

### Summary of students' performance by the end of Grade 2

#### Reasoning and problem solving

Students represent and interpret mathematical problems by using numbers, objects, signs and symbols, or simple diagrams. They explain in their own words or by using diagrams the method used to solve a simple problem. They explain a simple line of reasoning.

#### Number and algebra

Students understand and use place value in numbers up to 1000. They know by heart addition and subtraction facts to 20. They use these facts and their knowledge of the inverse relationship between addition and subtraction to calculate with larger numbers and to check results. They choose, use and explain mental methods to add and subtract multiples of 1, 10 or 100 to two- and three-digit numbers and written column methods to add and subtract numbers with two digits. They understand the operations of multiplication and division. They know by heart multiplication tables for 2, 5 and 10, and other facts to  $5 \times 5$ , and use them to multiply and divide, recording results in a number sentence. They use the four operations to solve routine and non-routine one-step problems. They find the unknown number in problems such as  $\square + 6 = 11$  and  $15 - \square = 8$  and solve real-life word problems involving money or a standard unit of measurement.

#### Geometry and measures

Students identify common 2-D and 3-D shapes, straight and curved lines and flat and curved surfaces. They measure and compare length, weight and capacity using standard metric units, reading scales to the nearest division. They use a ruler to measure and draw lines to the nearest centimetre. They tell the time to the nearest 5 minutes and calculate a simple time difference.

#### Data handling

Students make and interpret pictograms where the symbol represents a group of 2, 5 or 10 units. They answer questions by using data from simple graphs and tables.

### Content and assessment weightings for Grade 2

The mathematics standards for Grades K to 9 are grouped into four strands: reasoning and problem solving; number and algebra; geometry and measures; and data handling.

The reasoning and problem solving strand cuts across the other three strands and should be integrated with them in teaching and assessments. For Grade 2, about 40% of the teaching and assessment of each of the other three strands should be devoted to reasoning and problem solving.

For Grades 1 to 6, the weightings of the three content strands relative to each other are as follows:

Number and algebra	Geometry and measures	Data handling
60%	30%	10%

The standards are numbered for easy reference. Those in shaded rectangles, e.g. 1.2, are the performance standards for all students. The national tests for mathematics will be based on these standards.

**Grade 2 teachers should review and consolidate Grade 1 standards where necessary.**

### Reasoning and problem solving

By the end of Grade 2, students represent and interpret mathematical problems by using numbers, objects, signs and symbols, or simple diagrams. They explain in their own words or by using diagrams the method used to solve a simple problem. They explain a simple line of reasoning.

#### Students should:

#### 1 Use mathematical reasoning to solve simple problems

- 1.1** Represent a problem by using numbers, objects, signs and symbols, or simple diagrams (see also standard NA 4.18).

*Mohamed had 3 pots with 5 pencils in each pot.*

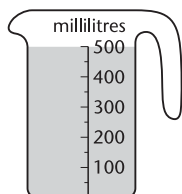
*How many pencils did he have altogether?*

*Which one of these would you use to work out the answer to the question?*

- A.  $5 + 5$     B.  $3 + 3$     C.  $5 \times 3$     D.  $3 + 5$

- 1.2** Explain orally in own words or by using numbers, objects, signs and symbols or simple diagrams the method used to solve a simple problem.

*A jug has 500 millilitres of water in it.*



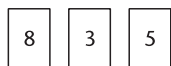
*150 millilitres of water are poured out of the jug.*

*How much water is left in the jug?*

*Explain how you worked out your answer.*

- 1.3** Explain a simple line of reasoning.

*Look at these digits.*



*Use all the digits to make the number nearest to 600.*



*Explain how you arrived at your answer.*

#### Key standards

Key performance standards are shown in shaded rectangles, e.g. **1.2**.

#### Cross-references

Standards are referred to using the notation RP for reasoning and problem solving, NA for number and algebra, GM for geometry and measures and DH for data handling, e.g. standard NA 2.4.

#### Examples of problems

The examples of problems in italics are intended to clarify the standards, not to represent the full range of possible problems.

Grade 2 students are not necessarily expected to read the examples. It is assumed that the teacher asks many of these and similar questions orally.

# Number and algebra

By the end of Grade 2, students understand and use place value in numbers up to 1000. They know by heart addition and subtraction facts to 20. They use these facts and their knowledge of the inverse relationship between addition and subtraction to calculate with larger numbers and to check results. They choose, use and explain mental methods to add and subtract multiples of 1, 10 or 100 to two- and three-digit numbers and written column methods to add and subtract numbers with two digits. They understand the operations of multiplication and division. They know by heart multiplication tables for 2, 5 and 10, and other facts to  $5 \times 5$ , and use them to multiply and divide, recording results in a number sentence. They use the four operations to solve routine and non-routine one-step problems. They find the unknown number in problems such as  $\square + 6 = 11$  and  $15 - \square = 8$  and solve real-life word problems involving money or a standard unit of measurement.

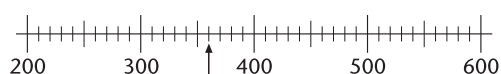
## Students should:

### 2 Understand and use place value in whole numbers to 1000

2.1 Read and write whole numbers up to 1000 in numerals and words.

2.2 Represent the place value of three-digit numbers (hundreds, tens, ones) using models and expanded notation, e.g.  $574 = 500 + 70 + 4$ .

*What number is the arrow pointing to?*



2.3 Compare and order a set of three-digit numbers and position them on a number line.

*Write these numbers in order of size.*

456    299    901    472    575  
              
smallest

### 3 Recognise properties of numbers and number sequences

3.1 Count on or back from a given three-digit number in 1s, 10s, 100s.

3.2 Count in steps 2, 3, 4, 5 and 10 from zero to the 10th multiple.

*Fill in the two missing numbers in this sequence.*

28 24 20 ... 12 8 ... 0

### 4 Add, subtract, multiply and divide whole numbers and apply these skills to solving routine and non-routine problems

#### Addition and subtraction

4.1 Know by heart addition and subtraction facts to 20.

#### Place value

Stress the use of 0 as a place holder.

Represent numbers using models such as a number line or abacus, or using place value cards.

#### Counting on

Include finding missing terms in number sequences.

Include counting backwards.

4.2 Use the commutative and associative laws of addition to simplify mental calculations and check results.

*Example of commutative law*

$$5 + 18 = 18 + 5$$

*Examples of associative law*

$$36 + 9 = 36 + (4 + 5) = (36 + 4) + 5 = 40 + 5 = 45$$

4.3 Add three one-digit numbers mentally.

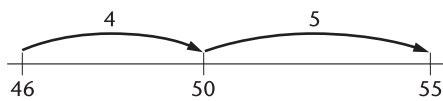
*Write a number in the box to make this correct.*

$$3 + \square + 9 = 17$$

4.4 Use and explain mental methods, supported at first by a model such as a number line or 100-square, to add and subtract multiples of 1, 10 or 100, including crossing the tens boundary:

- a two-digit number and ones

*e.g.  $46 + 9$ ,  $82 - 7$*



- a two-digit number and tens

*e.g.  $73 + 50$ ,  $94 - 60$*

- a three-digit number and ones

*e.g.  $457 + 6$ ,  $312 - 7$*

- a three-digit number and tens

*e.g.  $253 + 60$ ,  $242 - 70$*

- a three-digit number and hundreds

*e.g.  $546 + 300$ ,  $695 - 400$*

4.5 Use and explain written column methods to add and subtract whole numbers with two digits.

*Add:*  $63 + 48$        $24 + 37 + 46$

*Subtract:*  $86 - 57$

4.6 Know and use the inverse relationship between addition and subtraction to calculate and to check results.

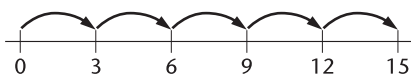
*Given that  $79 + 63 = 142$ , what is  $142 - 63$ ?*

### Multiplication and division

4.7 Relate multiplication to repeated addition or counting in multiples and division to repeated subtraction, sharing or forming equal groups.

*One box holds 3 cakes.*

*How many cakes are there in 5 boxes?*



### Laws of arithmetic

Exclude names of the laws.

### Mental methods

Include revision of the mental methods from Grade 1.

### Addition and subtraction

Include crossing the tens boundary.

### Inverse relationship between + and -

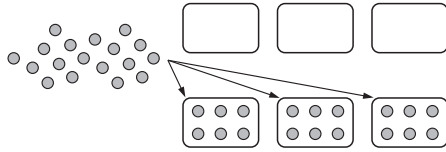
For example, since  $8 + 6 = 14$ , deduce that  $14 - 6 = 8$ .

### Multiplication and division

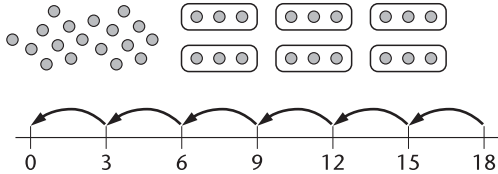
Model with number line, a 100-square and rectangular grids.

Exclude remainders.

Divide 18 into 3 equal groups.  
How many are there in each group?

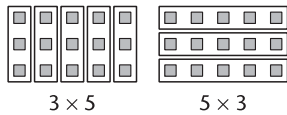


Divide 18 into groups of 3.  
How many groups are there?



**4.8** Understand the meaning of the symbols  $\times$  and  $\div$  and use them to record multiplication and division calculations in number sentences.

**4.9** Know that the commutative law applies to multiplication but not division (e.g.  $4 \times 2 = 2 \times 4$  but  $8 \div 4 \neq 4 \div 8$ ).



**4.10** Understand the inverse relationship between multiplication and division (e.g. since  $3 \times 10 = 30$ ,  $30 \div 10 = 3$ ).

**4.11** Multiply and divide within the multiplication tables for 2, 5 and 10, and other facts to  $5 \times 5$ .

**4.12** Know by heart multiplication tables for 2, 5 and 10.

**4.13** Know by heart multiplication tables for 3 and 4.

**4.14** Know by heart doubles of whole numbers to 15 and corresponding halves.

**4.15** Recognise half, quarter and three quarters of simple shapes and small whole numbers.

### Problem solving with whole numbers

**4.16** Given a number sentence involving a single addition, subtraction, multiplication or division, create a problem 'story' that might lead to it.

**4.17** Solve missing-number problems using inverse relationships.

Write the missing number in the box.

$$5 \times 4 = 10 \times \square$$

Wadha thinks of a number.

She says: 'If I subtract 14 from it, I get 29.'

What is Wadha's number?

**4.18** Given a word problem involving one-step addition, subtraction, multiplication or division, identify the relevant operation, write a related number sentence and do the required calculation (see also standard RP 1.1).

There are 58 oranges in one basket and 82 oranges in another basket.

What is the total number of oranges in the baskets?

One box will hold 5 apples.

How many boxes are needed to hold 35 apples?

### Commutative law

Exclude the name of the law.

### Multiplication and division

Limit to numbers in the 2, 5 and 10 times tables.

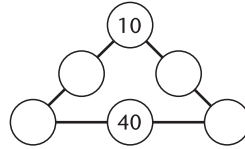
### Word problems

Include money and measurement problems expressed in the same unit.

Limit multiplication and division to numbers in the 2, 5 and 10 times tables.

**4.19** Solve non-routine problems involving small whole numbers.

Put all the numbers 20, 30, 50 and 60 in the circles. The numbers along each side must add up to 90.



**5** Solve problems involving money

**5.1** Show how to pay an exact number of riyals using smaller bank-notes.

**5.2** Find the total value of a mixed set of half and quarter riyal coins, up to QR 2.

**5.3** Find a total or amount of change up to QR 500.

*A tennis racket costs QR 325.  
A box of tennis balls costs QR 50.  
What is the total cost of the tennis racket and the tennis balls?  
How much change would you get from QR 500?*

**5.4** Find the cost of several items, given the cost of one item and the number of items.

*A ticket for the zoo costs QR 5.  
What is the cost of 8 tickets for the zoo?*

**Finding totals**

Add up the value of mixed coins mentally.

Limit totals up to QR 500 to whole numbers of riyals.

**Costs of items**

Limit to numbers in the 2, 5 and 10 times tables.

## Geometry and measures

By the end of Grade 2, students identify common 2-D and 3-D shapes, straight and curved lines and flat and curved surfaces. They measure and compare length, weight and capacity using standard metric units, reading scales to the nearest division. They use a ruler to measure and draw lines to the nearest centimetre. They tell the time to the nearest 5 minutes and calculate a simple time difference.

**Students should:**

**6** Name common 2-D and 3-D shapes and describe their properties using everyday language

**6.1** Identify straight and curved lines and flat and curved surfaces.

*Two of these letters from the English alphabet are made from straight lines only.*

**E P A C S**

*Draw a circle around each of them.*

**6.2** Use a ruler to measure and draw a straight line of a given length to the nearest centimetre.

*Draw a new line 4 cm longer than this one. Use a ruler.*






**Straight and curved lines**

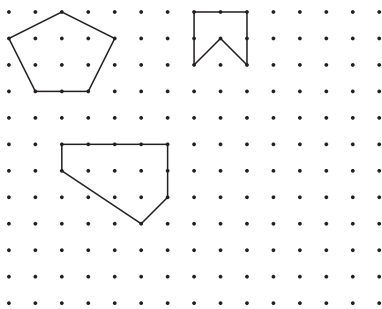
Include forming figures with straight lines and curves.

**6.3** Identify and name the cube, cuboid, sphere, cylinder, cone and pyramid, and the pentagon, hexagon and octagon; describe simple properties of these shapes using everyday language.

Write the missing numbers in the two empty boxes.

		number of square faces	number of triangular faces	number of circular faces
cylinder		0	0	
cube			0	0
pyramid		1	4	0

Use the dots to draw a different pentagon. Use a ruler.



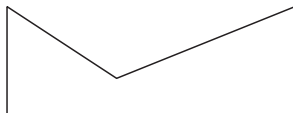
**6.4** Complete geometric patterns made from solid or flat shapes, according to shape, size, colour or orientation, or two of these attributes.

Use a structured set of shapes (e.g. four shapes, in three colours, two sizes and two thicknesses). Create a pattern in which there are exactly two differences between each shape and the next one. Describe the differences as each shape is placed in the pattern.

## 7 Use standard metric units to measure and compare length, weight, capacity and time

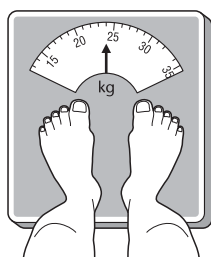
**7.1** Use a single standard unit (metre, centimetre; kilogram, gram; litre, millilitre) to estimate, measure and compare length, mass/weight or capacity, recording readings using a single unit.

Use a ruler. Measure the longest side of this shape to the nearest centimetre.

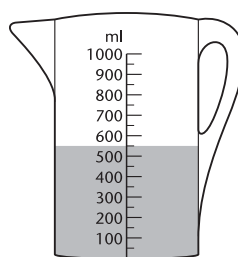


**7.2** Choose and use appropriate measuring equipment, reading scales to the nearest division.

How heavy is Aziz?



How much water is in the jug?



### Shapes

Use a square-based pyramid.

Include the term *polygon*.

Include properties such as cubes pack, or cylinders roll in a straight line when placed on a curved face but are stable when placed on an end face.

### Standard units

Include abbreviations (m, cm; kg, g; l, ml)

### Weight

Strictly speaking, mass, not weight, is compared. But in the lower grades, mass and weight are treated as the same, so 'weight' is used.

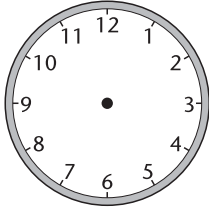
### Measuring equipment

Use everyday equipment such as rulers, metre sticks and measuring tapes; bathroom scales, kitchen scales and spring balances; measuring jugs, cups and cylinders.

Measurements should involve a single unit only.

- 7.3** Read the time on a clock with hands to the nearest 5 minutes; understand and use the notation 6:35, reading this as *six thirty-five*.

*The bowling alley closes at 7:45.  
Draw the hands on the clock face to show this time.*



- 7.4** Calculate a time interval of less than 1 hour (a multiple of 5 minutes), or of a whole number of hours.

*The time is 6:30 in the morning.  
What time was it 20 minutes ago?*

*A family left at 9 o'clock to go to the Al Bida Park.  
They arrived 45 minutes later.  
Draw a ring around the time they got to the Al Bida Park.*

9:15    11:15    9:45    10:45    10:15

*The time is 5:15.  
What time will it be 4 hours later?  
What time was it 3 hours earlier?*

**Time**

Include the phrases *quarter to* and *quarter past* the hour.

**Time intervals**

Exclude time intervals of less than 1 hour that cross the hour.

## Data handling

By the end of Grade 2, students make and interpret pictograms where the symbol represents a group of 2, 5 or 10 units. They answer questions by using data from simple graphs and tables.

**Students should:**

**8 Make and interpret pictograms of simple sets of data using a scale representation**

- 8.1** Represent a given set of data in a pictogram using a symbol representing 2, 5 or 10 units.

*Look at this pictogram.*

The fruit that we like best	
oranges	
dates	

Key	
	2 children

*12 children like dates best.  
Show this on the pictogram.*

**Pictograms**

Exclude graphs where an incomplete symbol represents part of a unit, unless the part is specified in the key to the graph.

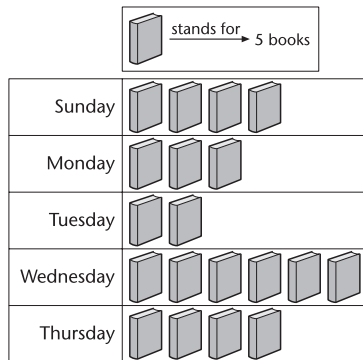
Include both horizontal and vertical formats.

**8.2** Read and interpret pictograms where the symbol represents 2, 5 or 10 units.

*Look at the pictogram.*

*How many more books were borrowed on Wednesday than on Monday?*

Number of books borrowed from the library



**8.3** Solve problems by using data from simple graphs and tables.

*Roza asked some children which fruit they like best.*

The fruit we like best	
fruit	number of children
apples	7
grapes	4
bananas	6
pears	3

*How many children did Roza ask altogether?*

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