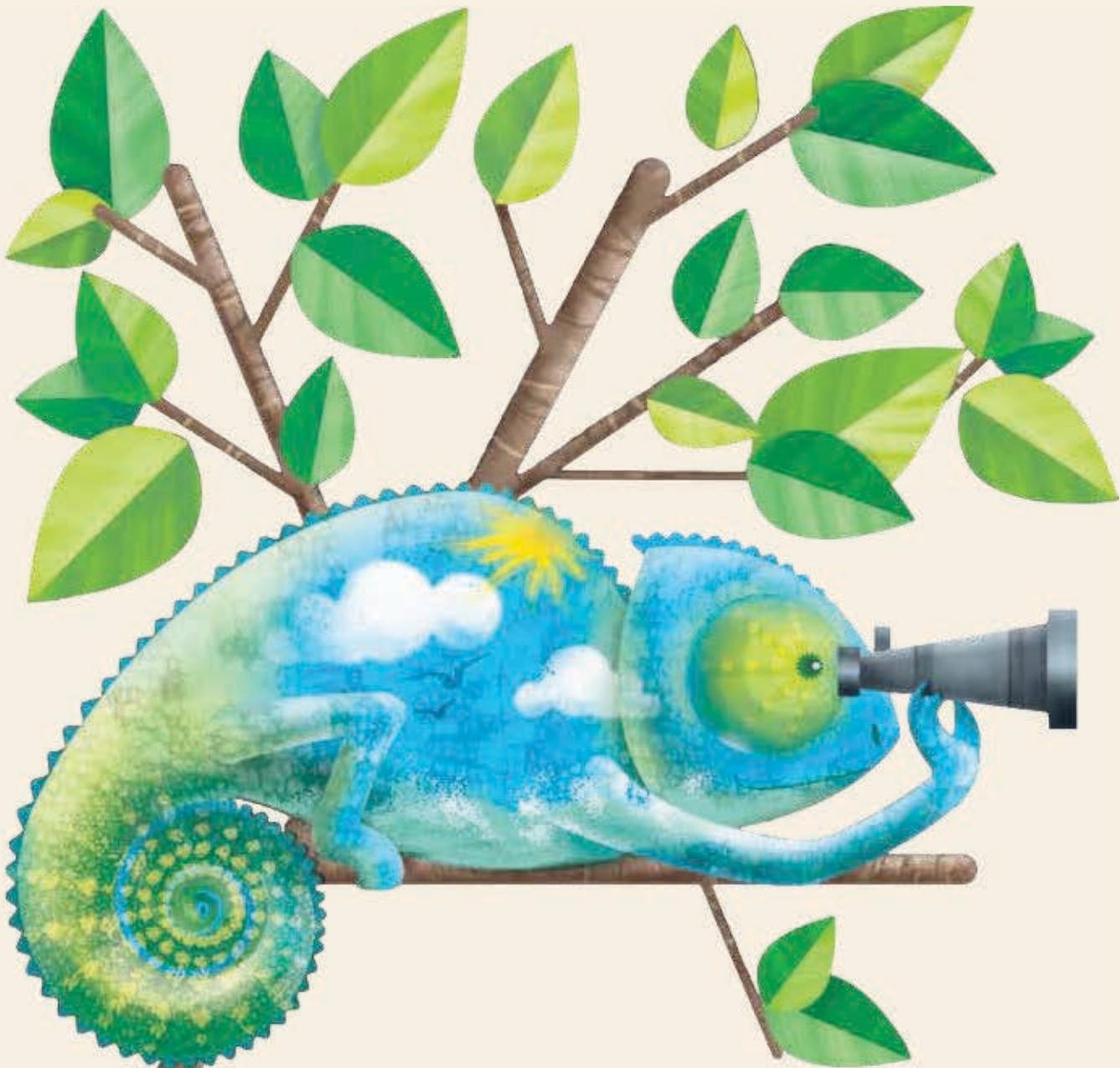


Program Sampler



en**Vision**MATHS™

A whole new teaching equation

www.pearson.com.au/primary/envisionmaths

- Provide a deeper conceptual understanding and higher proficiency in Maths
- Align to Australian Curriculum Mathematics content through direct curriculum links, using enVisionMATHS' instructional design that incorporates the proficiency strands
- Incorporate digital teaching and learning tools
- Use powerful visual learning strategies
- Be supported with expansive teacher support materials



Suggested Teaching Sequence

- 1 Plan**
Teacher Resource Book
 - Plan and pre-assess using resources in the topic-based booklet from the Teacher Resource Box.
- 2 Introduce**
Teacher Resource Book
 - Introduce each lesson by setting the and make connections to students' previous learning
 - Whole class teaching focus consolidating the concept and including problem solving (incorporating use of concrete materials)
- 3 Conceptual Understanding**
Interactive Whiteboard DVD
 - Explore the concept through watching the Visual Learning Animation and the Visual Learning Bridge
- 4 Guided and Independent Practice**
Student Activity Book
 - Students complete activities in Student Activity Book

- 5 Differentiated Group Work**
Activity Zone
 - Small group work with students who may need further instruction while the rest of the class works in groups on differentiated learning centre activities from the Activity Zone, recording their work in their Maths Thinking Skills Book.

(This group work may include digital activities using the Tools4Maths)

 - Differentiated worksheets (from the Teacher Resource CD) used for extra fluency practice at home or school.
- 6 Reflection**
Maths Thinking Skills Book
 - Whole-class reflection. Students record reflections in Maths Thinking Skills Book.
- 7 Assessment**
 - Ongoing and throughout using observations and recorded work in Maths Thinking Skills Book and topic-based pre- and post-assessment from teacher booklet. Includes assessment of reasoning.

Introduction

This sampler of enVisionMATHS demonstrates the suggested teaching sequence using sample pages from the different Year 4 components. This is representative of the components across Years 3 to 6. There are some minor differences between these and the components for Years F to 2, but the suggested teaching sequence is the same. All differences are highlighted with sample pages from the Year 1 components from page 41.

Year 1 & 4 Topics

The enVisionMATHS program is organised around 12 to 13 Topics per year level. All components are connected to the topics.

Topics	
Topic 1	Numbers and Place Value to and Beyond 20
Topic 2	Addition Concepts
Topic 3	Length, Capacity and Mass
Topic 4	Place Value 10s and 1s and Money
Topic 5	Addition Strategies
Topic 6	Shapes and Objects
Topic 7	Time and Location
Topic 8	Subtraction
Topic 9	Numbers and Place Value to 100
Topic 10	Fractions: Equal Parts of Shapes
Topic 11	Data, Graphs and Chance
Topic 12	Making and Sharing Groups
Topic 13	Patterns

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Topic 2 Addition Concepts and Strategies

Skills Trace

Looking Back Year 3 Lessons	Year 4 Topic 2 Lessons	Looking Ahead Year 5 Lessons
<p>Topic 2: Addition Concepts and Strategies</p> <p>2.1 Using Mental Maths to Make 10</p> <p>2.2 Adding Tens to a 2-Digit Number</p> <p>2.4 Adding Tens and Ones</p> <p>2.5 Using Models to Add</p> <p>2.7 Adding Larger Numbers</p>	<p>2.1 Using Mental Maths to Add</p> <p>2.2 Using Models to Add 3-Digit Numbers</p> <p>2.3 Adding Whole Numbers</p> <p>2.4 Adding Three or More Numbers</p> <p>2.5 Using Diagrams to Connect Addition and Subtraction</p>	<p>Topic 2: Addition and Subtraction Mental Strategies</p> <p>2.1 Using Mental Maths to Find Missing Parts</p> <p>2.2 Rounding and Estimating Whole Numbers</p> <p>2.3 Using Mental Strategies to Add and Subtract</p> <p>2.4 Adding and Subtracting Large Numbers</p>

Suggested Teaching Sequence

- Topic**
- Teacher planning (using pages 2–11 of this booklet)
 - Use Topic Opener to introduce topic (page 2)
 - Pre-assessment given to students (pages 23–26)
- Lessons**
- Introduce each lesson by setting the purpose
 - Make connections to students' previous learning (connect)
 - Watch the Visual Learning Animation (VLA) and show students the Visual Learning Bridge (VLB) on the IWB or at the top of the relevant lesson page in the Student Activity Book
 - Whole-class teaching focus consolidating the concept and including problem solving
 - Students complete activities in the Student Activity Book
 - Small-group work with students who may need further instruction (error intervention, extension); rest of class work in groups on differentiated learning centre activities from the Activity Zone that are appropriate to their level (refer to pages 6–10 of this booklet), recording their findings in the Maths Thinking Skills Book
 - Whole-class reflection
 - Students record their reflections in the Maths Thinking Skills Book
 - Differentiated worksheets used for extra practice at home or school
- Assessment**
- Ongoing and throughout using pages 22–30, including post-assessment (pages 27–30), observations and recorded work in the Maths Thinking Skills Book

Note

Blue text = suggested question/language for teachers to use

Pink text = answer/solution

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Strand Colours

- Number and Algebra
- Measurement and Geometry
- Statistics and Probability

written by **Rochelle Manners**
with
Carmen Morgan • Matt Skoss

Maths Background for Teachers



Topic Focus

- There are multiple interpretations of addition, subtraction, multiplication and division of rational numbers, and each operation is related to other operations.
- There is more than one algorithm for each of the operations with rational numbers. Most algorithms for operations with rational numbers, using both mental maths and paper and pencil, use equivalence to transform calculations into simpler ones.

Essential Understandings

- 2.1 There is more than one way to do a mental calculation. Techniques for doing addition mentally involve changing the numbers of the expression so the calculation is easier to do mentally and has the same answer as the original calculation.
- 2.2 Models and standard algorithms for adding 3-digit numbers are just an extension to the hundreds place of the models and standard algorithms for adding 2-digit numbers.
- 2.3 The standard addition algorithm for multi-digit numbers breaks the calculation into simpler calculations using place value, starting with the ones, then the tens and so on.

2.4 Three or more whole numbers can be grouped and added in any order.

2.5 Addition and subtraction are inverse relationships. The inverse relationship between addition and subtraction can be used to find subtraction facts—every subtraction fact has a related addition fact.

Australian Curriculum Links

Number and Algebra

• Number and place value

NA055 Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation 2.5

NA073 Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems 2.1–2.4

• Patterns and algebra

NA083 Use equivalent number sentences involving addition and subtraction to find unknown quantities 2.5

About Addition Concepts and Strategies

Topic Opener

Introduce students to the topic of addition concepts and strategies by focusing on the thought-provoking real-life questions and vocabulary used in the Topic Opener. Encourage students to come up with their own questions. Model the vocabulary listed in the Topic Opener and ensure students understand the terms.

Topic 2 Addition Concepts and Strategies

Vocabulary

- adding
- splitting
- regrouping
- place value blocks
- whole numbers
- sum
- fact family

Construction of the Sydney Harbour Bridge was completed in 1932. The Sydney Opera House was completed in 1973. Use these facts to estimate how many years there were between the completion of each of these famous Australian landmarks.

During the 2009 Ashes cricket series, in the second test match at Lord's, Australia scored 218 runs in the first innings and 388 in the second innings. How many runs did they score in the match?

This map of Australia shows the strong distances between some major cities. How many kilometers is it to drive from Perth to Melbourne, via Adelaide?

Using Mental Maths

What is mental maths? Mental maths is the process of finding an exact answer to a calculation in your head. Mental maths is also used to find an estimated answer. Many mental maths techniques for addition rely on the ability to decompose or break apart numbers in a way that is appropriate to the situation.

Partitioning into place values involves breaking apart one or both numbers into expanded form. Then the 'parts' are rearranged to create a set of additions that are each simpler than the original addition.

Partitioning one addend into place values

$$\begin{aligned} &51 + 28 \\ = &51 + (20 + 8) \\ = &(51 + 20) + 8 \\ = &71 + 8 \\ = &79 \end{aligned}$$

Partitioning two addends into place values

$$\begin{aligned} &51 + 28 \\ = &(50 + 1) + (20 + 8) \\ = &(50 + 20) + (1 + 8) \\ = &70 + 9 \\ = &79 \end{aligned}$$

Bridging tens is another technique. To use this technique, first identify the amount needed to count on from one number to the next multiple of 10. Then use that amount to partition the other number.

$$\begin{aligned} 76 + 15 &= 76 + (4 + 11) && \text{Numerical equivalence} \\ &= (76 + 4) + 11 && \text{Associative property of addition} \\ &= 80 + 11 && \text{Addition} \\ &= 91 && \text{Addition} \end{aligned}$$

These techniques for mental maths are rooted in the properties of numbers and operations. For example, when 15 is replaced by an expression such as 4 + 11, it is an application of numerical equivalence. That is, a number can be named in different ways without changing its value. The justification for other steps varies from calculation to calculation.

Estimation

Why estimate? When you estimate a sum, you determine about how much it is. Students should be encouraged to estimate sums before calculating. This practice helps them keep in mind an approximate number that the answer may be. Then after they have performed the calculation, they can look back to check if the answer is reasonable. As students proceed in their study of mathematics, they will learn about some situations where an estimate is sufficient.



Always distinguish between estimates and exact answers when discussing calculations with students. For example, if $427 + 1 + 291$ is estimated as $400 + 1 + 300$, refer to that sum as 'about 700'.

Using Models

A diagram can be used to represent addition of whole numbers. A labourer earned \$50 at his first job and \$35 at his second. What did he earn in total? [\$85]

$$\text{Initial amount } \$50 \rightarrow \text{Amount added: } \$35 \rightarrow \$50 + \$35 = \$85$$



Give counters to students who are having trouble with addition to model the problems.

Maths Language

Vocabulary

Language of Addition Concepts and Strategies

Help students become familiar with Topic 2 terms as they relate to addition concepts and strategies. The following terms will all be encountered in this topic.

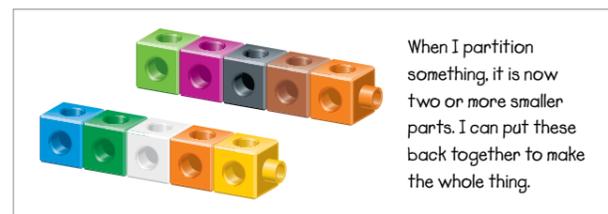
Review Vocabulary	New Vocabulary
place-value blocks	sum
related	bridging
hundreds digit	partitioning
ones digit	splitting
tens digit	regrouping
estimate	fact family
rounding	whole numbers
reasonable	

Connection to Everyday Vocabulary

Making real-life connections to vocabulary can strengthen students' understanding of mathematical terms.

Partitioning Strategy

This strategy works well for addition with or without regrouping. Students should first separate each number into its place value. Starting with the greatest place value, add the sums for each place value.



$48 + 26 = ?$			
Partitioning strategy			Regrouping
40	8	60	50
$+ 20$	$+ 6$	$+ 14$	$+ 26$
60	14	74	76
			$- 2$
			74

Vocabulary Activities

Identifying

Draw a sum on the board and have students identify the answer. Give them three more problems and ask them to estimate the answer and then calculate the sum. Have them describe in a sentence. For example: 'The estimate to this question was four but the answer was five.'

Meeting Individual Needs

ESL



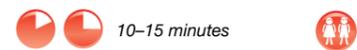
Considerations for ESL Students

Repeated oral-language practice of the terms that describe mental computations will help English learners remember and understand the steps.

- **Beginning** Review with students the term 'estimate' and how to use an estimate to help check their answer to an addition problem.
- **Intermediate** Be sure students understand what it means to estimate first for every problem and that if their answer is not near the estimate, they should check their work.
- **Advanced** Check students understand the term 'compare' and how to compare their estimates with the actual sums and comment on whether or not their estimations are correct (that is, identify whether they are estimating correctly or not).

ESL Activity: Listen Up!

Use with Lesson 2.4



- Some students may have trouble accurately copying large numbers. Write the following numbers on the board in vertical form: 38 451, 146 233; and 34 098, 190 436.
- Group students in pairs with one student reading the first number aloud while their partner copies the number onto paper. When dictating the numbers, students should say each digit rather than reading the word form. For example, 38 451 is dictated as 'three, eight, four, five, one'.
- Have partners swap roles to copy the second number onto paper.

Additional Needs

Considerations for Additional Needs Students

- Additional needs students will benefit from visual models that illustrate how 2-digit numbers can be broken apart and combined in many ways.
- Write $36 + 23$ on the board. Display place-value blocks for each number. Group all the tens blocks together and have students find the sum. Group all the ones blocks together and have students find the sum. Add the sums together to find the total sum of the blocks.
- Write $18 + 46$ on the board. Have students display place-value blocks for each number. Move 2 ones blocks from the model of 46 to the model of 18. Exchange the 10 ones blocks for 1 tens block. Ask students to name the addition sentence the blocks now model and find its sum. [$20 + 44 = 64$]

Additional Needs Activity: Comparing Numbers

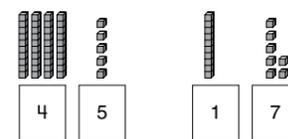
Use with Lesson 2.1



Materials

number cards 0-9
place-value blocks

- Have students shuffle the number cards and place them face down in a stack.
- The first student draws two cards and forms a 2-digit number. The second student uses place-value blocks to model the number.
- The third student draws two more cards and forms another 2-digit number. The fourth student uses place-value blocks to model the number.
- Students then combine all the tens blocks and find the sum. Then they combine the ones blocks and find the sum.
- Students can write and solve a new addition sentence modelled by the blocks.



$$40 + 10 = 50$$

$$5 + 7 = 12$$

$$50 + 12 = 62$$

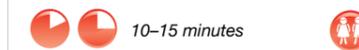
Emerging-level

Considerations for Emerging-level Students

- Pairs of students may benefit from using words to write addition sentences. One partner writes a sentence and the other partner writes the symbols to complete the sentence.

Emerging-level Activity: Original Story Problems

Use with Lesson 2.5



- Instruct partners to each write a joining, separating or comparing story problem involving two characters and the number of books in their bookcases. For example, one character can give the other books, one character can take away some books, or one character can have more books than the other.
- Have partners exchange problems and solve them with both a drawing and a number sentence. If time allows, ask partners to try to modify their story problems so that the necessary operation is now addition or subtraction.

Mark has 7 books in his bookcase. His mother gives him 3 more. How many books does Mark have altogether?
 $7 + 3 = 10$

Mark has 7 books in his bookcase. His mother has 3 in her bookcase. How many more books does Mark have?
 $7 - 3 = 4$

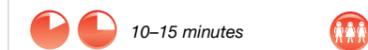
Extending-level

Considerations for Extending-level Students

- Challenge students to use logic and reasoning skills to estimate sums. Have them track the variety of ways in which they are able to solve problems without using a paper-and-pencil method.
- Connect students who have a firm grasp on the paper-and-pencil addition algorithm with the concept of multiplication. Allow them to explore the idea that adding doubles is the same as multiplying by two and so on.

Extending-level Activity: 3-Digit Numbers

Use with Lesson 2.2



- Ask students to take turns doing these steps.
- Write any 3-digit number with 2 in the hundreds place.
- Write any 3-digit number with 4 in the hundreds place.
- Write a third number so that the sum of all three numbers will be between 900 and 1 000.
- Add to verify that the sum is between 900 and 1 000. Students can work together to adjust the third number.
- As an extension, ask students to determine the range of 3-digit numbers that would work given the selection of the first two numbers.
- Have each pair write a set of steps for another, similar problem.

Topic
2

Addition Concepts and Strategies



During the 2009 Ashes cricket series, in the second test match at Lord's, Australia scored 215 runs in the first innings and 388 in the second innings. How many runs did they score for the match?

Construction of the Sydney Harbour Bridge was completed in 1932. The Sydney Opera House was completed in 1973. Use mental maths to estimate how many years there were between the completion of each of these famous Australian landmarks.

Vocabulary

- bridging
- partitioning
- splitting
- regrouping
- place-value blocks
- whole numbers
- sum
- fact family



This map of Australia shows the driving distances between some Australian cities. How many kilometres is it to drive from Perth to Melbourne, via Adelaide?



Topic 2 Lesson 1

Using Mental Maths to Add

Student Activity Book Pages



Topic 2 Lesson 1

Understand it!
Numbers can be broken apart to find sums using mental maths.

Visual Learning Bridge (VLB)

What does it mean to add with mental maths? [Sample response: It means to find the answer in your head.]

Could you separate 14 to 7 + 7 instead of 10 + 4? [Yes.] Would it help the calculations? [No, as it wouldn't make the calculation as easy as using tens.]

Prevent Misconceptions

Students may not understand that partitioning numbers involves two or three additions to do the one sum. Remind students that adding using mental maths uses a series of steps. To help students keep track of steps, have them use sequence words such as first, next, last.

Using Mental Maths to Add

How can you add with mental maths?

Dr Pickford recorded how many whales, dolphins and seals she saw. How many whales did she see during the two weeks?

Find $25 + 14$.

Animal	Week 1	Week 2
Whales	25	14
Dolphins	28	17
Seals	34	18

One way

$25 + 14$
Bridging the tens by adding 5 more to make 30.
 $25 + 14 = 25 + 5 + 9$
 $= 30 + 9$
 $= 39$
Dr Pickford saw 39 whales.

Another way

$25 + 14$
Using partitioning by splitting the numbers. Add the tens. Add the ones.
 $25 + 14 = (20 + 10) + (5 + 4)$
 $= 30 + 9$
 $= 39$
Dr Pickford saw 39 whales.

Mental Computation

- 1 $35 + 26 = 61$ 2 $50 + 42 = 92$
3 $43 + 3 = 46$ 4 $71 + 13 = 84$
5 $52 + 44 = 96$ 6 $54 + 7 = 61$

Guided Practice

Bridge the tens.

- 7 $38 + 26 = 38 + 2 + 24$ 8 $26 + 12 = 26 + 4 + 8$
 $= 40 + 24$ $= 30 + 8$
 $= 64$ $= 38$

Use partitioning.

- 9 $25 + 12 = (20 + 10) + (5 + 2)$ 10 $46 + 23 = (40 + 20) + (6 + 3)$
 $= 30 + 7$ $= 60 + 9$
 $= 37$ $= 69$

Reasoning

- 11 How does knowing that $17 = 2 + 15$ help you to find $28 + 17$ mentally?
Answers will vary. You can bridge the tens by adding 2 to 28 to make 30, and then add the 15 to make 45.

Independent Practice

Use partitioning to add mentally.

- 12 $72 + 18 = (70 + 10) + (2 + 8)$ 13 $34 + 25 = (30 + 20) + (4 + 5)$
 $= 80 + 10$ $= 50 + 9$
 $= 90$ $= 59$

Use bridging the tens to add mentally.

- 14 $47 + 9 = 47 + 3 + 6$ 15 $55 + 37 = 55 + 5 + 32$
 $= 50 + 6$ $= 60 + 32$
 $= 56$ $= 92$

Problem Solving

16a I bought a T-shirt for \$26 and a pair of shorts for \$27. Use mental maths to find the total cost of the two items. **\$53**

b How many different ways can you solve this problem? Explain your thinking.
Answers will vary.
For example, you can bridge the tens ($26 + 4 + 23 = 30 + 23 = 53$) or use partitioning ($20 + 20 + 6 + 7 = 40 + 13 = 53$).

Problem Solving

- 16a The total cost of the two items is \$53.
- b How many different ways did students think of? Ask students to share their strategies to see how many different ways the class has thought of. Are some better than others? Do students now see a better way of thinking?
- Bridging tens $26 + 4 = 30$ $30 + \text{the remaining } 23 = 53$
Partitioning $20 + 20 = 40$ $6 + 7 = 13$ $40 + 13 = 53$
 $26 \text{ and } 27 \text{ are near doubles}$ $\text{Double } 26 \text{ is } 52$ $52 + 1 = 53$ OR $\text{Double } 27 \text{ is } 54$ $54 - 1 = 53$

Topic Focus

There are multiple interpretations of addition, subtraction, multiplication and division of rational numbers, and each operation is related to other operations.

Quick and Easy Lesson Overview

Objective

Students solve problems by adding with mental maths.

Essential Understanding

There is more than one way to do a mental calculation. Techniques for doing addition mentally involve changing the numbers of the expression so the calculation is easier to do mentally and has the same answer as the original calculation.

Vocabulary

bridging
partitioning
splitting
regrouping

Maths Background for Teachers

Instruction in mental arithmetic can help students see that they can make problems easier to solve. In this lesson students learn about partitioning numbers into tens and ones as a technique they can use to simplify an addition problem and find the solution mentally.

Students may find it easier to compute with numbers in different ways. Note that the properties of addition of whole numbers can be used to justify the mental techniques students will use to get correct answers.

Booker et al. (2010) describe a method of 'thinking in tens' to help students add numbers; so $40 + 30 = 70$ is the same as $4 + 3 = 7$. Methods like this and other mental applications that break down the calculations into methods that make it easier for students will be useful.

Set the Purpose

You know how to add numbers on a hundred chart. Today, you will add with mental maths by using place value or by making a ten.

Differentiated Worksheets

Provide spare paper and concrete materials such as counters to help students completing the Replay worksheet to model the additions. Encourage the students attempting the Challenge worksheet to explain their working and to check their answers. Review with students the partitioning principles for the Challenge activity.

Replay

Using Mental Maths to Add

You can break apart numbers to make them easier to add mentally.

Add 21 + 16 by breaking apart numbers.
Break the numbers into tens and ones.
Add the tens: $20 + 10 = 30$
Add the ones: $1 + 6 = 7$
Add the tens: $30 + 7 = 37$
So, $21 + 16 = 37$

Add 26 + 17 by breaking apart numbers to make a ten.
Use a number that adds with the 6 to make a 10.
Since $6 + 4 = 10$, use 4.
Think: $17 = 10 + 7$
Add: $26 + 4 = 30$
Add: $30 + 7 = 37$
So, $26 + 17 = 37$

Find each total using mental maths.

1 $24 + 71 = 95$ 2 $36 + 13 = 49$ 3 $64 + 23 = 87$
4 $25 + 69 = 94$ 5 $37 + 56 = 93$ 6 $77 + 13 = 90$

7 To add $32 + 56$, Chloé first added $30 + 50$. What does she also need to do to find the total? What is Chloé's total?
She needs to add $2 + 6 = 8$ and then $80 + 8 = 88$.

8 How can Steve add $48 + 34$ by making a ten? What is the total?
Steve can break apart 34 as $32 + 2$, so he can make a ten by adding $48 + 2 = 50$. Then he can add $50 + 32 = 82$.

Practice

Using Mental Maths to Add

Bridge to tens to add mentally.

1 $53 + 34 = 87$ 2 $42 + 24 = 66$ 3 $47 + 41 = 88$
 $= 50 + 37$ $= 40 + 28$ $= 40 + 40$
 $= 87$ $= 66$ $= 88$

Use the split strategy to add mentally.

4 $27 + 21 = 48$ 5 $56 + 12 = 68$ 6 $38 + 21 = 59$
 $= (20 + 20) + 7$ $= (50 + 10) + 8$ $= (30 + 10) + 19$
 $= 48$ $= 68$ $= 59$

Find each total using mental maths.

7 $82 + 26 = 108$ 8 $47 + 6 = 53$ 9 $32 + 17 = 49$ 10 $28 + 31 = 59$
 $= 80 + 28$ $= 40 + 13$ $= 30 + 19$ $= 30 + 29$
 $= 108$ $= 53$ $= 49$ $= 59$

11 $43 + 38 = 81$ 12 $72 + 7 = 79$ 13 $42 + 33 = 75$ 14 $56 + 14 = 70$
 $= 40 + 43$ $= 70 + 9$ $= 40 + 35$ $= 50 + 20$
 $= 81$ $= 79$ $= 75$ $= 70$

15 Double twice spent a number into $30 + 7$. What number did he start with?
16 What is the total of $27 + 12$ using mental maths?
A 45 B 69 C 78 D 79

Challenge

Break It Up and Add

1 Which choice helps the most to solve $43 + 87$?
A Think of 43 as 4 + 3.
B Think of 87 as 80 + 7.
C Think of 43 as 40 + 3.
D Think of 87 as 80 + 7.
E Think of 28 as 20 + 8.
F Think of 28 as 25 + 3.
G Think of 28 as 25 + 3.
H You should find the sum using tens. 25 is not a tens number.
I 43 + 87 = 91

2 Which choice helps the most to solve $67 + 297$?
A Think of 67 as 63 + 4.
B Think of 297 as 300 - 3.
C Think of 29 as 25 + 4.
D Think of 67 + 30 = 97, then subtract 1.
E Add 67 + 30 = 97, then subtract 1.
F 67 + 29 = 96

3 Which choice does not help you solve $43 + 28$ using mental math?
A Think of 43 as 40 + 3.
B Think of 28 as 30 - 2.
C Think of 28 as 25 + 3.
D You should find the sum using tens. 25 is not a tens number.
E 43 + 28 = 91



Visual Learning Animation



Explore the concept through watching the Visual Learning Animation and viewing the Visual Learning Bridge on the IWB DVD. The Tools4Maths (IWB e-tools) are also on the IWB DVD.

Topic 2 Lesson 1

Understand it!
Numbers can be broken apart to find sums using mental maths.

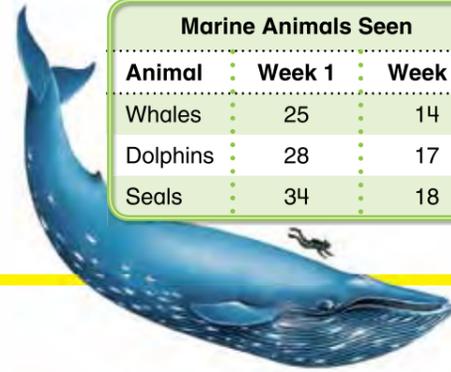
Using Mental Maths to Add

How can you add with mental maths?

Dr Pickford recorded how many whales, dolphins and seals she saw. How many whales did she see during the two weeks?

Find 25 + 14.

Marine Animals Seen		
Animal	Week 1	Week 2
Whales	25	14
Dolphins	28	17
Seals	34	18



One way

25 14
Bridging the tens by adding 5 more to make 30.
25 14 25 5 9
30 9
39

Dr Pickford saw 39 whales.

Another way

25 14
Using partitioning by splitting the numbers. Add the tens. Add the ones.
25 14 (20 10) (5 4)
30 9
39

Dr Pickford saw 39 whales.

Visual Learning Bridge



Tools4Maths (available on each enVisionMATHS Interactive Whiteboard DVD)

Topic **2** Lesson **1**

Understand it!
Numbers can be broken apart to find sums using mental maths.

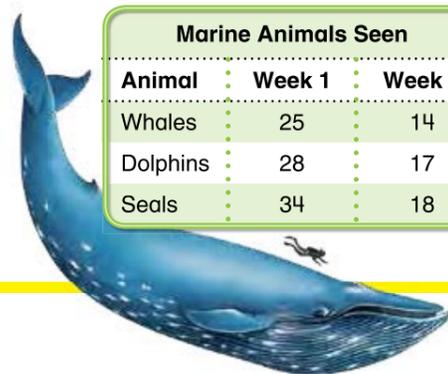
Using Mental Maths to Add

How can you add with mental maths?

Dr Pickford recorded how many whales, dolphins and seals she saw. How many whales did she see during the two weeks?

Find $25 + 14$.

Marine Animals Seen		
Animal	Week 1	Week 2
Whales	25	14
Dolphins	28	17
Seals	34	18



One way

$25 + 14$
Bridging the tens by adding 5 more to make 30.

$$\begin{array}{r} 25 + 14 \\ 25 + 5 = 30 \\ 30 + 9 = 39 \end{array}$$

Dr Pickford saw 39 whales.

Another way

$25 + 14$
Using partitioning by splitting the numbers. Add the tens. Add the ones.

$$\begin{array}{r} 25 + 14 \\ (20 + 5) + (10 + 4) \\ 20 + 10 = 30 \\ 5 + 4 = 9 \\ 30 + 9 = 39 \end{array}$$

Dr Pickford saw 39 whales.

Mental Computation

- 1 $35 + 26 = \square$
3 $43 + 3 = \square$
5 $52 + 44 = \square$

- 2 $50 + 42 = \square$
4 $71 + 13 = \square$
6 $54 + 7 = \square$

Guided Practice

Bridge the tens.

- 7 $38 + 26 = 38 + 2 = 40$
 $40 + 6 = 46$

- 8 $26 + 12 = 26 + 4 = 30$
 $30 + 8 = 38$

Use partitioning.

- 9 $25 + 12 = (20 + 5) + (10 + 2) = 30 + 7 = 37$
10 $46 + 23 = (40 + 6) + (20 + 3) = 60 + 9 = 69$

Reasoning

- 11 How does knowing that $17 + 2 = 19$ help you to find $28 + 17$ mentally?

Independent Practice

Use partitioning to add mentally.

- 12 $72 + 18 = \square$
13 $34 + 25 = \square$

Use bridging the tens to add mentally.

- 14 $47 + 9 = \square$
15 $55 + 37 = \square$

Problem Solving

- 16a I bought a T-shirt for \$26 and a pair of shorts for \$27. Use mental maths to find the total cost of the two items.

- b How many different ways can you solve this problem? Explain your thinking.



Topic 2

enVision Minds

Addition Concepts and Strategies

CARD A STRATEGY

4

Bridging to 100

Rudolf and Jane are working out how many tiles they need for their bathroom. They need 178 wall tiles and 64 floor tiles. How many tiles do they need in total?



I need to find the total of 178 and 64. I can bridge to the nearest 100 to help add these two numbers in my head.

64 can be broken into 22 + 42

$178 + 22 = 200$

$200 + 42 = 242$

So they would need 242 tiles in total.

How would I work this out in my head?

Add the following numbers using the Bridging to 100 strategy. Take turns to answer each question, and explain your thinking to your partner.

- 1 $76 + 37 = ?$
- 2 $87 + 29 = ?$
- 3 $182 + 46 = ?$
- 4 $279 + 48 = ?$

Make up a question for your partner to answer using the Bridging to 100 strategy. Talk about two situations when you might use the Bridging to 100 strategy in real life.

See pages 28 and 29 of this sampler for pages from the Maths Thinking Skills Book where responses to these cards can be recorded.

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Topic 2

enVision Minds

Addition Concepts and Strategies

CARD A QUIZ

4

Instructions

- Read each question to your partner and ask them to write each answer in their *Maths Thinking Skills Book*.
- Check if their answer is correct and ask them to place a ✓ or a X beside their answer.
- Ask them to count the number of ticks and write the number in the 'Total' box at the bottom of their page.



1 Esther had 48 large stickers and 17 small stickers. How many stickers did she have altogether?	65 stickers
2 What is seventy plus twenty?	90
3 What is 175 and 10?	185
4 What is 45 tens plus 3 tens?	48 tens or 480
5 Add 56 to 35.	91
6 What is the total of 23, 27 and 22?	72
7 $68 + ? = 76$	8
8 What is three hundred and fifty plus twenty?	370
9 What is 234 and 100?	334
10 What is 54 tens plus 15 tens?	69 tens or 690
11 Add 124 to 134.	258
12 What is the total of 28, 36 and 25?	89
13 $86 + ? = 124$	38
14 What is four hundred and fifty plus one hundred and thirty?	580
15 What is 432 and 200?	632
16 What is 47 tens plus 24 tens?	71 tens or 710
17 Add 639 to 142.	781
18 What is the total of 47, 33 and	

Quiz questions are in groups of 6 with each group being progressively more difficult.

Activity Zones 3 to 6:

- 2 Minds (Mental computation) cards per topic x 2
- 3 Investigations cards per topic x 2
- 4 Games cards per topic x 1
- 1 Digital card per topic x 4

provided in one box per level.
The 3 to 6 Activity Zone quantities anticipate children working on different activities in different groups.

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Topic
2

enVision Investigations

Addition Concepts and Strategies

CARD A

4

Year 4
Topic 2
Addition Concepts and Strategies
CARD A

1 Investigate the number of students in each class at your school. Show how you could use addition to find the total number of students in the school.

2 Explore the width of your foot and other students' feet. Demonstrate how you could use addition to find out the combined width of your class's feet.

See page 30 of this sampler for a page from the Maths Thinking Skills Book where responses to these cards can be recorded.

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Topic
2

enVision Investigations

Addition Concepts and Strategies

CARD A

4

Year 4
Topic 2
Addition Concepts and Strategies
CARD A

3 Investigate how many syllables are in the last name of each student in your class. Show how you could use addition to find the total number of syllables.

Investigations are progressively more challenging.

4 See how far each member of your class can throw a tennis ball and record the results. Demonstrate how you could use addition to find the total distance of all these throws.

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Topic 2

enVision Games

Addition Concepts and Strategies

CARD A ★

4

Clip and Cover



You Need
 or

- 10 counters in one colour and 10 in another colour
- 2 paperclips
- 2 dice

How to Play

Take turns. Roll two dice to find your ovals. **EXAMPLE:** Choose the 3rd oval on the left and the 5th oval on the right, or choose the 5th oval on the left and the 3rd oval on the right. Mark your ovals with paperclips.

Explain how to add the numbers by breaking them apart.

EXAMPLE: $36 + 19 = (30 + 10) + (6 + 9)$ and $40 + 15 = 55$

Find and cover the answer. Lose your turn if the answer is already taken.

The first player or team to get any three connected squares in a row or column wins.

18	37	55	64	90	25
36	73	43	52	46	54
27	61	70	72	99	46
45	91	82	81	64	19
18					54
36					46

If you have more time

Play again! Talk about how you break apart th

See page 31 of this sampler for a page from the Maths Thinking Skills Book where responses to these cards can be recorded.

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Year 4 Topic 2 Addition Concepts and Strategies CARD A ★



Topic 2

enVision Games

Addition Concepts and Strategies

CARD A ★★

4

Clip and Cover



You Need
 or

- 10 counters in one colour and 10 in another colour
- 2 paperclips
- 2 dice

How to Play

Take turns. Roll two dice to find your ovals. **EXAMPLE:** Choose the 3rd oval on the left and the 5th oval on the right, or choose the 5th oval on the left and the 3rd oval on the right. Mark your ovals with paperclips.

Explain how to add. Make a ten in two different ways.

EXAMPLE: $24 + 39 = (24 + 6) + 33 = 30 + 33 = 63$

EXAMPLE: $24 + 39 = 23 + (1 + 39) = 23 + 40 = 63$

Find and cover the answer. Lose your turn if the answer is already taken.

The first player or team to get any three connected squares in a row or column wins.

There are 1-star and 2-star (more complex) versions of games.

24	76	54	86	65	18
47	81	69	53	71	45
36	42	75	98	92	39
53	92	65	82	63	18
24					29
36					45

If you have more time

Play again! Talk about your strategies as you play.

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enVision Digital

Topic 2 Addition Concepts and Strategies

4

Use: TOOLS & MATHS

- 1 Go to the Place-value Blocks tool.
- 2 Click on the Options tab at the bottom of the screen.
- 3 Click on the down arrow twice, click on the Place-value Charts icon and choose the Hundreds, Ones Place-value Chart. Click on the OK button.
- 4 Click on the Maths Mate button at the top of the screen. Your workspace should now look like this:



- 5 Click on the Hundreds icon in the menu at the bottom of the screen and then click four times in the HUNDREDS column. Count aloud with each click (“one hundred, two hundred, three hundred etc.”). Check that what you say each time matches the number next to the Maths Mate button at the top of the screen. Stop when you get to 400. Your workspace should now look like this:



See page 32 of this sampler for a page from the Maths Thinking Skills Book where responses to this card can be recorded.

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Year 4 Topic 2 Addition Concepts and Strategies



enVision Digital

Topic 2 Addition Concepts and Strategies

4

- 6 Now click on the vertical Tens icon and click twice in the TENS column. Count aloud with each click (“four hundred and ten, four hundred and twenty”). Check that what you say each time matches the number next to the Maths Mate button at the top of the screen. Stop when you get to 420. Your workspace should now look like this:



- 7 Now click on the Ones icon and click three times in the ONES column. Count aloud with each click (“four hundred and twenty-one, four hundred and twenty-two and four hundred and twenty-three”). Check that what you say each time matches the number next to the Maths Mate button at the top of the screen. Stop when you get to 423. Your workspace should now look like this:



- 8 Finally, add on 257 by adding on seven Ones, five Tens and then two Hundreds. Count aloud with each click and check that what you say each time matches the number next to the Maths Mate button at the top of the screen. Now click on the Glue icon in the toolbar, then click and drag over the 10 ones that need to be regrouped. Click on a highlighted one to regroup your ones. Use the Select icon in the toolbar to move the newly made ten into the TENS column. Your workspace should now look like this:



Follow-up tasks:

Use the Hundreds, Tens and Ones icons in the menu at the bottom of the screen to create another number. Count aloud with each click. Challenge your partner to add on another amount where they will need to show regrouping using the Glue icon in the toolbar, to find the total. Can you think of an addition number sentence to show regrouping in the ONES column, and then the TENS column?

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Year 4 Topic 2 Addition Concepts and Strategies

Introduction

In this Maths Thinking Skills Book, you will be able to write and draw your own maths thinking. The pages are divided into different colours, with many of the pages matching the colour of the cards in the Activity Zone.

enVision Minds

You will learn mental maths strategies in your maths classes. The yellow enVision Minds cards in the Activity Zone require you to choose a partner, talk about the mental strategy and to ask each other the mental quizzes on the back of the strategy card. Record your results from these cards and questions on the yellow pages in this book.

enVision Investigations

Investigations are questions about real-life situations. You will be using many different maths skills to answer these questions. Start by choosing one of the blue Investigations cards on your topic from the Activity Zone, then selecting the question you would like to investigate. Record your working out on the blue pages in this book. The first few blue pages in this book have some questions to guide you, but as you improve your investigation skills you will be able to record your work on the blank blue pages, setting your answers out in your own way.

enVision Games

The Activity Zone contains games on your topic for you to play with your friends. Your teacher may ask you to record one of the strategies you use to help win these games. You can write these strategies on the red pages in this book. Your teacher may also ask you to add your own ideas to an enVision game you have played; for example, a new theme, easier or harder rules, a different way to win. You can write these ideas on the red pages in this book.

enVision Digital

When you choose the digital activities from the green cards in the Activity Zone, you can print your work and paste it onto the green pages in this book.

My Reflections

At the end of some of your maths lessons, your teacher will ask you to complete a reflection activity on one of the purple pages of this book. At other times, your teacher will talk to you as a class, allowing you to discuss your reflections rather than write them down.

My Maths Language

As you learn new maths language, your teacher may ask you to write the new words on the orange pages of this book. You can also include diagrams to help explain the meaning of the words.

Contents

 enVision Minds	Strategies	2
 enVision Minds	Quizzes	9
 enVision Investigations	Structured	15
 enVision Investigations	Unstructured	30
 enVision Games	Strategies	45
 enVision Games	Ideas	50
 enVision Digital		55
 My Reflections 1		61
 My Reflections 2		71
 My Reflections 3		81
 My Maths Language		91



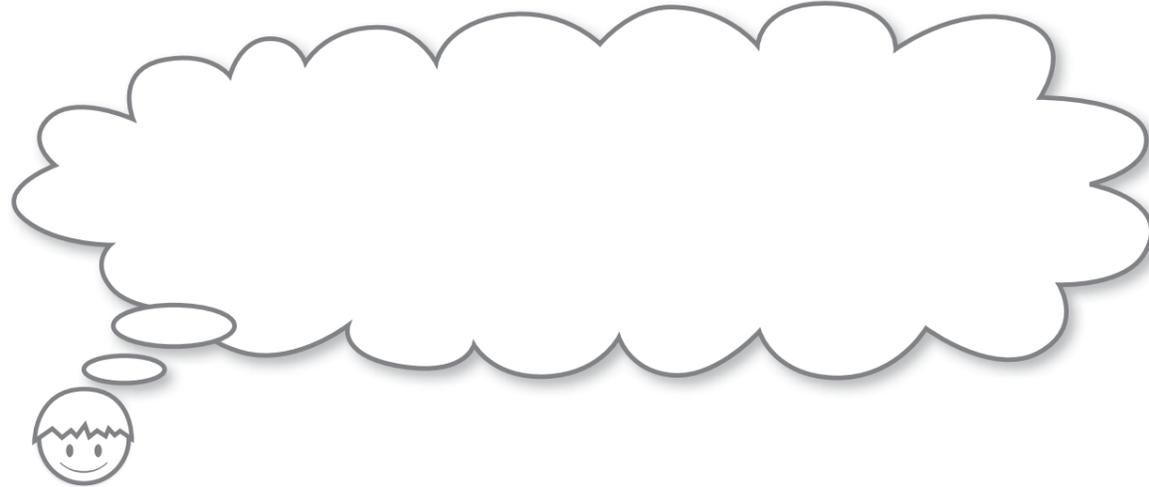
enVision Minds

Strategies

Topic no. _____ Card _____

Strategy _____

How does the strategy on the card make mental maths easier for you?



The card asks you to make up a question for your partner. Write the question for your partner here.

Write the answer to your question here, showing how to use the strategy on the card to get this answer.

Name one of the situations that you discussed where you might use this strategy in real life.

These pages provide formats for responding to the Activity Zone cards shown on pages 18 and 19 of this sampler.



enVision Minds

Quizzes

Instructions

- Select a yellow Minds card on your topic from the Activity Zone.
- Fill in the date, the topic number and the card letter (A or B) below.
- Your partner reads each question. Write your answer below and say it aloud.
- Your partner tells you to place a ✓ or ✗ in the column next to your answer.
- Add up the ✓ and write the number in the 'Total' box.

Date:	Date:	Date:	Date:
Topic: Card:	Topic: Card:	Topic: Card:	Topic: Card:
Answer: ✓/or✗	Answer: ✓/or✗	Answer: ✓/or✗	Answer: ✓/or✗
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
Total:	Total:	Total:	Total:



enVision Investigations

Structured

Instructions

- Select a blue Investigations card on your topic from the Activity Zone.
- Fill in the date, the topic, card A, B or C and the investigation number (1, 2, 3 or 4) below.
- Write the investigation question, then complete the activity.

Date _____ Topic no. _____ Card _____ Investigation no. _____

Investigation question:

My questions:

My maths working out:

My findings:

How I found a solution:

References I used in this investigation:



enVision Games

Strategies

Strategies I Use When Playing enVision Maths Games

•

•

•

•

•

•

•

•

This page provides a format for responding to the Activity Zone cards shown on pages 20 and 21 of this sampler.

This page provides a format for responding to the Activity Zone cards shown on pages 22 and 23 of this sampler.



enVision Digital

A large, empty white rectangular box for writing or drawing.



My Reflections 1

Topic _____

Today I learnt ...

Three horizontal lines for writing.

My level of understanding of this lesson
(colour one face):



Some ways I can use the maths I learnt today in my own life:
(Include pictures if you like.)

A large, empty white rectangular box for writing or drawing.

This page provides a format for responding to the Activity Zone cards shown on pages 24 and 25 of this sampler.

Topic **2**
Lesson **1**
Practice

Name _____

4

Using Mental Maths to Add

Bridge to tens to add mentally.

1 53 34

$$53 \quad \square \quad 4$$

$$83 \quad \square$$

87

$$\text{So, } 53 + 34 = \square$$

2 42 29

$$42 \quad \square \quad 9$$

$$62 + 9$$

71

$$\text{So, } 42 + 29 = \square$$

3 47 41

$$47 + 40 = \square$$

$$\square + 1$$

88

$$\text{So, } 47 + 41 = \square$$

Use the split strategy to add mentally.

4 27 21

$$(20 + 20) + (7 + \square)$$

$$\square + 8$$

48

$$\text{So, } 27 + 21 = \square$$

5 54 12

$$(50 + 10) + (4 + \square)$$

$$60 + \square$$

66

$$\text{So, } 54 + 12 = \square$$

6 38 21

$$(30 + \square) + (8 + 1)$$

$$50 + \square$$

59

$$\text{So, } 38 + 21 = \square$$

Find each total using mental maths.

7 52 26

8 47 8

9 32 17

10 28 31

11 43 38

12 72 7

13 42 33

14 36 14

15 Daniel broke apart a number into 30 + 7.
What number did he start with?

16 What is the total of 27 + 42 using mental maths?

A 68

B 69

C 78

D 79

Topic **2**
Lesson **1**
Challenge

Name _____

4

Break It Up and Add

1 Which choice helps the most to solve $43 + 8$?

A Think of 8 as 4 + 4.

B Think of 43 as 44 + 1.

C Think of 8 as 10 + 2.

Explain. _____

$$43 + 8 = \underline{\hspace{2cm}}$$

2 Which choice helps the most to solve $67 + 29$?

A Think of 67 as 63 + 4.

B Think of 29 as 30 + 1.

C Think of 29 as 25 + 4.

Explain. _____

$$67 + 29 = \underline{\hspace{2cm}}$$

3 Which choice does **not** help you solve $63 + 28$ using mental maths?

A Think of 63 as 60 + 3.

B Think of 28 as 30 + 2.

C Think of 28 as 25 + 3.

Explain. _____

$$63 + 28 = \underline{\hspace{2cm}}$$

Overview of Assessment

The focus of assessment in enVisionMATHS is both formative and summative assessment.

Assessment should be more than merely a test at the end of instruction to see how students perform ... it should be an integral part of instruction that informs and guides teachers as they make instructional decisions. Assessment should not merely be done to students; rather, it should also be done for students, to guide and enhance their learning.

(NCTM 2000, p. 22)

The formative assessment tools are used to determine students' achievements, resulting in action plans, for both teacher and student, in the pursuit of further learning. The summative assessment tools are used to determine an overall measure of achievement at the end of a topic. Assessments focus on the following concepts.

Maths Concepts for Addition Concepts and Strategies

- 1 Mental Maths (Lesson 2.1)
- 2 Models for Adding (Lesson 2.2)
- 3 Addition of Larger Numbers (Lessons 2.3 and 2.4)
- 4 Diagrams for Adding (Lesson 2.5)

Formative Assessment

Pre-assessment for Each Maths Concept Within the Topic

This pre-assessment helps to gauge the ability of the students in a particular area of mathematics, providing information about a student's strengths and weaknesses.

The results of this assessment guide and support teachers in customising instruction for individual student needs. This form of assessment should be administered at the beginning of each topic. It covers both prerequisite material and new content.

There are four questions in each pre-assessment: Q1 multiple choice; Q2 short answer; Q3 reasoning; and Q4 problem solving.

During a Lesson

- Error intervention
- Prevent misconceptions
- Small-group interaction
- Differentiated worksheets

Summative Assessment

Post-assessment for Each Maths Concept Within the Topic

The post-assessment provides teachers with information about a student's achievement on a particular topic that has just been studied. These results help the teacher determine whether a student requires revision or intervention in that topic. It also allows teachers to chart a student's progress from the beginning of the topic to the end, and gives them information to report back to parents.

There are four questions in each post-assessment: Q1 multiple choice; Q2 short answer; Q3 reasoning; and Q4 problem solving.

Assessment Formats

Each of these assessments incorporates a range of assessment styles. Different approaches to and formats for assessment are required to measure the mathematical knowledge, skills and attitudes of students.

Multiple Choice

Multiple-choice assessment is helpful for teachers wanting to implement a quick and practical assessment task for students. These tests measure students' levels

of mathematical fluency and allow a quick and direct opportunity for teachers to identify strengths and weaknesses in their students' maths ability. The multiple-choice style of assessment also reflects that which is used for NAPLAN at Years 3, 5, 7 and 9.

Short Answer (Free Response)

Free-response assessment helps to eliminate guessing the correct answer. Students answer a question and may have the opportunity to represent their answer pictorially.

These questions can be more open-ended but not too wordy as they could restrict some students' access to maths learning due to language barriers.

Reasoning

Students' reasoning includes their capacity for logical thought and actions such as analysing, proving, evaluating, explaining, inferring, justifying and generalising. The reasoning questions ask students to demonstrate their level of understanding by explaining their thinking behind their choices. This allows teachers to elicit a wealth of information even though the assessment instrument is a written test. Information on students' reasoning makes it possible to identify misconceptions and inconsistencies. It allows the teacher to identify emerging ideas in students' thinking so they can be clarified, shared and formalised.

Problem Solving

Problem-solving assessment allows students to demonstrate their problem-solving skills by applying various mathematical problem-solving techniques to non-routine problems. Students are assessed on how they organise information, decode graphic representations, make generalisations and justify conclusions from data.

The problem-solving assessment questions appear at the end of each assessment so students have to think about which maths tools or processes they need to apply to formulate their answers.

Diagnostic Assessments on DVD

The diagnostic pre- and post-assessments are also found on the Teacher Resource DVD for Year 4. While teachers may wish to simply photocopy and administer each assessment as it appears in the following pages, the DVD format allows teachers to select and print PDFs of pre- and post-assessments for Year 3, 4 or 5.

Further Assessment

Other opportunities for assessment throughout the program include:

- observation of a student's attitude and ability in maths classes
- problem-solving discussion based on each lesson's problems; for example, identifying and comparing approaches to answers by students
- a record of each student's maths thinking in the various sections of the Maths Thinking Skills Book, including self-assessment through reflection activities.

Observable Skills for Addition Concepts and Strategies

- Uses mental maths to calculate addition
- Regroups ones to tens, tens to hundreds, hundreds to thousands
- Adds whole numbers
- Adds three or more numbers
- Checks calculations by estimating

Topic 2 Addition Concepts and Strategies

Pre-assessment

Name

Concept 1: Mental Maths

1 Which of the following add to 110? (Use mental maths.)

- | | | |
|---------------------------------|---------------------------------|---------------------------------|
| a <input type="radio"/> 55 + 65 | b <input type="radio"/> 47 + 63 | c <input type="radio"/> 100 + 1 |
| <input type="radio"/> 55 + 55 | <input type="radio"/> 43 + 63 | <input type="radio"/> 10 + 1 |
| <input type="radio"/> 55 + 45 | <input type="radio"/> 47 + 67 | <input type="radio"/> 110 + 10 |
| <input type="radio"/> 45 + 45 | <input type="radio"/> 67 + 53 | <input type="radio"/> 100 + 10 |

2 Use mental maths to calculate the total time John is playing rugby when he goes on the field first for 32 minutes and then goes on for another 12 minutes.

3 What number completes this number sentence family?

$$11 = 7 + 4$$

$$11 = 4 + 7$$

$$7 = 11 - 4$$

$$\underline{\quad} = 11 - 7$$

Explain.

4 Each day for four days, Tessa went jogging. The first day she jogged for 35 minutes, the second 112 minutes, the third 45 minutes, and the fourth 67 minutes. How many minutes did Tessa jog over the four days?

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Topic 2 Addition Concepts and Strategies

Post-assessment

Name

Concept 1: Mental Maths

1 Which does not have the same value as the others?

- | | | |
|-----------------------------------|---|--|
| a <input type="radio"/> 38 | b <input type="radio"/> $60 + 5$ | c <input type="radio"/> $77 + 23$ |
| <input type="radio"/> $30 + 8$ | <input type="radio"/> $70 - 5$ | <input type="radio"/> $77 + 3 + 20$ |
| <input type="radio"/> $40 - 8$ | <input type="radio"/> $50 + 15$ | <input type="radio"/> 100 |
| <input type="radio"/> $40 - 2$ | <input type="radio"/> 75 | <input type="radio"/> $70 + 10 + 30$ |

2 Use mental maths to calculate how long in total it took to travel to the local shop if you stopped after 23 minutes and still had 14 minutes to go.

3 Use bridging the tens to add mentally: $46 + 8$. Then use partitioning to add mentally.

Explain which strategy is easier for this problem.

4 How many different ways can you solve the following problem?

You spent \$34 on a jacket and then \$23 on a pair of pants.
How much did you spend in total?

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Year 1 Sample pages

The preceding pages show sample pages from enVisionMATHS Year 4 across all components. There are some differences in the components and instructional design of the program between the F to 2 and 3 to 6 levels. The following section displays pages from the Year 1 components that demonstrate some of the differences.



Topic 4 Place Value 10s and 1s and Money

Contents

Skills Trace

Looking Back Year 1 Lessons

Topic 1 Numbers and Place Value to and Beyond 20

- 1.1 Counting and Writing Numbers 0 to 5
- 1.2 Counting and Writing Numbers 6 to 10
- 1.3 Counting and Writing Numbers 10, 11, 12
- 1.4 Counting and Writing Numbers 13 to 19
- 1.5 Counting and Writing Numbers to 20
- 1.6 Ordering Numbers Using a Number Line
- 1.7 Counting Beyond 20
- 1.8 Comparing Two Numbers
- 1.9 Ordering Three Numbers

Year 1 Topic 4 Lessons

- 4.1 Representing Numbers on a Ten Frame
- 4.2 Understanding Parts of 10
- 4.3 Using Numbers Made with 10s
- 4.4 Using Numbers with 10s and 1s
- 4.5 Counting with 10s and 1s
- 4.6 Writing Numbers in Different Ways
- 4.7 Identifying Features and Values of Coins
- 4.8 Recognising the Values of Coins

Looking Ahead Year 1 and 2 Lessons

Year 1 Topic 9 Numbers and Place Value to 100

- 9.1 Making Numbers to 100
- 9.2 Identifying One More, One Less
- 9.3 Counting to 100
- 9.4 Comparing Numbers
- 9.5 Identifying Before, After and Between
- 9.6 Ordering Numbers on a Number Line

Year 2 Topic 9 Using Money

- 9.1 Counting Collections of Coins
- 9.2 Showing the Same Amount in Different Ways
- 9.5 Recognising and Counting Notes and Coins

Suggested Teaching Sequence

Topic

- Teacher planning (using pp. 2–11 of this booklet)
- Topic engagement activities (p. 6)
- Interview assessment given to students (p. 29)
- Pre-assessment given to students (p. 30)

Lessons

- Introduce each lesson by setting the purpose.
- Watch the VLA (Visual Learning Animation) and show students the Visual Learning Bridge (VLB) on the IVB or as a printed copy to support students in understanding the concept.
- Whole-class teaching focus exploring and consolidating the concept.
- Students complete activity in the Student Activity Book.
- Small-group work with students who may need further instruction (error intervention, extension), rest of class work in groups on differentiated learning centre activities from the Activity Zone that are appropriate to their level (refer to pp. 8–11 of this booklet), recording their work in their Maths Thinking Skills Book.
- Whole-class reflection.
- Students record reflections in their Maths Thinking Skills Book.
- Differentiated worksheets used for extra practice at home or school.

Assessment

- Ongoing and throughout using pp. 28–37, including post-assessment, observations and recorded work in the Maths Thinking Skills Book.

Note

Blue text = suggested question/language for teachers to use.

Pink text = answer/solution.

Planning 2

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enVisionMATHS™

Strand Colours

Number and Algebra

Measurement and Geometry

Statistics and Probability

written by **Kerrie Shanahan**

with

Carmen Morgan • Matt Skoss • Greg Thomas

Maths Background for Teachers



Topic Focus

Number Uses, Classification and Representation: Numbers can be used for different purposes and numbers can be classified and represented in different ways.

Equivalence: Any number, measure, numerical expression, algebraic expression or equation can be represented in an infinite number of ways that have the same value.

The Base Ten Numeration System: The base ten numeration system is a scheme for recording numbers using digits 0–9, groups of ten and place value.

Measurement: Some attributes of objects are measurable and can be quantified using unit amounts.

Essential Understandings

- 4.1 Numbers to 10 can be represented on a ten frame using 5 and 10 as benchmarks.
- 4.2 The number 10 can be broken into parts of the whole in different ways.
- 4.3 The decade numbers to 100 are built on groups of ten. When there are only tens, counting by 10s can be used to find how many there are altogether.
- 4.4 Sets of 10 can be perceived as single entities. In a standard numeral the tens are written to the left of the ones.
- 4.5 When objects are grouped in sets of 10 and leftovers (ones), counting the groups of 10 and adding ones tells how many there are altogether.
- 4.6 Numbers greater than 10 can be represented as the sum of the tens and the ones.
- 4.7 Each coin has a specific value, features and a set value.
- 4.8 Different coins have different values.

Australian Curriculum Links

Number and Algebra

Number and place value

- NA012** Develop confidence with number sequences to and from 100 by ones from any starting point. Skip count by twos, fives and tens starting from zero **4.1–4.2, 4.4–4.6**
- NA013** Recognise, model, read, write and order numbers to at least 100. Locate these numbers on a number line **4.1–4.2, 4.4–4.6**
- NA014** Count collections to 100 by partitioning numbers using place value **4.2–4.6**

Money and financial mathematics

- NA017** Recognise, describe and order Australian coins according to their value **4.7–4.8**

The Base Ten Number System

Why Base Ten?

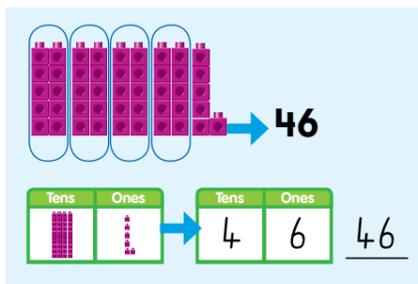
Our place-value number system is called a base ten system because each place represents an increasing power of 10 – ones, tens, hundreds, thousands and so on. Although other cultures in ancient times used other bases, the system we use today is probably based on the fact that we have 10 fingers. When people were beginning to develop the idea of numbers they ran out of fingers to count on. They had to devise a way of showing numbers greater than 10, so they ended up using the concept of groups of 10 in addition to individual units. This eventually grew into our present base-ten system, which allows us to express infinitely large and infinitely small numbers.

It is critical that students understand the concept of 10, because the ability to work with place value, regrouping and many other concepts depends on that understanding.

Reading and Writing Numbers

The way we say a number, such as 46, is also connected to the grouping-by-tens concept. When we count by tens and ones we say the number of groups and singles separately: '4 tens and 6 ones'.

In the same way the symbols that we use for writing numbers (ones on the right, tens on the left of the ones) coordinate with the grouping-by-tens concept. Counting by groups and singles matches the left-to-right manner in which numbers are written.



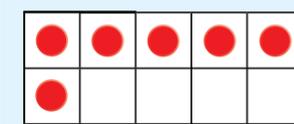
To avoid digit reversal (e.g. 64 for 46), try to emphasise writing numbers in the order in which they are spoken. Write digits left to right in the order that words are spoken. It is important here to note the difference between the spoken and written, e.g. that words such as forty name four groups of 10.

Number Relationships

5 and 10 as Benchmarks

Understanding number relationships is the basis for understanding ideas about numbers and operations. The relationship of numbers to 5 and 10 is particularly useful in thinking about various combinations of numbers. Thinking about 7, for example, as '5 and 2 more' and as '3 away from 10' can help answer $5 + 2$, $7 - 5$, $7 - 2$ and $7 + 3$. In later years, similar relationships can be used to mentally compute with greater numbers.

Ten frames are an excellent way to help students recognise numbers without having to stop their thought process to resort to counting. By using the ten frame model to develop 5 and 10 as benchmarks in number relationships, students are building foundations for written and mental computation strategies for adding and subtracting.



6 is 1 more than 5.
6 is 4 fewer than 10.



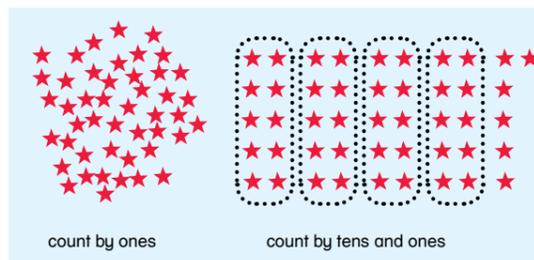
Help students to develop mental images of numbers by having them work with numbers arranged in patterns. Ten frames, dominoes, playing cards and rectangular arrays all display numbers in easy-to-comprehend layouts. Students may even want to create their own arrangements of objects that make it easy for them to recognise quantities.

Place Value

Basic Ideas

Understanding place value requires integrating the concept of grouping by tens with the knowledge of how groups are recorded in our place-value system, how numbers are written and how they are spoken.

Students can count out a set of 46, one by one, but they should also see that making groupings of tens and leftovers is another more efficient way of counting the same quantity.



Provide students with opportunities to count sets of objects in different ways. If students count the set by ones, ask questions such as, 'What will happen if you count these by tens and ones?' If the set has been grouped and counted by tens and ones, ask: 'What do you think you will get if you count the set by ones?'

Money

Money provides the units used to measure the value or cost placed on objects. Formal computations involving money use precisely those number skills required to cope with operations on whole numbers and hundredths, and therefore provide a motivational context in real-world situations that are highly relevant to all children for learning the number operations involved ... Children need to develop the ability to recognise coins and to handle money.

(Booker et al. 2010, p. 490)

Examples of coins can be dated back to 650 BC. As well as being an important part of everyday human life, money demonstrates real-life examples of how we use maths.

Using our money system also provides students with many opportunities to practise and develop their maths number skills and ability. Knowledge of place value 10s and 1s is used to determine value, addition and subtraction is used to work out amounts, and counting on is an important strategy to find a total. We recognise and describe the values of Australian coins by their unique appearance as well as their monetary value.

Students can learn more about our money system by comparing it with Asian coins and money systems that are different from our own.

For example, Indonesian rupiah consists of coins from 25 rupiah to 1 000 rupiah. The South Korean won (W) comes in W10, W50, W100 and W500 coins and Japanese yen comes in ¥10, ¥50, ¥100 and ¥500 coins.

Ask students to compare coins from Asian countries with Australian coins: **What is similar about the coins? What is different? How could you group these coins?**



To obtain these coins you could ask students if they have any Asian coins at home, ask fellow teachers or visit the bureau de change.

Maths Language

Meeting Individual Needs

Vocabulary

The Language of Place Value 10s and 1s and Money

As students begin to work with numbers greater than 10, they need to be able to use the correct mathematical terminology as they learn the concept of place value.

The concept of numbers as quantities that are made up of parts is more complicated for students than simple counting. Students will need to utilise the words 'part' and 'whole' and their synonyms in order to explore this idea.

The following vocabulary will be encountered in this topic.

Review Vocabulary	New Vocabulary
More than	Tens
Less than	Ones
Whole	Digit
Part	Break apart a ten
	Coins
	Cents
	Dollars
	Value

Connections to Everyday Vocabulary

Making real-life connections to vocabulary can strengthen students' understanding of mathematical terms.

Ones

Ones are single items.

There is one chocolate in each wrapper.



Tens

When we talk about tens we talk about 10 items that are in a group.

There are 10 bananas in the bunch.



Digit

A digit is any of the single numbers from 0 to 9 (0, 1, 2, 3, 4, 5, 6, 7, 8, 9). Therefore, a 2-digit number has two digits in it, e.g. 32, 46, 87, etc.



A digit is a single number.

Whole

The whole is the complete thing or the full amount.

This is the whole cake.



Part

A part is only some of a thing, not all of the thing.

This piece of cake is part of the whole cake.



Vocabulary Activities

Number Pictures

Give each student a sheet of drawing paper with a 2-digit number on it. Have students use stickers to illustrate their numbers by making the proper number of tens and ones with their stickers. Underneath, have students write a caption telling the numbers of objects shown.



Part-Part-Whole

Have each student cut out a picture from a magazine and cut it into two pieces. Have students glue the pieces onto a sheet of paper, labelling each part with the word 'part'. Underneath have them sketch the picture before it was divided and label it with the word 'whole'.

What's the Missing Part?

Have students draw a simple picture with a part missing. Have them sit knee-to-knee with a partner and take turns to find the missing part in each picture.



ESL

Considerations for ESL Students

Combining auditory and visual skills will help English language learners use, learn and incorporate number terms and concepts. Regular reinforcement will promote familiarity and provide English language learners with confidence in using these terms correctly.

- Beginning** Have students skip count by tens as you point to the written numeral every day until they have mastered the names of the multiples of ten.
- Intermediate** Each day write five 2-digit numerals on the board. Call on students to read each one aloud. Reinforce the concept of place value by repeating the number and then stating how many tens and ones make up the number.
- Extending** Reinforce the idea that words such as twenty, thirty and forty name groups of ten. On the board write *twenty = 2 tens*. Ask students for the word that means 3 tens and then write *thirty = 3 tens*. Continue with the multiples of ten through to ninety.

ESL Activity: Perfect Tens

Use with lesson 4.3



Materials

Chart paper, felt markers, 100 paperclips

- English language learners may have difficulty learning the names of groups of ten. To help students learn the names, create a 2-column chart.
- Have students count 10 paperclips. Write 10 in the first column and ten in the second column on the chart. Continue with 20 to 100.
- Display the chart in the classroom.

10	ten
20	twenty
30	thirty
40	forty
50	fifty
60	sixty
70	seventy
80	eighty
90	ninety
100	one hundred

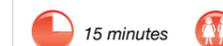
Additional Needs

Considerations for Additional Needs Students

- Although some additional needs students may only feel comfortable counting actual objects, it is important to encourage them to begin to visualise numbers as well. Provide students with cubes or counters to help them solve the problems in this topic. If students have difficulty manipulating these objects provide them with larger materials such as large place-value blocks.
- Provide students with many opportunities to practise ten facts.
- Practise oral counting daily with students. Use movements such as clapping or stomping as you count to highlight the tens.

Additional Needs Activity: Ten Facts

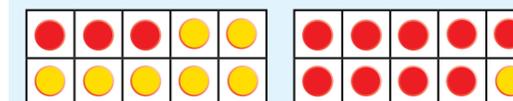
Use with lesson 4.2



Materials

Ten frame, cards with the digits 1 to 9 on them, counters (two different colours)

- Have students turn the cards face down.
- One student turns a card over and their partner counts out that number of counters in one colour and places them on the ten frame.
- The other student says the ten fact. If the card turned over is 3 the response would be '3 and 7 is 10'. Have students model the fact by filling the ten frame with the counters in another colour.
- Repeat with the remaining cards.



Three and seven makes ten.

Nine and one make ten.

For Years F-3, suggestions are provided for ESL (EAL/D) and Additional Needs Students. For Years 4-6, suggestions are also provided for Emerging- and Extending-level students.

Topic 4 Lesson 1

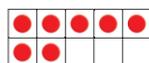
Representing Numbers on a Ten Frame

Topic 4 Lesson 1

Visual Learning Bridge (VLB)



What number is this?



The number is more than 5.

How do you know there are more than 5 counters? [The top row is filled and there are more counters in the bottom row. So there must be more than 5.]



7

What does the ten frame show? [7] How can you use 5 to describe the number 7? [5 and 2 more is 7.] How can you use 10 to describe 7? [7 is 3 less than 10.]



4

The number is less than 5.

You can see that the first four sections of the ten frame have counters. What number is shown? [4] How can you use 5 to describe 4? [4 is one less than 5.]



9

The number is less than 10.

What is the number shown on the ten frame? [9] How can you use 5 to describe 9? [5 and 4 more is 9.] How can you use 10 to describe 9? [9 is

Visual Learning Bridges are separate from Student Activity Book pages (single pages).

Arrangement of lesson pages in Teacher Booklets for F-2 is different from 3-6 due to differences in Student Activity Books. See Year 1 Student Activity Book sample pages on pages 52 & 53.

Topic Focus

Number Uses, Classification and Representation: Numbers can be used for different purposes and numbers can be classified and represented in different ways.

Quick and Easy Lesson Overview

Objective

Students will learn to recognise numbers on a ten frame, noting the relationship of those numbers to 5 and 10.

Essential Understanding

Numbers to 10 can be represented on a ten frame, using 5 and 10 as benchmarks.

Vocabulary

More than
Less than

Materials

Counters
Ten frames
Sets of number cards 1-10

Set the Purpose

Today you will learn how to find the number shown on a ten frame.

Teaching Focus

Draw 3 ten frames on the board. I am going to make three different numbers on these ten frames. Draw in spots on the ten frames to make three different numbers. Point to the first ten frame. What number have I made here? Ask students to explain how the number relates to either 5 or 10 or both.

Invite a student to draw dots on the ten frame on the board to make a number. Ask another student to say the number and describe it in terms of 5 or 10 or both. [Sample answer: You have made 8. 8 is three more than 5. 8 is two less than 10.] Give other students the opportunity to make numbers on the board using the ten frame.

Provide pairs of students with a ten frame and some counters. One student asks the other student to show them a number, e.g. 'Make 4 on your ten frame'. After the student has made the number their partner explains how it relates to 5 or 10, e.g. 4 is one less than 5. Partners then change roles. Give the students the opportunity to make at least three different numbers on their ten frame.

Write this problem on the board: Jon says the number on the ten frame is 5 and 4 more. Danny says the number on the ten frame is one less than 10. What number is it? Ask students to turn and tell a partner what they think the answer is. Discuss their ideas with the whole group.

Error Intervention

If students are having difficulty determining how many counters are in the ten frame remind them to start counting from the top left box, and if there are more than 5 counters continue counting from the bottom left box.

You could also take the time with these students to make the numbers from 1 to 10 one at a time on the ten frame.

Extension

Give each student a number between 1 and 10 and ask them to make a poster about that number. In the poster the student needs to show what that number looks like on a ten frame and write sentences about the number underneath that explain that number's relationship to 5 or 10 or to both these numbers. Ask students to share their finished posters with the whole group and then display them in the classroom.

Reflection

During the whole-class reflection remind students of the purpose of the lesson. Today you learnt how to recognise numbers on a ten frame. You also learnt how to explain how this number relates to either 5 or 10 or both. What things help you to know what number is being shown on a ten frame? Compile students' answers on a chart.

Students have a go at recording their ideas in their Maths Thinking Skills Book (MTSB). They may also complete another page of the MTSB to reflect on one of the learning centre activities they completed from the Activity Zone.

Student Activity Book Page

Solution to problem-solving question is on p. 7.

enVision Games

These games can be used as a way for students to practise recognising numbers shown on a ten frame. They will need to think about the relationship these numbers have to 5 and to 10 when playing these games. Provide students with counters and ten frames if they need extra support to play the games.

There are games for every lesson in F-2 rather than a selection per topic in 3-6.

Materials needed: 1 dice, 6 red counters, 6 blue counters, number tiles 1 to 9 in a bag

Differentiated Worksheets

Topic Engagement Links

The following are suggested as ideas and resources for engaging students with the topic and connecting the concepts to real-life contexts.

Prior Knowledge Task

Ask students to choose a number between 0 and 100 and have them record everything they know about that number. Encourage students to use numbers, words, pictures and diagrams to record their knowledge.

Have students brainstorm a list using words, pictures and symbols to show what they know about money.

Displays

Display a hundred chart in the classroom. Students could also have smaller versions of the hundred chart laminated on their table tops.

Books and Stories

Stuart J. Murphy, *A Fair Bear Share*, Harper Collins, 1982
This story about blueberry pie and the bears that are baking it introduces students to the concept of grouping by tens and ones. By doing this the bear cubs realise that one cub has not done her fair bear share!

Judith Viorst, *Alexander, Who Used to be Rich Last Sunday*, Macmillan, 1978
Last Sunday Alexander was given a dollar. He was rich! He had so many things he wanted to buy. Somehow, however, his money soon disappeared! **What would you buy with one dollar?**

Songs and Rhymes

Sing a Song of Sixpence

Sing a song of sixpence a pocket full of rye,
Four-and-twenty blackbirds baked in a pie.
When the pie was opened the birds began to sing,
Wasn't that a dainty thing to set before the king?

What numbers can you hear in this rhyme? How would we usually say the number four-and-twenty? Point out that in the past people would say, for example, six-and-forty for forty-six. Pairs of students could take turns to say a number in the 'old-fashioned' way and their partner could say it the way we say it today. Compare the 'old-fashioned' money system to our current system.

Games

Make Me a Number

Students work with a partner. Students take turns to make a number using cubes and ask their partner to estimate what that number is. The students then check the number together. Students then change roles.

Visualising 10

Students work in pairs. Use cards with pictures of numbers represented on a ten frame. Show these cards to students very briefly (no more than 2 seconds) so that they don't have time to count them.

Students discuss with their partner how many they think they saw, then share answers with the whole class. Discuss the strategies students used. For example: **I saw a pattern of 3 in each grid but the one on the left had one more underneath.**

Board Games

Many board games involve number concepts. Games such as Snakes and Ladders, Monopoly and Trouble all involve the use of maths skills and knowledge. Invite students to bring in a board game from home and have a games afternoon.

Shop Corner

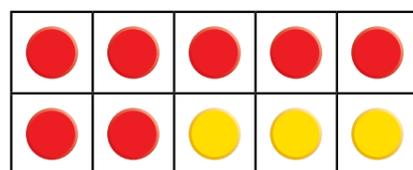
Set up a shop in the corner of the classroom with empty grocery packets and plastic coins. Students practise buying and selling items.

F to 2: topic engagement links are provided on page 6 of each Teacher booklet.

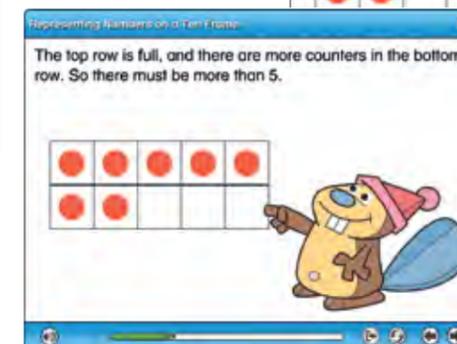
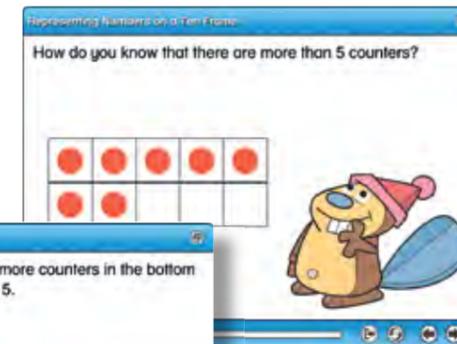
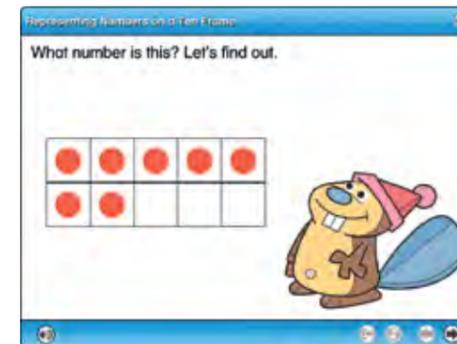
F to 2: short topic explanations appear in the Student Activity Book Contents and in the Overview and Implementation Guides for teachers to read aloud

Topic 4 Place Value 10s and 1s and Money

We often count in tens or to the nearest ten. Our number system is based on tens. This topic will help you learn more about counting. Our money system is also based on tens. Here you will learn all about our coins.

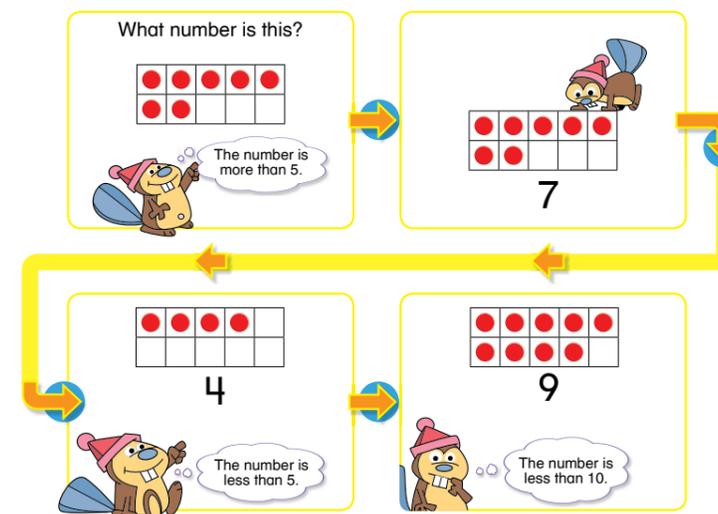


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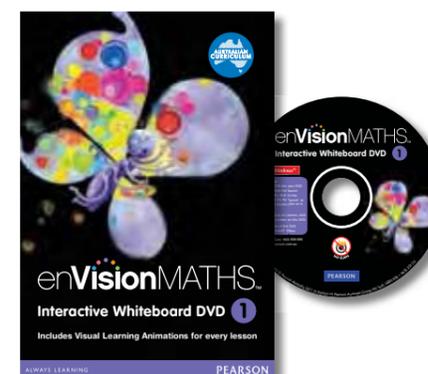


Explore the concept through watching the Visual Learning Animation and viewing the Visual Learning Bridge on the IWB DVD. The Tools4Maths (IWB e-tools) are also on the IWB DVD.

Topic 4 Lesson 1 Representing Numbers on a Ten Frame



F to 2: Visual Learning Bridges are provided as PDFs on the IWB DVD and in the Teacher Resource Box (on the Teacher Resource DVD) rather than on the Student Activity Book pages.





Topic 4

enVision Investigations

Place Value 10s and 1s and Money

CARD A



1

Year 1 Topic 4 Place Value 10s and 1s and Money CARD A ★

How many 2-digit numbers are there where one of the digits is one-half of the other?

See page 63 of this sampler for pages from the Maths Thinking Skills Book where responses to these cards can be recorded.

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Topic 4

enVision Investigations

Place Value 10s and 1s and Money

CARD A



1

Year 1 Topic 4 Place Value 10s and 1s and Money CARD A ★★

The 2-star investigation builds upon the 1-star version, which is shown on the previous page.

Look at the numbers. What do you notice?

Activity Zones at F to 2:
 • 2 to 5 Investigations cards per topic x 4
 • 1 Game card per lesson x 4
 • 1 Digital card per topic x 4
 provided in two boxes per level.
 The F to 2 Activity Zone quantities anticipate younger children working on the same activities in different groups.

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Year 1 Topic 4 Lesson 1 Representing Numbers on a Ten Frame



Topic 4

Lesson 1

enVision Games

Representing Numbers on a Ten Frame



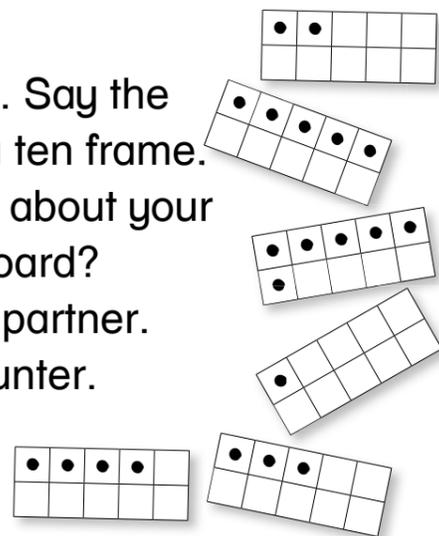
1

You Need

- 6 red counters
- 6 blue counters

How to Play

Take turns. Roll the . Say the number. Point to it on a ten frame. Do you see a sentence about your number on the game board? If you do, say it to your partner. Then cover it with a counter. If not, lose your turn.



My number is four less than five.	My number fills a whole row.	My number is one less than five.
My number is two less than five.	My number is one more than five.	My number is four less than five.
My number is one more than five.	My number is three less than five.	My number fills a whole row.

How to Win

To win, get: ■■■ or ■ or ■ or ■

Play Again

Have another go!

See page 64 of this sampler for a page from the Maths Thinking Skills Book where responses to these cards can be recorded.

There are 1-star and 2-star (more complex) versions of games.

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Topic 4

Lesson 1

enVision Games

Representing Numbers on a Ten Frame



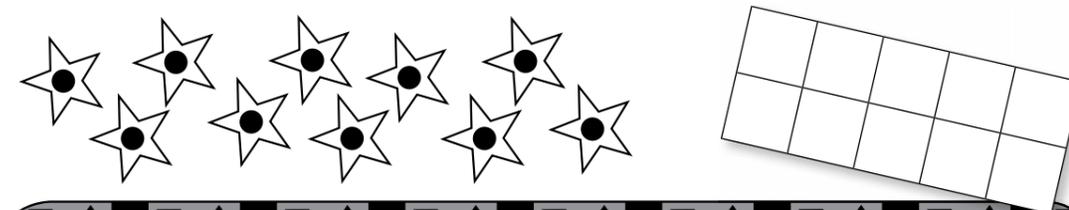
1

You Need

- 1 2 3 4 5 6 7 8 9 in a
- 6 red counters
- 6 blue counters

How to Play

Take turns. Pick a tile. Say how that number looks on a ten frame. Find a sentence about your number on the game board. Say it to your partner. Then, cover it with a counter. Set the tile aside.



Year 1 Topic 4 Lesson 1 Representing Numbers on a Ten Frame

My number is two less than five.	My number is five in a row and one more.	My number fills up a whole row.
My number is three less than five.	My number is nine less than ten.	My number is five in a row and three more.
My number is one less than five.	My number is five in a row and two more.	My number is one less than two full rows.

How to Win

To win, get: ■■■ or ■ or ■ or ■

Play Again

Have another go!

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Topic
4

enVision Digital

Place Value 10s and 1s and Money

1

Use: TOOLS & MATHS

- 1 Go to the Place-value Blocks tool.
- 2 Click on the Options tab at the bottom of the screen.
- 3 Click on the down arrow twice, click on the Place-value Charts icon and then choose the Tens, Ones Place-value Chart. Click on the OK button.
- 4 Click on the Maths Mate button at the top of the screen. Your workspace should look like this:



- 5 Click on the Tens icon in the menu and then click 6 times in the TENS column. Count aloud with each click (“ten, twenty, thirty, forty, fifty, sixty”). Check that your counting matches the number next to the Maths Mate button.

See page 65 of this sampler for a page from the Maths Thinking Skills Book where responses to these cards can be recorded.

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Topic
4

enVision Digital

Place Value 10s and 1s and Money

1

- 6 Click on the Ones icon in the menu. Now click in the ONES column 4 times. Count aloud with each click (“sixty-one, sixty-two, sixty-three, sixty-four”). Check that your counting matches the number next to the Maths Mate button. Your workspace should look similar to this:



- 7 Clear your workplace then have a go making another number between 10 and 99.

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Contents

Introduction

In this book you will find space to write and draw your maths goals and thinking. The pages have **different colours** because they ask you to do different things. Some pages are the same colour as the cards in the Activity Zone. When you use the Activity Zone cards, you can go to those pages with the same colour to show your work.



My Maths Goals

There are eight Maths Goals pages. There is a page for the beginning of each term, where you can record your maths goals. There is also a page for the end of each term, where you can think about what you have learnt. **Pages 2–5 and 87–90**



enVision Minds

You will learn many mental maths strategies in your maths classes. You can see how smart you are getting in maths by recording the strategies you have learnt on the yellow pages in this book. There is a yellow page for each topic. **Pages 6–18**



enVision Investigations

When you do a maths investigation, you can do your work on the bright blue pages! The first few pages have questions to help you. But later the pages are blank, so you can come up with your own ways to record investigations. You can take notes, make a diagram, create a table or draw a picture. You can also come up with your own maths questions and do your work on these blue pages. **Pages 19–40**



enVision Games

You can record the maths strategies you have learnt for playing games on the red pages. **Pages 41–60**



enVision Digital

You can use the green pages for your computer work. There is a green page for each topic. Only print out your best work to keep. **Pages 61–73**



My Reflections

Your teacher may ask you to reflect on your maths. You can do this by talking to your classmates or writing on a purple page. There is a purple page for each topic. **Pages 74–86**



My Maths Language

At the back of the book, there are some orange pages where you can make your own maths glossary. You can write notes or draw pictures to explain what maths words mean. **Pages 91–94**



My Maths Goals

Date _____

This term in maths, I learnt _____



enVision Minds

See how smart you are getting at quickly solving maths problems in your head.

Date _____

If I had to explain to someone how to do _____

in their head, I would say

enVision Minds

To develop an understanding of place value, the first concept students must grasp is that a group of ten objects can be called '1 ten'.

Children first need to visualise numbers and then use materials as a basis for talking about them in order to develop the language used to name numbers. Only then will the symbols make sense and be used as a concise representation of ideas that are understood.

(Booker et al. 2010, p. 82)

After students have had the opportunity to explore 2-digit numbers using concrete materials they can begin to record 2-digit numbers. Students should be given the opportunity to make and then record 2-digit numbers in a variety of ways to help them fully understand the value of the 10s and the 1s in 2-digit numbers.

Mental Computation

When students think mentally about numbers they will visualise these numbers. This will help them to develop their understanding of numbers and their relationships to other numbers. Estimation skills play an important role in mental computation. Knowing the name and value of coins in our money system automatically is also an essential skill for students to develop. The following games and activities will help students develop these skills.

Guess the Secret Number

Ask students to visualise a ten frame. Give students clues about a number and ask them to guess it. Some examples:

- If there are 3 empty spaces in a ten frame, what number is shown?
- On a ten frame the top row is full and the bottom row is empty. What number is shown?
- There are 4 empty spaces on the ten frame. What number is shown?

Double-Digit Dilemma

Give the students a clue and ask them to guess the number. For example:

- I am a 2-digit number. I have 5 tens. The number in my ones column is an odd number. What number could I be? {51, 53, 55, 57, 59}
- I am a 2-digit number. The number in my ones column is 8. The number in my tens column is two less than the number in the ones column. What number am I? {68}
- There are 30 ones in this 2-digit number. What number am I? {30}
- I am a 2-digit number but I have a 0 in the ones column. What number could I be? {10, 20, 30, 40, 50, 60, 70, 80 or 90}

Coin Call Out

Have students sit with a partner. One student holds a coin in their clenched fist. They undo their fingers and show the coin to their partner for a split second. Their partner has to identify the coin. Are they correct? Students can then swap roles.

Recording Thinking

Students will learn many mental maths strategies in their maths classes. They can see how smart they are getting in maths by recording their results and strategies on the yellow pages in the Maths Thinking Skills Book, pp. 6–18.

enVision Minds Page from Maths Thinking Skills Book

8 Topic 4 Place Value 10s and 1s and Money enVision Minds

Across F–2 mental computation activities are provided on page 8 of each Teacher Booklet rather than on cards in the Activity Zone (as in 3–6). Pages for responses are still provided in the Maths Thinking Skills Book for F–2.



enVision Investigations

See how you can solve investigations.

Date _____ Topic no. _____ Card _____

To do an investigation, it helps to read the question and write down the important words.

What are the important words in this problem?

In this investigation, I found out _____

This page provides a format for responding to the Activity Zone cards shown on pages 54 and 55 of this sampler.



enVision Games

See how you learn with maths games.

Date _____ Topic no. _____

To play this game, I had to think _____

This page provides a format for responding to the Activity Zone cards shown on pages 56 and 57 of this sampler.



enVision Digital

Look what I learnt on the computer!

Date _____ Topic no. _____

This page provides a format for responding to the Activity Zone cards shown on pages 58 and 59 of this sampler.



My Reflections

What I did in maths today.

Today we learnt about _____

I felt



My Maths Language

Write and draw on this page to help you remember what maths words mean.

Topic **4** Lesson **1** **Replay**

Name _____

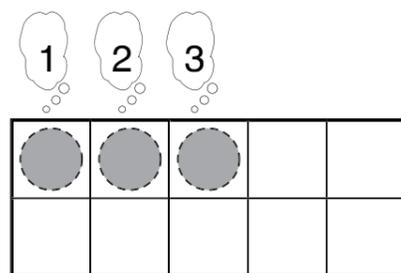
1

Representing Numbers on a Ten Frame

You can use a ten frame to show numbers up to 10.

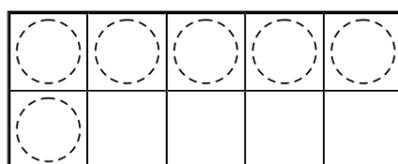
To show 3, start at the top left box.

Count as you draw a counter for each number.

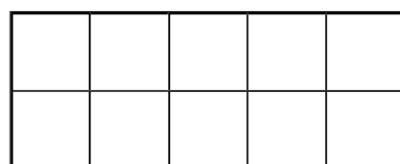


Draw counters in the ten frame to show each number.

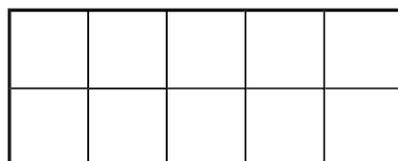
1 6



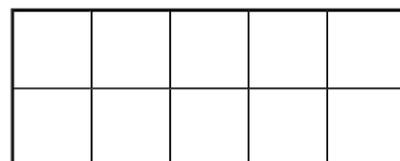
2 8



3 7



4 9



Topic **4** Lesson **1** **Practice**

Name _____

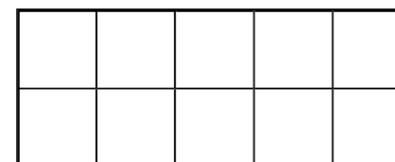
1

Representing Numbers on a Ten Frame

Draw counters in the ten frame to show each number.

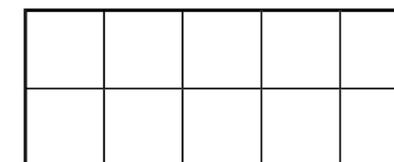
1

4



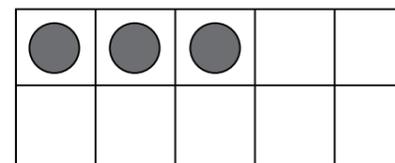
2

6

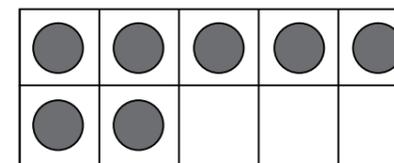


Write the number shown on each ten frame.

3

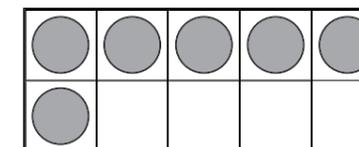


4



5

Kylie put 6 counters in a ten frame. How many more counters should Kylie put in the frame to make 10?



A 2

B 3

C 4

D 5

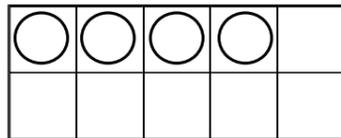
Topic **4** Lesson **1** **Challenge**

Name _____

1

The Dog House

Katie's Dog Hotel has room for 10 dogs.
Katie keeps track of how many dogs are at the hotel.
She draws 1 water bowl for each dog at the hotel.
Here is how she showed 4 dogs.



Help Katie keep track of how many dogs are at the hotel each day. Draw dog bowls or circles to show how many dogs are at the hotel.

1 On Thursday, there were 6 dogs at the Dog Hotel.

2 On Friday, there were 8 dogs at the Dog Hotel.

3 On Saturday, there were 10 dogs at the Dog Hotel.

4 Katie learns that on Sunday, 3 less than 10 dogs are coming to the hotel. What will she draw to show this?

Overview of Assessment

The focus of assessment in enVisionMATHS is both formative and summative assessment.

Assessment should be more than merely a test at the end of instruction to see how students perform ... it should be an integral part of instruction that informs and guides teachers as they make instructional decisions. Assessment should not merely be done to students; rather, it should also be done for students, to guide and enhance their learning.

(NCTM 2000, p. 22)

The formative assessment tools are used to determine students' achievements, resulting in action plans for both teacher and student in the pursuit of further learning. The summative assessment tools are used to determine an overall measure of achievement at the end of a topic. Assessments focus on the following concepts:

Maths Concepts for Place Value 10s and 1s and Money

- Using Numbers Made with 10s (lessons 4.1–4.3)
- Using Numbers Made with 10s and 1s (lessons 4.4–4.6)
- Counting with 10s and 1s (lessons 4.5–4.6)
- Identifying Features and Values of Coins (lessons 4.7–4.8)

Formative Assessment

Interview Assessment

This is intended to be used before teaching the topic, although there is also value in using it after a topic in certain situations.

Pre-assessment for Each Maths Concept Within the Topic

This pre-assessment helps to gauge the ability of the students in a particular area of mathematics, providing information about a student's strengths and weaknesses.

The results of this assessment guide and support teachers in customising instruction for individual student needs. This form of assessment should be administered at the beginning of each topic. It covers both prerequisite material and new content.

Prior Knowledge Task (p. 6)

This task can be repeated and compared to see how students' conceptual understandings have changed during the course of the topic.

There are three questions in each pre-assessment: Q1 multiple choice, Q2 short-answer and Q3 problem solving.

During a Lesson

- Error intervention
- Small-group interaction
- Prevent misconceptions
- Differentiated worksheets

Summative Assessment

Post-assessment for Each Maths Concept Within the Topic

The post-assessment provides teachers with information about a student's achievement on a particular topic that has just been studied. These results help the teacher determine whether a student requires revision of, or intervention on, that topic. It also allows teachers to chart a student's progress from the beginning of the topic to the end and gives them information to report back to parents.

There are three questions in each post-assessment: Q1 multiple choice, Q2 short-answer and Q3 problem solving.

Assessment Formats

Each of these assessments incorporates a range of assessment styles. Different approaches to, and formats for, assessment are required to measure the mathematical knowledge, skills and attitudes of students.

Multiple Choice

Multiple-choice assessment is helpful for teachers to implement a quick and practical assessment task for students. These tests measure students' levels of mathematical fluency and allow for a quick and direct opportunity for teachers to identify strengths and weaknesses in their students' maths ability. The multiple-choice style of assessment also reflects that which is used for NAPLAN at Years 3, 5, 7 and 9.

Short-Answer (Free Response)

Free-response assessment helps to eliminate guessing the correct answer. Students answer a question and may have the opportunity to represent their answer pictorially. These questions can be more open-ended, but not too wordy, to avoid language barrier issues.

Reasoning

Students' reasoning includes their capacity for logical thought and actions such as analysing, proving, evaluating, explaining, inferring, justifying and generalising. During the Interview Assessment the teacher will ask students to demonstrate their level of understanding by explaining their thinking behind their choices. This allows teachers to elicit a wealth of information. Information on students' reasoning makes it possible to identify misconceptions and inconsistencies. It allows the teacher to identify emerging ideas in students' thinking so they can be clarified, shared and formalised.

Problem-Solving

Problem-solving assessment allows students to demonstrate their problem-solving skills by applying various mathematical techniques to non-routine problems. Students are assessed on how they organise information, decode graphic representations, make generalisations and justify conclusions from data.

Diagnostic Assessments on DVD

The diagnostic pre- and post-assessments are also found on the Teacher Resource DVD for Year 1. While teachers may wish to simply photocopy and administer each assessment as it appears in the following pages, the DVD format allows teachers to select and print PDFs of pre- and post-assessments for Years F, 1 and 2.

Further Assessment

Other opportunities for assessment throughout the program include:

- observation of a student's attitude and ability in maths classes
- problem-solving discussion based on each lesson's problems
- a record of each student's maths thinking in the various sections of the Maths Thinking Skills Book, including self-assessment through reflection activities.

Observable Skills for Place Value 10s and 1s and Money

- Represents numbers to 10 on a ten frame using 5 and 10 as benchmarks.
- Represents 10 in parts in different ways.
- Skip counts by 10s to find out how many in a group.
- Reads, writes and makes models of 2-digit numbers.
- Understands that 2-digit numbers are made up of 10s and 1s and that the value of each digit number is related to the way it is represented.
- Identifies and names coins in the Australian money system.
- Describes the features of each coin.
- Understands that each coin has a different value and orders coins according to their values.

An interview assessment and prior knowledge task are included for F–2.

Topic 4 Place Value 10s and 1s and Money

Interview Assessment

Name

Materials: ten frame, counters, cubes, pencil, paper, Australian coins

1 Provide the student with a ten frame and some counters. **Show me 7 using your counters on the ten frame. Does the top row being full help you know this shows 7? How?** Check to see if the student relates 7 as being 2 more than 5. **How can you use 10 to describe 7?** Check to see if the student can relate 7 as being 3 less than 10.

2 Provide the student with connecting cubes. **Can you show me the number 34 with your cubes?** Check to see if the student shows this as 3 groups of ten (3 ten trains of cubes) and 4 left over (4 loose cubes). **How many cubes have you shown? [34] Explain how this shows 34.** Check to see if the student is able to explain that each ten train has ten cubes and that 3 tens make 30. Check to make sure the student can explain that the 4 loose cubes represent the 4 leftovers, that is, the 4 that did not fit into the groups of 10.

3 **Can you check to make sure there are 34 cubes? How?** Check to see if the student skip counts by 10s to count to 30 and then counts on from 30 to make 34. If the student counts each cube one by one, you could ask: **Is there a quicker way to find out how many cubes altogether?** Check to see if the student understands that each cube train has 10 in it and skip counts by tens to get to 30.

4 Provide a pencil and paper and ask the student to write the number 34. **How many tens in 34? How many ones? How could you write this?** Check to see if the student knows to write 3 tens and 4 ones as 34. **How did you know to write 34? What does the 3 stand for?** Check to see if the student knows that the 3 means there are 3 groups of ten in this number. **What does the 4 stand for?** Check to see if the student knows that the 4 in 34 means there are 4 ones in this number.

5 Show the student one of each of the Australian coins.

Do you know the names of these coins? Check to see if the student can identify and name the coins.

Point to the \$1 coin. **What could you buy for \$1?**

Check for reasonable responses. Check to see if the student shows an understanding of the value of \$1.

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ISBN 978 1 4425 3011 9

Example of interview assessment; one is provided for each topic across F–2.

Topic 4 Place Value 10s and 1s and Money

Pre-assessment

Name

Concept 1: Using Numbers Made with 10s

1 What is the number?

a 4 tens

4

b 5 tens

50

c 2 tens

2

14

5

20

40

15

12

2 Draw a picture to show 3 tens. Write the number in the box.

3 What numbers ending in 0 come between 20 and 70?

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Topic 4 Place Value 10s and 1s and Money

Post-assessment

Name

Concept 1: Using Numbers Made with 10s

1 What is this number?

- | | | |
|--------------------------|--------------------------|---------------------------|
| a 1 ten | b 6 tens | c 10 tens |
| <input type="radio"/> 1 | <input type="radio"/> 16 | <input type="radio"/> 1 |
| <input type="radio"/> 11 | <input type="radio"/> 60 | <input type="radio"/> 100 |
| <input type="radio"/> 10 | <input type="radio"/> 6 | <input type="radio"/> 10 |

2 Draw a picture to show 5 tens. Write the number in the box.

3 What numbers ending in 0 come between 32 and 81?

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Teacher Resource Box
• 12 to 13 topic booklets
• Overview and Implementation Guide
• Teacher Resource DVD with planning documents, worksheets, assessment items and Visual Learning Bridges

Interactive Whiteboard DVD
• Captivating Visual Learning Animations
• Visual Learning Bridges
• Tools4Maths (11 digital tools) for interactive work

Student Activity Book
• Allows for further conceptual understanding, fluency building, reasoning, mental computation and open-ended problem solving
• F-2 books: 96 pages (approx.)
• 3-6 Books: 232 pages (approx.)

Activity Zone
• Laminated topic-based cards, colour-coded and provided in multiples for group work
• Investigations, digital activities, games and (for 3-6) mental computation cards
• F-2: 2 boxes (4 copies of every card)
• 3-6: 1 box (1 to 4 copies of every card)

Maths Thinking Skills Book
• Links directly to the cards activities in the Activity Zone
• Allows students to record their maths thinking and reflections
• A valuable portfolio of the student's maths thinking and goals
• Both 96 pages

Year	Teacher Resource Box	Interactive Whiteboard DVD	Student Activity Book	Activity Zone	Maths Thinking Skills Book
Year F	ISBN 978 1 4425 3007 2	ISBN 978 1 4425 3008 9	ISBN 978 1 4425 2927 4	ISBN 978 1 4425 3009 6	
Year 1	ISBN 978 1 4425 3011 9	ISBN 978 1 4425 3012 6	ISBN 978 1 4425 3010 2	ISBN 978 1 4425 2498 9	ISBN 978 1 4425 3006 5
Year 2	ISBN 978 1 4425 3014 0	ISBN 978 1 4425 3015 7	ISBN 978 1 4425 3013 3	ISBN 978 1 4425 3016 4	
Year 3	ISBN 978 1 4425 3023 2	ISBN 978 1 4425 3024 9	ISBN 978 1 4425 3022 5	ISBN 978 1 4425 3025 6	
Year 4	ISBN 978 1 4425 3018 8	ISBN 978 1 4425 3019 5	ISBN 978 1 4425 3017 1	ISBN 978 1 4425 3020 1	ISBN 978 1 4425 3021 8
Year 5	ISBN 978 1 4425 3027 0	ISBN 978 1 4425 3028 7	ISBN 978 1 4425 3026 3	ISBN 978 1 4425 3029 4	
Year 6	ISBN 978 1 4425 3031 7	ISBN 978 1 4425 3032 4	ISBN 978 1 4425 3030 0	ISBN 978 1 4425 3033 1	

Program Sampler

enVisionMATHS™

A whole new teaching equation

"We have been using enVisionMATHS since the beginning of this term. Our teachers from K–7 are using this resource in their classrooms and are extremely happy with it.

As Western Australian schools move towards the new Australian Curriculum Mathematics, it is easy to ensure complete coverage of the content through the use of enVisionMATHS. In our context—having a large population of EAL/D (ESL) students—the ability to provide differentiated worksheets with each topic is invaluable. Also, the visual learning bridges are extremely useful as our teachers are able to discuss students' understandings and development of concept knowledge as the stages of the video progress. We have begun creating word walls with the mathematics vocabulary provided with enVisionMATHS as a means to ensure a common language for our students as they move through their schooling. The assessment provided as part of this resource is comprehensive and provides a wealth of information. The planning documentation is also very widespread and our teachers are utilising this to guarantee complete coverage of content.

We believe the purchase of the enVisionMATHS resource for our school has not only provided teachers with a well-produced, effective resource, it has also ensured our students have the maximum potential for improved mathematical educational outcomes."

Jacqui Gannon
Curriculum Leader
Nollamara Primary and Intensive English School, WA

www.pearson.com.au/primary/envisionmaths

Find your Pearson Consultant's details by visiting www.pearson.com.au/findmyconsultant

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