Mathematics

Curriculum

Overview

first and second classes

Skills development

Skills	• Applying and problem-solving • Communicating and expressing • Integrating and connecting • Reasoning • Implementing • Understanding and recalling

Strands	*Strand units*
Number	• Counting and numeration • Comparing and ordering • Place value • Operations *Addition* *Subtraction* • Fractions
Algebra	• Extending and using patterns
Shape and space	• Spatial awareness • 2-D shapes • 3-D shapes • Symmetry • Angles
Measures	• Length • Area • Weight • Capacity • Time • Money
Data	• Representing and interpreting data

Overview

infant classes

Skills development

Skills	• Applying and problem-solving • Communicating and expressing • Integrating and connecting • Reasoning • Implementing • Understanding and recalling

Strands	*Strand units*
Early mathematical activities	• Classifying • Matching • Comparing • Ordering
Number	• Counting • Comparing and ordering • Analysis of number *Combining* *Partitioning* *Numeration*
Algebra	• Extending patterns
Shape and space	• Spatial awareness • 3-D shapes • 2-D shapes
Measures	• Length • Weight • Capacity • Time • Money
Data	• Recognising and interpreting data

Overview

fifth and sixth classes

Skills development

Skills	• Applying and problem-solving • Communicating and expressing • Integrating and connecting • Reasoning • Implementing • Understanding and recalling

Strands	*Strand units*
Number	• Place value • Operations • Fractions • Decimals and percentages • Number theory
Algebra	• Directed numbers • Rules and properties • Variables • Equations
Shape and space	• 2-D shapes • 3-D shapes • Lines and angles
Measures	• Length • Area • Weight • Capacity • Time • Money
Data	• Representing and interpreting data • Chance

Overview

third and fourth classes

Skills development

Skills	• Applying and problem-solving • Communicating and expressing • Integrating and connecting • Reasoning • Implementing • Understanding and recalling

Strands	*Strand units*
Number	• Place value • Operations *Addition and subtraction* *Multiplication* *Division* • Fractions • Decimals
Algebra	• Number patterns and sequences • Number sentences
Shape and space	• 2-D shapes • 3-D shapes • Symmetry • Lines and angles
Measures	• Length • Area • Weight • Capacity • Time • Money
Data	• Representing and interpreting data • Chance

Fifth and sixth classes

Overview

fifth and sixth classes

Skills development

Skills	• Applying and problem-solving • Communicating and expressing • Integrating and connecting • Reasoning • Implementing • Understanding and recalling

Strands	*Strand units*
Number	• Place value • Operations • Fractions • Decimals and percentages • Number theory
Algebra	• Directed numbers • Rules and properties • Variables • Equations
Shape and space	• 2-D shapes • 3-D shapes • Lines and angles
Measures	• Length • Area • Weight • Capacity • Time • Money
Data	• Representing and interpreting data • Chance

Skills development for fifth and sixth classes

Through completing the strand units of the mathematics curriculum the child should be enabled to

Applying and problem-solving

- select appropriate materials, concepts and processes for particular tasks and applications
- apply concepts and processes in a variety of contexts
- analyse problems and plan an approach to solving them
- select and apply a variety of strategies to complete tasks and projects or solve problems
- reflect upon and evaluate solutions to problems

Communicating and expressing

- discuss and explain the processes used and the results of mathematical activities, problems and projects in an organised way
- listen to and discuss other children's mathematical descriptions and explanations
- discuss and record the processes and results of work using a variety of methods
- discuss problems and carry out analyses

Integrating and connecting

- connect informally acquired mathematical ideas and processes with formal mathematical ideas and processes
- recognise mathematics in the environment
- represent mathematical ideas and processes in different modes: verbal, pictorial, diagrammatic and symbolic
- understand the connections between mathematical procedures and the concepts he/she uses
- recognise and apply mathematical ideas and processes in other areas of the curriculum

Reasoning

- make hypotheses and carry out experiments to test them
- make informal deductions
- search for and investigate mathematical patterns and relationships
- reason systematically in a mathematical context
- justify processes and results of mathematical activities, problems and projects

Implementing

- devise and use mental strategies and procedures for carrying out mathematical tasks
- use appropriate manipulatives to carry out mathematical procedures
- execute standard procedures efficiently with a variety of tools

Understanding and recalling

- understand and recall facts, definitions and formulae.

Strand: Number

Strand unit: Place value

Content for fifth class	*Content for sixth class*
The child should be enabled to	*The child should be enabled to*
• read, write and order whole numbers and decimals *extend previous conceptual and practical work to include larger numbers and decimals*	• read, write and order whole numbers and decimals
• identify place value in whole numbers and decimals *extend previous conceptual and practical work to include larger numbers and decimals*	• identify place value in whole numbers and decimals
• round whole numbers and round decimals *round whole numbers to nearest ten, hundred, thousand* *round decimals to nearest whole number.*	• round decimals *round decimals to one, two or three decimal places.*

Strand unit: Operations

The child should be enabled to	*The child should be enabled to*
• estimate sums, differences, products and quotients of whole numbers *use strategies for estimation, e.g. front-end estimation, rounding, clustering, special numbers* *estimate calculations and compute answers with a calculator* *e.g.* 450 × 9 = 4500 (*estimation based on* 450 × 10) *estimate first, then use calculator to get actual result*	• estimate sums, differences, products and quotients of decimals *use strategies for estimation* *estimate calculations and compute answers with a calculator*
• add and subtract whole numbers and decimals (to three decimal places) without and with a calculator *develop and extend the use of existing algorithms*	• add and subtract whole numbers and decimals (to three decimal places) without and with a calculator

- multiply a decimal (up to three places) by a whole number, without and with a calculator

  develop and extend the use of existing algorithms
  8.125 × 9

- divide a three-digit number by a two-digit number, without and with a calculator

  explore the concept of division with concrete materials
  develop the long division algorithm from repeated subtraction and multiples of repeated subtraction

- divide a decimal number by a whole number, without and with a calculator

  explore the concept of division of decimals with concrete materials, money and measurement
  extend the algorithm in conjunction with place value
  75.6 ÷ 4.

- multiply a decimal by a decimal, without and with a calculator

  develop and extend the use of existing algorithms
  7.25 × 1.5; 13.2 × 0.75

  understand that multiplication does not always make larger

- divide a four-digit number by a two-digit number, without and with a calculator

  develop and extend the use of existing algorithms
  7852 ÷ 26

- divide a decimal number by a decimal, without and with a calculator

  explore the concept of division by decimals with concrete materials, money and measurement
  36.92 ÷ 2.6; 27.6 ÷ 0.2
  understand that division does not always make smaller.

Strand unit — Fractions

The child should be enabled to

- compare and order fractions and identify equivalent forms of fractions with denominators 2–12

  explore, compare and record simple equivalence using concrete materials, paper folding, and fraction charts

- express improper fractions as mixed numbers and vice versa and position them on the number line

  establish equivalence by using concrete materials

  explore, compare and record simple improper fractions and mixed numbers diagrammatically, numerically and on the number line

- add and subtract simple fractions and simple mixed numbers

  use equivalent fractions to simplify calculations

The child should be enabled to

- compare and order fractions and identify equivalent forms of fractions

  order equivalent fractions on the number line and on fraction charts

- express improper fractions as mixed numbers and vice versa and position them on the number line

- add and subtract simple fractions and simple mixed numbers

  commondenominator should be found by listing multiples

The treatment of content as suggested in the exemplars is common to both classes.

Content for fifth class

- multiply a fraction by a whole number

  develop concepts with concrete materials, paper folding and fraction charts

  four $\frac{3}{4}$ *of a pizza is how many pizzas?*

- express tenths, hundredths and thousandths in both fractional and decimal form

  explore and compare using concrete materials

  express as fractions and as decimals.

Content for sixth class

- multiply a fraction by a fraction

  explore and develop concept by using concrete materials and the number line and by drawing diagrams to illustrate examples, leading to the development of an algorithm

- express tenths, hundredths and thousandths in both fractional and decimal form

- divide a whole number by a unit fraction

  how many quarters in 2?

  $2 \div \frac{1}{4}$; $15 \div \frac{1}{5}$

- understand and use simple ratios

  explore and record the relationship between the natural numbers and their multiples.

Strand unit — Decimals and percentages

The child should be enabled to	*The child should be enabled to*
• develop an understanding of simple percentages and relate them to fractions and decimals *express percentages as fractions and as decimals, and vice versa* *calculate simple percentages, e.g. 50%, 25% 10%*	• use percentages and relate them to fractions and decimals *express quantities as percentages*
• compare and order fractions and decimals *explore, compare and record using concrete materials and money* *order diagrammatically or on the number line*	• compare and order percentages of numbers
• solve problems involving operations with whole numbers, fractions, decimals and simple percentages *use diagrams; estimate and compute answers with a calculator* *include simple discount and increase examples* *10% off all jeans, 20% extra free.*	• solve problems relating to profit and loss, discount, VAT, interest, increases, decreases.
Linkage Measures: Money *Integration* Geography: Human environments	*Linkage* Measures: Money *Integration* Geography: Human environments

The treatment of content as suggested in the exemplars is common to both classes.

Content for fifth and sixth classes

Strand unit	*Content for fifth class*	*Content for sixth class*
	Number theory	
	The child should be enabled to	*The child should be enabled to*
	• identify simple prime and composite numbers *define a prime number, i.e. a number greater than 1 with exactly two divisors, itself and 1* *identify simple prime numbers by trial and error, e.g. 2, 5, 7, 11* *identify and record primes with Sieve of Eratosthenes* *define a composite number, i.e. a number that has more than two divisors, e.g. 4, 6, 9* *identify and record composite numbers using number facts and/or a calculator* *investigate relationship with odd and even numbers*	• identify simple prime and composite numbers
	• identify square and rectangular numbers *construct diagrams on geoboards, pegboards and squared paper to illustrate simple square and rectangular numbers* *explore, compare and record these numbers*	• identify and explore square numbers $16 = 4 \times 4 = 4^2$
		• explore and identify simple square roots *construct diagrams* *record and relate to square numbers*
	• identify factors and multiples *identify factors and multiples from basic multiplication facts.*	• identify common factors and multiples *explore and record factors and multiples to identify common factors and multiples* • write whole numbers in exponential form $1000 = 10 \times 10 \times 10 = 10^3$ $8 = 2 \times 2 \times 2 = 2^3$.

Strand: Algebra

Strand unit: Directed numbers

Content for fifth class

The child should be enabled to

- identify positive and negative numbers in context

  examine and discuss money affairs, video counters and calculator displays, sports reports, golf scores, temperature, sea level and lifts, leading to the need to distinguish between amounts above and below zero

  refer to positive and negative numbers as '**positive seven**' *and* '**negative three**'

  record positive and negative numbers with + or − signs raised e.g.

  $^{+}7$ $^{-}3$

  rewind a video tape

  pupils draw and label a thermometer, mark in temperatures, consult weather forecasts in newspapers.

Integration

Geography: Natural environments: weather, climate and atmosphere

Content for sixth class

The child should be enabled to

- identify positive and negative numbers on the number line

  walk the number line to experience positive and negative numbers that arise in discussion and/or in context

  identify and mark positive and negative numbers on personal and class number lines

- add simple positive and negative numbers on the number line

  add simple positive and negative numbers by walking the number line and by counting on the class and personal number line

  $^{+}5 + {}^{-}7 =$ ☐ $\quad {}^{-}9 + {}^{-}3 =$ ☐

  $^{-}8 + {}^{+}2 =$ ☐

  add positive and negative numbers that arise contextually, e.g. a golfer's score over four rounds was 6 under par, 2 over par, 3 under par, and 1 under par; what was her final score relative to par?

Integration

Geography: Natural environments: weather, climate and atmosphere

The child should be enabled to

- explore and discuss simple properties and rules about brackets and priority of operation

  identify, discuss and compute expressions with brackets in a variety of positions

  $10 + (4 + 7) =$ ☐ $(10 + 4) + 7 =$ ☐

  $(8 - 1) + 4 =$ ☐ $8 - (1 + 4) =$ ☐

  $(3 \times 4) + 5 =$ ☐ $3 \times (4 + 5) =$ ☐

  $8 \div (2 + 2) =$ ☐ $(8 \div 2) + 2 =$ ☐

  what is the significance of the positions of the brackets?

  identify, discuss and compute expressions with brackets excluded

  $4 + 3 \times 5 =$ ☐ $12 \times 6 + 3 =$ ☐

  $2.45 \div 5 - 0.75 =$ ☐ $96 \div 8 - 12 =$ ☐

  what is the significance of starting operations at different points?
  e.g. 4 + 3 before 3 × 5 or vice versa in 4 + 3 × 5

  establish the value of brackets, leading to the priority of multiplication and division over addition and subtraction

  explore these properties and rules without and with a calculator

- identify relationships and record verbal and simple symbolic rules for number patterns

  identify and discuss rules for simple number sequences
  2.0, 3.5, 5.0, 6.5 … i.e. sequence increases by adding 1.5

  81, 27, 9 … decreases by dividing by 3

  1, 4, 9, 16, 25, 36 …

The child should be enabled to

- know simple properties and rules about brackets and priority of operation

  use the calculator in exercises to find missing numerals and missing operator

  e.g. 37 ? 21 ? 23 = 800
  27 ? (36 ? 11) = 675

- identify relationships and record symbolic rules for number patterns

  deduce and record rules for given number patterns

  2, 6, 12, 20, 30 …

  4:1, 8:2, 16:4 …

The treatment of content as suggested in the exemplars is common to both classes.

Content for fifth and sixth classes