding numeral card takes the card to the knotted chord, and stands at the appropriate spot in the sequence. Alternatively, the card could be attached to the knotted chord.


## Why?

Students need to be able to recall or easily derive multiplication and division facts if they are to move to solving problems involving more than one step.

# Multiplication memory

## Where are they now?

Students are able to use skip counting or repeated addition to solve multiplication and division problems.

## Where to next?

Students are able to recall multiplication and division facts.

TP

Prepare the question cards and the answer cards on cardboard of two different colours. The students will then easily be able to turn over one card from each set.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building multiplication and division through equal grouping: level 5

## How?

Select a multiple to be practised. Prepare 40 cards, 10 multiplication question cards and 10 division question cards for the selected multiple and 20 appropriate answer cards. Have the students shuffle the cards and place them face down on the floor in four or five rows. The students then take turns to flip over two cards. If a student turns over a question card and the correct answer card then he or she keeps the cards. All players must agree that the cards are a "match". If the cards do not match then the student flips the cards back over. The player with the most cards wins.

## Variation

Have the students create their own set of cards for other multiples.

## Why?

Recall of multiplication and division number facts are useful in solving problems involving more than one step. Students also need to be able to use multiplication and division as inverse operations.


Students could record the number sentences as the cards are matched.

# Honey jumbles

## Where are they now?

Students are able to use skip counting or repeated addition to solve multiplication and division problems.

## Where to next?

Students are able to recall multiplication and division facts.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

PAS2.1: Generates, describes and records number patterns using a variety of strategies and completes simple number sentences by calculating missing values

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building multiplication and division through equal grouping: level 5

## How?

Collect a bundle of popsticks. On each one write four numbers that are the factors and product to a multiplication fact. For example, 4, 8, 3, 2 could be written for the multiplication fact 4 x 8 = 32. Place the popsticks into a jar such as a honey pot. Have the students take turns to pick a stick from the "honeypot" and write a division or multiplication fact for the numerals written on the popstick.

## Variations

Have the students make their own "honey pot" popsticks to give to other students.

Have the students write both the multiplication and division number sentence for each popstick.

## Why?

Recall of multiplication and division number facts are useful in solving problems involving more than one step. Students also need to be able to use multiplication and division as inverse operations.

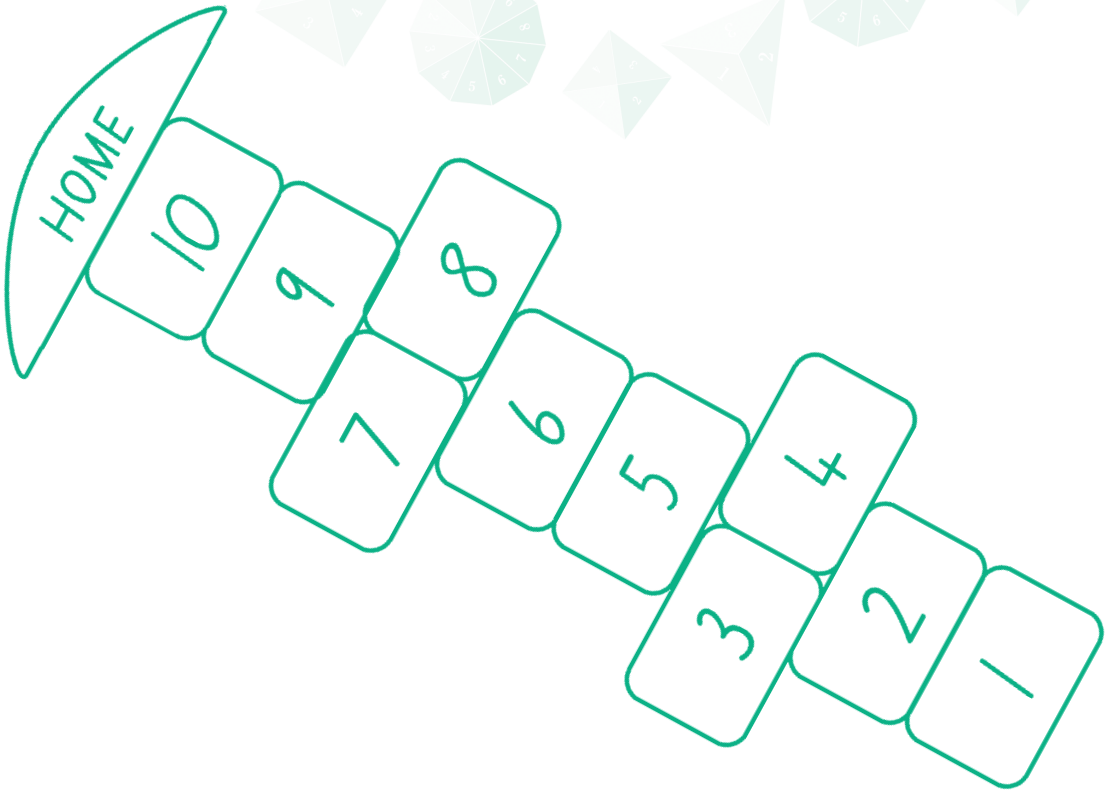
# Hopscotch

## Where are they now?

Students are able to use skip counting or repeated addition to mentally solve multiplication and division problems.

## Where to next?

Students are able to recall multiplication and division facts.




## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.1: Asks questions that could be explored using mathematics in relation to Stage 2 content

## CMIT reference

Building multiplication and division through equal grouping: level 5

## BLM

Hopscotch, page 323

## How?

Prepare a *Hopscotch* baseboard for each pair of students. The students will also need a die or spinner marked 1–10, ten counters of one colour for each player and a calculator. The players take turns to roll or spin up a number and place a counter on the corresponding number on the hopscotch board. The student's partner then asks a multiplication question up to 10 x 10, using the calculator as verification. If the first student answers correctly, he or she leaves the counter on the grid. If the student answers incorrectly, then he or she must remove the counter. Play continues until one player has a counter on each numbered section of the "hopscotch".

## Variations

Students ask division or multiplication questions.

Students have one counter each and move one space on the hopscotch board each time a question is correctly answered.

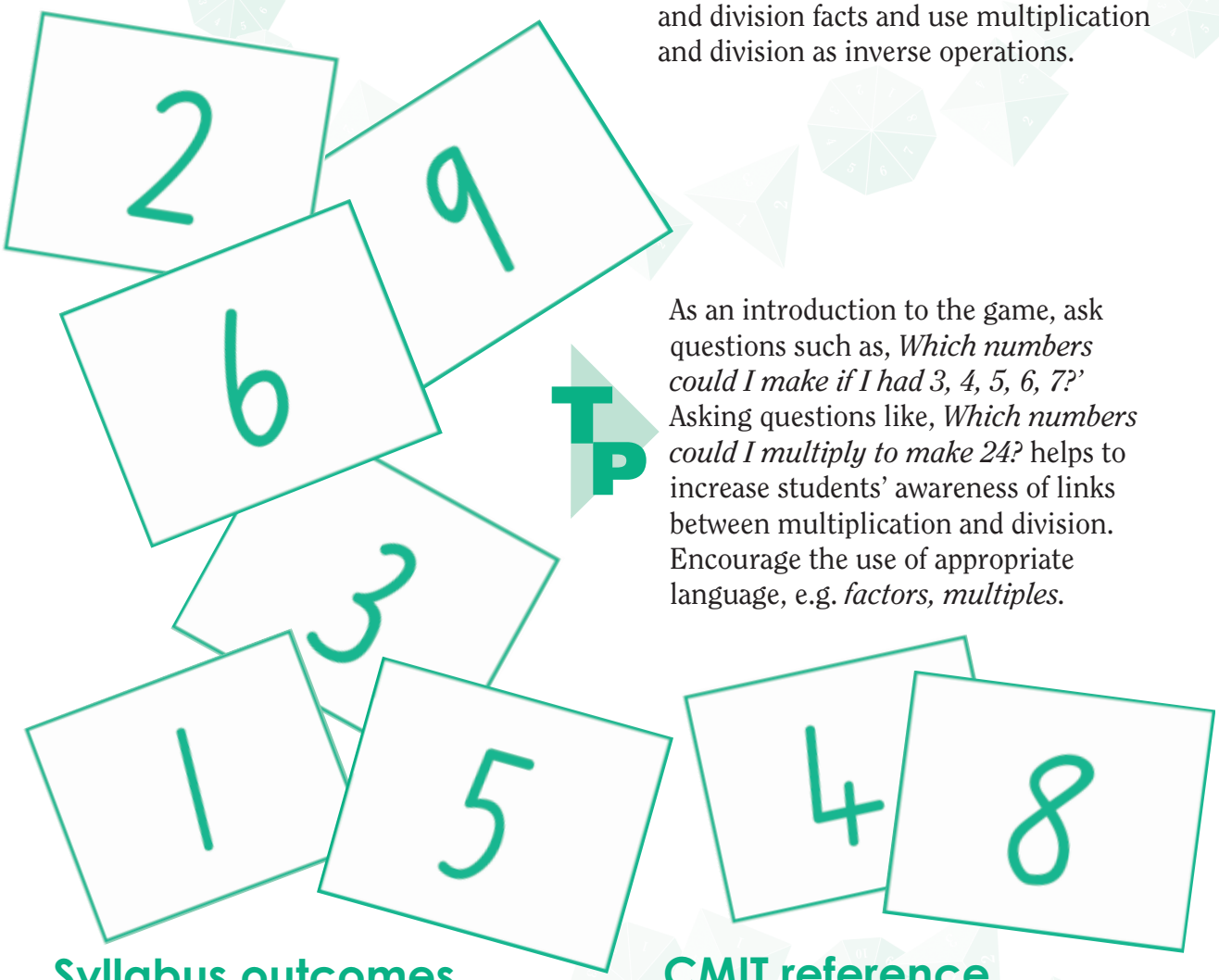
## Why?

Recall of multiplication and division number facts are useful in solving problems involving more than one step.

# Multiplication game board

## Where are they now?

Students are able to use skip counting or repeated addition to mentally solve multiplication and division problems.




## Where to next?

Students are able to recall multiplication and division facts and use multiplication and division as inverse operations.

TP

As an introduction to the game, ask questions such as, *Which numbers could I make if I had 3, 4, 5, 6, 7?'* Asking questions like, *Which numbers could I multiply to make 24?* helps to increase students' awareness of links between multiplication and division. Encourage the use of appropriate language, e.g. *factors, multiples.*

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building multiplication and division through equal grouping: level 5

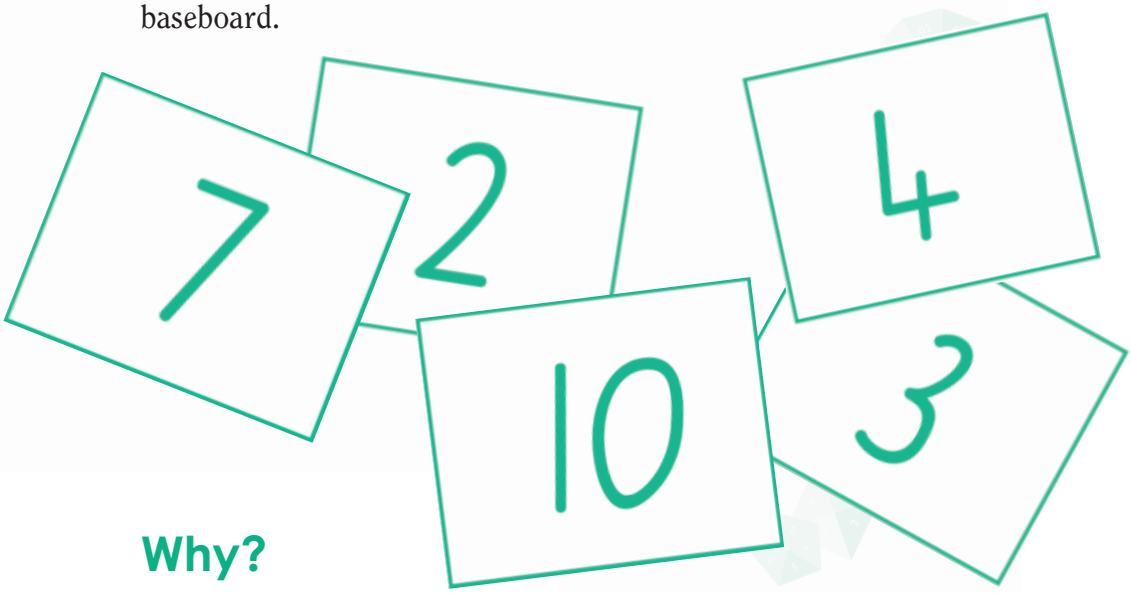
## BLM

Multiplication game board, page 324

## How?

Organise the students into groups of three or four. Provide each group with a copy of the multiplication game board, a set of numeral cards numbered 1–10 (three or four of each numeral) and sets of coloured counters; one colour per student. In groups of four, each student needs 11 counters. In a group of three, each student needs 14 counters.

To begin the activity, the students are dealt five cards each. The first student multiplies two of his or her cards together (say 9 x 5) and then covers the corresponding number on the baseboard. The student then picks up another two cards so that there are always five cards with each student. The winner is the first player to cover four squares in a row horizontally, vertically, diagonally or to form a square. Each number on the board may only be covered with one counter. All players must agree with the calculation before the player may place a counter on the baseboard.




## Why?

This activity provides students with the opportunity to recall and practise all multiplication tables from 1 x 1 to 10 x 10.

# Set the rules

## Where are they now?

Students are able to use skip counting or repeated addition to mentally solve multiplication and division problems.

## Where to next?

Students are able to recall multiplication and division facts and use multiplication and division as inverse operations.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building multiplication and division through equal grouping: level 5

## BLM

Hundred chart, page 238

## How?

Organise the students into small groups or pairs and provide them with a hundred chart, a die or spinner and a marker each. (Ensure the squares on the chart are large enough to fit the markers.) Have the students take turns to roll the die and starting at one, move their markers a corresponding number of spaces around the hundred chart. Have the students set say three or four rules for each game before playing. The rules must be based on a multiple. For example, *Land on a multiple of 5, lose a turn. Land on a multiple of 6, move ahead four spaces. Land on a multiple of 4, move to the number which is the reverse of the number you are currently on.*

The student reaching 100 first, wins.

## Why?

Recall of multiplication and division number facts are useful in solving problems

# Self-correcting facts

## Where are they now?

Students are able to use skip counting or repeated addition to mentally solve multiplication and division problems.

## Where to next?

Students are able to recall multiplication and division facts and use multiplication and division as inverse operations.

TP

Have the students prepare their own "fact sheets" for others to use.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

PAS2.1: Generates, describes and records number patterns using a variety of strategies and completes simple number sentences by calculating missing values

WMS2.3: Uses appropriate terminology to describe, and symbols to represent, mathematical ideas

## CMIT reference

Building multiplication and division through equal grouping: level 5

## BLM

Self-correcting facts, pages 325 and 326

## How?

Prepare a multiplication and division fact sheet for the multiples to be practised and a cover board. A sheet for multiples of eight and nine is included in the BLM section. Cut out the rectangles from the cover board and fold the fact sheet and cover board. Display the covered fact sheet to the class. Reveal the top multiplication or division question, keeping the tab down, covering the end number. Ask the students to provide the answer and describe how they solved the question if they did not automatically recall the fact. Progressively reveal the remaining questions. Encourage students to discuss how they are determining the total. Allow the students to work in pairs and repeat the activity.

## Why?

Recall of multiplication and division number facts are useful in solving problems.

# Hand multiplication

## Where are they now?

Students are able to use skip counting or repeated addition to mentally solve multiplication and division problems.

## Where to next?

Students are able to recall multiplication and division facts and use multiplication and division as inverse operations.

Students may discover that it is possible to ensure an even number each time. Discuss why this is possible and then have the class establish a way of resolving the problem.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

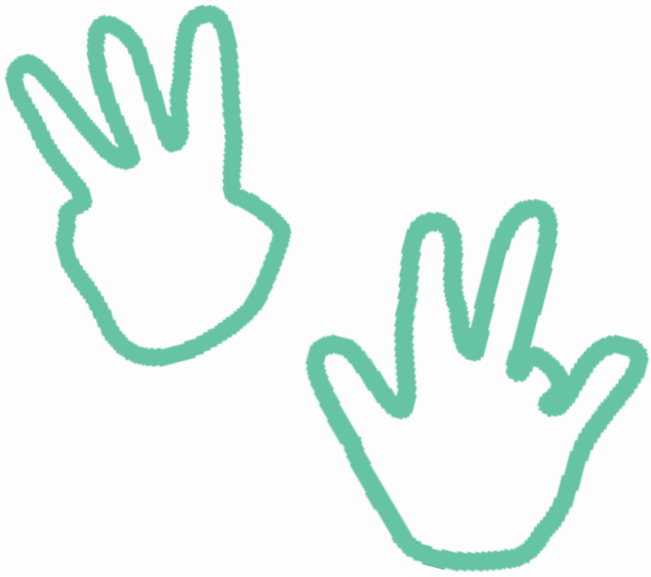
WMS2.5: Links mathematical ideas and makes connections with, and generalisations about, existing knowledge and understanding in relation to Stage 2 content

## CMIT reference

Building multiplication and division through equal grouping: level 5

## How?

Organise the students into pairs and have them decide who is to be "even" and who is to be "odd". To play the game both students put their hands behind their backs and on a count of three bring out their hands, raising some fingers. Multiply the numbers represented and decide if the answer is even or odd. If the answer is odd then the "odd" person scores a point. If the answer is even then the "even" person scores a point. Play ten rounds and record the points. Discuss with the students if there were more even or odd numbers and if there is a reason for this result?



## Why?

Recall of multiplication and division number facts are useful in solving problems.

# Ten-strip division challenge

## Where are they now?

Students use a variety of strategies to solve division problems.

## Where to next?

Students use a variety of strategies to solve division problems with remainders.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.3: Uses appropriate terminology to describe, and symbols to represent, mathematical ideas

## CMIT reference

Building multiplication and division through equal grouping: level 3, 4 and 5

Recording symbols

## BLM

Ten-strip division challenge, page 327

## How?

Provide the students with a collection of ten-strips and a numeral die and ask them to represent a nominated number using the ten-strips. For example, "40" could be represented using four ten-strips. Each student then rolls his or her die to determine the number of equal groups to form from the nominated number. The student then determines how many would be in each group and if there are any remainders. Have the students share their findings and their methods of solution.

## Variation

Have the students roll the die a second time and redistribute the number into the new number of groups. Discuss the students' methods of solution.

## Why?

Students should be exposed to problems that deal with both equal groups and equal groups with remainders.


Have the students record their method of solution to share with others.

# Saucy sixes

## Where are they now?

Students are able to use mental strategies to solve division problems.

## Where to next?

Students are able to mentally solve division problems with remainders.

TP

Discuss how multiplication will assist in solving these division tasks.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building multiplication and division through equal grouping: level 5

## BLM

Saucy sixes, page 328

## How?

Organise the students into pairs and provide them with a copy of the baseboard grid, 18 counters each (use two different colours) and a numeral die marked 1–6. The aim is to be the player with the most numbers covered on the grid. To cover a number, the students take turns to roll the die. The number that is rolled represents a "remainder". The student then chooses a number on the baseboard that when divided by "6" would leave a remainder corresponding to the number rolled on the die. For example, if a "3" is rolled, then "3" is the "remainder". The student could place a counter on 9, 15, 21 or 27 on the baseboard as each of these numbers, when divided by "6", leaves a remainder of "3". If a "6" is rolled the student misses a turn. Only one counter may be placed on each numeral. Continue until all numbers on the board are covered.

## Variations

Have the students work together to cover the board, rather than competing against each other. Change the die to one displaying numerals 1–5.

Have the students develop a new baseboard by writing in suitable numerals for a different dividing number.

## Why?

Students need to be able to see the relationship between division and multiplication and develop the ability to flexibly use these as inverse operations when solving problems.

WR

If the students are unable to automatically recall the division facts, encourage them to work out the solution on paper. Students' recordings could be used as work samples for assessment purposes.

# Remainders count

## Where are they now?

Students are able to use mental strategies to solve division problems.

## Where to next?

Students are able to mentally solve division problems with remainders.


Discuss strategies for solving division problems such as recalling a multiplication fact to help solve a division task.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building multiplication and division through equal grouping: level 5

## How?

Provide each pair of students with three numeral dice and paper to record on. In turns, students roll the dice and using the three numbers shown make a division number sentence. For example if a 6, 4 and 5 were rolled then a student could make 46 ÷ 5. The student determines the answer and keeps a tally of any remainders; in this case the remainder would be "one". However, if the student makes the sentence 45 ÷ 6, the remainder would be "three". The remainders become the student's score. The winner is the first to reach a score of 20.

## Variation

Once the dice have been rolled, the student's partner decides on the division question. In this way the students can try to give each other questions that will not give a remainder in the answer or give the lowest possible remainder.

## Why?

Students should be exposed to problems that deal with both equal groups and equal groups with remainders.

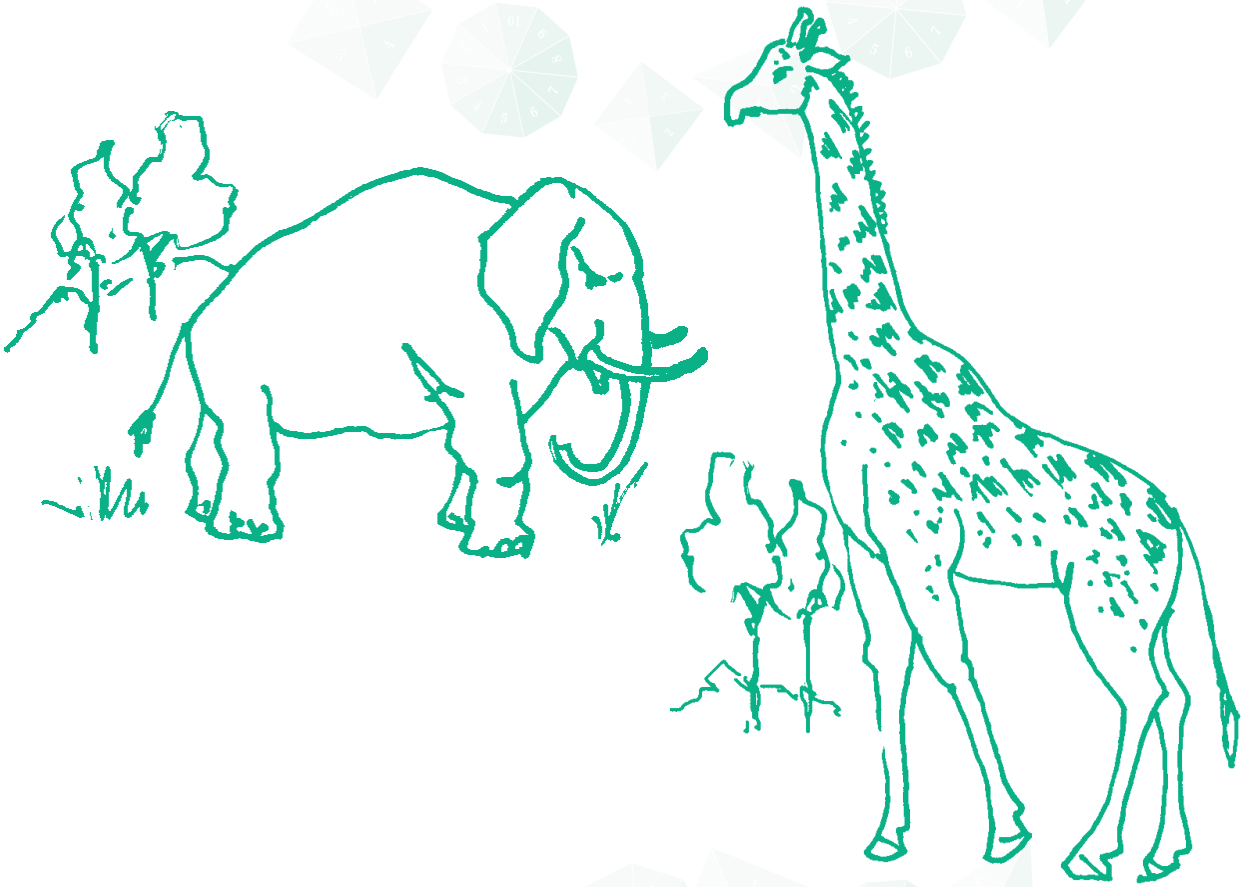
# Safari

## Where are they now?

Students are able to use mental strategies to solve division problems.

## Where to next?

Students are able to mentally solve division problems with remainders.



## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building multiplication and division through equal grouping: level 5

## BLM

Safari, page 329

## How?

Organise the students into small groups and provide them with a copy of the *Safari* baseboard, a die and a marker for each player. To begin the game, each player takes a turn to throw the die and move his or her marker forward a corresponding number of spaces. On the same player's next turn, (and all subsequent turns) he or she throws the die and divides the number his or her marker is on by the number rolled on the die. The student then calculates the answer and determines if there is a "remainder". The player then moves his or her counter forward the same number of spaces as the "remainder". Play continues until a player reaches the finish line. Alternatively, the exact remainder must be used to reach the finish line.

## Why?

Students should be exposed to problems that deal with both equal groups and equal groups with remainders.

# Froggy

## Where are they now?

Students are able to use mental strategies to solve division problems.

## Where to next?

Students are able to mentally solve division problems with remainders.

## Syllabus outcomes

NS2.3: Uses mental and informal written strategies for multiplication and division

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building multiplication and division through equal grouping: level 5

## BLM

Froggy, page 330

## How?

Organise the students into small groups and provide them with a copy of the *Froggy* baseboard, two numeral dice and a marker each.

To begin, the players place their markers on the frog. The first player rolls the dice to make a two-digit number. He or she then divides this number by six and if there is a remainder the student moves to the closest lily pad displaying the same numeral as the remainder. If six divides equally into the number, the player moves his or her marker one space backwards. The winner is the first person to land on the last lily pad.

## Variation

Choose a different multiple to use and continue the game in the same manner. Note: the numerals on the lily pad will need to be modified.

## Why?

Students should be exposed to problems that deal with both equal groups and equal groups with remainders.

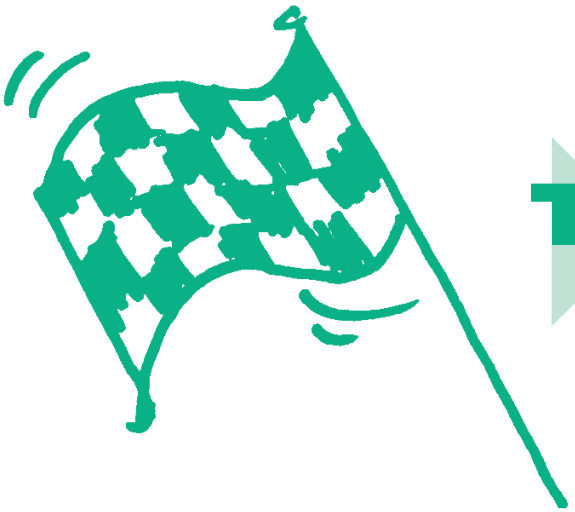
# Race to 1000

## Where are they now?

The student is able to find the total of two, two-digit numbers by counting by tens and ones, with or without the use of materials.

## Where to next?

The student is able to use hundreds, tens and units to mentally add and subtract reasonable combinations to 1000.



TP

Model strategies such as grouping hundreds, tens and units and bridging to the next decade as a way of completing an addition problem.

## Syllabus outcomes

NS2.2: Uses mental and written strategies for addition and subtraction involving two-, three- and four-digit numbers

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building place value through grouping: level 3

Combining and partitioning

## BLM

Race to 1000, pages 331 and 332

## How?

Organise the students into pairs and provide them with two sets of cards in the range 0–9 and a sheet for recording. Have the students spread the cards out face-up in front of them. The first player chooses any two cards to make a two-digit number and records the number on the recording sheet. He or she then discards one of the digits and returns the other to the displayed cards. In turns, the players then select two cards, make a two-digit number, add the number to the previous total and record the new total. Encourage the students to explain their counting strategies to each other. Play continues until a player reaches a total of "1000". If the total falls between 990 and 999, then a player may take a single-digit number to reach 1000. If the total does not add to 1000 exactly, then the highest total wins or, alternatively, the game is a draw and the winner is the best of three games.

## Variation

Start at 1000 and subtract the numbers. The aim is the first to reach zero.

## Why?

Students should have the opportunity to develop mental strategies for solving addition and subtraction problems and to record their thinking before introducing algorithmic procedures.

# How many more?

## Where are they now?

The student is able to find the total of two two-digit numbers by counting by tens and ones, with or without the use of materials.

## Where to next?

The student is able to use hundreds, tens and units to mentally add and subtract reasonable combinations to 1000.

TP

- Have the students complete activities involving counting forwards and backwards by tens off the decade.
- Discuss and model partitioning and combining numbers to ten and to one hundred.

## Syllabus outcomes

NS2.2: Uses mental and written strategies for addition and subtraction involving two-, three- and four-digit numbers

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building place value through grouping: level 3

Combining and partitioning

## BLM

How many more? page 333

## How?

Organise the students into pairs and provide them with a copy of the worksheet and a set of numeral cards 0–6. Instruct the students to take turns to draw six numeral cards from the pile and make two, three-digit numbers. The students may choose any combinations from drawn cards. The student then records these two, three-digit numbers onto their recording sheet. The student may decide in which order to record the numbers as this will determine if the task will be an addition or a subtraction. The student then determines the number of tens and units that would need to be added to, or taken away from, the first number to equal the second number.

## Variation

Increase the range of numeral cards. The BLM may need to be modified to record the solution in terms of hundreds, tens and ones.

## Why?

Students should have the opportunity to develop mental strategies for solving addition and subtraction problems and to record their thinking before introducing algorithmic procedures.

# Snake eyes

## Where are they now?

The student is able to find the total of two, two-digit numbers by counting by tens and ones, with or without the use of materials.

## Where to next?

The student is able to use hundreds, tens and units to mentally add and subtract reasonable combinations to 1000.


- Demonstrate the strategy of building-on a number by tens and ones prior to this activity.
- Use two different coloured dice to make it easier to nominate which is the "tens" die and which is the "ones" die.

## Syllabus outcomes

NS2.2: Uses mental and written strategies for addition and subtraction involving two-, three- and four-digit numbers

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

## CMIT reference

Building place value through grouping: level 3

## How?

Organise the students into small groups and provide each group with two dice and a recording sheet. One die represents "tens" and the other die represents "ones". Each player may throw the two dice any number of times when it is his or her turn, endeavouring not to roll the "venomous" number (refer to later explanation). On the first throw the player states and records the number formed by the dice (tens and ones). On each subsequent throw the player adds the tens to the tally and then the units. For each game a "venomous" number is chosen, say number "6". If the "venomous" number is rolled on either die then the player forfeits the points rolled for that turn and it is the next player's turn. (That is, the player goes back to his or her previous total.) If a "double one" (snake eyes) is rolled then the player loses all of their points (accumulated total) and it is the next player's turn. It is up to each player to decide how many times to roll the die. The aim is to stop before a "venomous" number or "snake eyes" is rolled while trying to accumulate the highest total. As each player rolls the dice he or she adds the number to the total of their last throw. The winner is the first to 1000.

## Variations

Start at 1000 and subtract the numbers rolled. The winner is the first to zero.

Discard the "venomous" number and only play with the "snake eyes" number.

## Why?

Students should have the opportunity to develop mental strategies for solving addition and subtraction problems and to record their thinking before introducing algorithmic procedures.

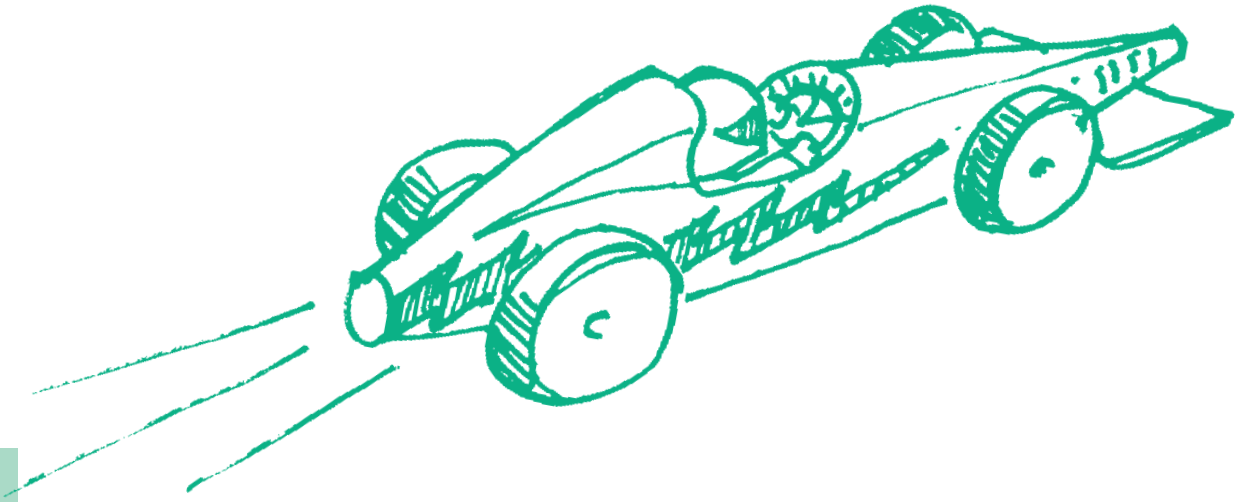
# Highway racer

## Where are they now?

The student uses mental strategies to solve two-digit addition and subtraction problems.

## Where to next?

The student can add and subtract reasonable numbers to 1000 using strategies such as incrementing by hundreds and tens mentally. The student has a *part-whole* knowledge of numbers to 1000.



## Syllabus outcomes

NS2.2: Uses mental and written strategies for addition and subtraction involving two-, three- and four-digit numbers

WMS2.2: Selects and uses appropriate mental or written strategies, or technology, to solve problems

WMS2.1: Asks questions that could be explored using mathematics in relation to Stage 2 content

## CMIT reference

Building place value through grouping: level 2, 3

## BLM

Highway racer, page 334

## How?

Have the students work in pairs so that each student can explain and verify calculations. Prepare *Highway racer* worksheets for each pair of students. To complete the worksheet, the students take turns to mentally calculate, and record, the number needed to be added or subtracted in order to move to the total written in the next box.

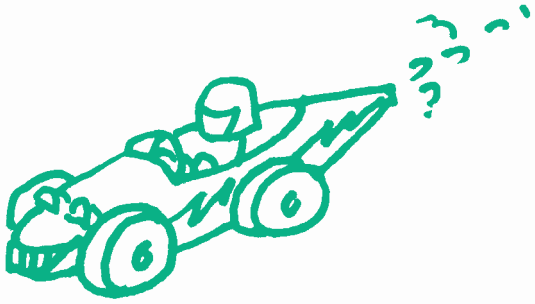
## Variations

Have the students create their own "race tracks" for others to solve.

Have the students verify their partner's answers using a calculator.

Have one of the players time his or her partner from "start" to "finish" and then swap roles.

Have the students "race the clock". For example, *How far can you move along the track in 60 seconds?*



## Why?

Students should learn place value concepts through explicit teaching of its use in mental addition and subtraction.