



RAKA PYP Grade 4 / Year 4 Mathematics

Number

Conceptual understandings

The base 10 place value system can be extended to represent magnitude. Fractions and decimals are ways of representing whole-part relationships. The operations of addition, subtraction, multiplication and division are related to each other and are used to process information to solve problems. Even complex operations can be modelled in a variety of ways, for example, an algorithm is a way to represent an operation.

Whole Numbers, Place Value, Estimation and Rounding

- Read, write and model numbers using the base 10 system to 10,000 and beyond
- Estimate quantities and answers to 1000

Counting and Ordering Numbers

- Count in, 3's 4's, 6's and 8's and explore other numbers
- Count on and back from a given number to 10,000.
- Compare and order numbers to 10,000

Addition and Subtraction

- Recall and use addition and subtraction facts (number stories) to 100
- Use and describe strategies to add or subtract mentally most pairs of two-digit whole numbers (e.g. $47 + 58$, $91 - 35$)
- Mentally add/subtract 1 digit to a 3-digit number, with and without regrouping
- Know the sums, differences and multiples of 100
- Fluently add and subtract within 1000 with and without regrouping using a variety of strategies e.g. partitioning, compensation, number line, etc.

Multiplication and Division

- Recognize number patterns to learn multiplication tables to learn and use facts for: 3,4,5,6 and 8
- Derive related times table facts involving multiples of ten E.g. $4 \times 4 = 16$ $4 \times 40 = 160$
- Use mental strategies to begin to solve 2 by 1 digit division problems
- Model 2 by 1 digit multiplication problems. (e.g. 36×4)
- Model 2 by 1 digit division problems (without remainders) (e.g. $69 \div 3$)
- Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80 , 5×60)

Fractions, Decimals, Percentages

- Understand a fraction as the quantity when a whole is partitioned into equal parts;
- Investigate simple fractions equivalences (e.g. $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}$)
- Represent unit and non-unit fractions on a number line, bar diagram, circle diagram, fractions of shapes, etc.
- Begin to compare fractions by identifying if a fraction is 'greater than', 'less than' or 'equal to' a half
- Model addition and subtraction of fractions with the same denominator (e.g. $\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$)
- Understand and model the concept of equivalence to 1 whole using common fractions (e.g. 1 whole = two halves, four quarters, three thirds)
- Find simple fractions of whole numbers (e.g. $\frac{1}{2}$ of 10, $\frac{1}{4}$ of 20)
- Apply fractions in real life situations

Strategies and Problem Solving

- Solve and explain word problems involving all four operations in real-life situations, using one and two steps
- Use a calculator to problem solve, and check answers
- Look for the most appropriate strategy of solving a problem: mental estimation, mental arithmetic, pencil and paper algorithm, calculator
- Check the reasonableness of answers using different computation strategies
- Begin to compute simple 1 and 2 step word problems mentally

Pattern and Function

Conceptual understandings

Functions are relationships or rules that uniquely associate members of one set with members of another set. By analysing patterns and identifying rules for patterns it is possible to make predictions.

- Reliably count by 3, 4, 5, 6 and 8s and recognize patterns using a 100s chart
- Identify patterns and rules for multiplication and division (e.g. fact families)
- Understand that multiplication is repeated addition and division is repeated subtraction.
- Model (with manipulatives) the inverse relationship between multiplication and division
- Explore multiplication as an array and rectangular and square numbers
- Understand and use number patterns to make predictions and solve problems
- explore and use patterns with missing terms, non-patterns, patterns with errors, spatial patterns
- Describe and represent the rule for a pattern in a variety of ways.(words, symbols and input/output tables)
- Identify a sequence of operations (rules) relating one set of numbers to another set.
- Begin to use function machines using input and output
- Design and test rules based on previous patterns including skip counting with calculators

Measurement

Conceptual understandings

Objects and events have attributes that can be measured using appropriate tools. Relationships exist between standard units that measure the same attributes.

- Estimate, measure, label and compare using formal methods and standard units of measurement: perimeter, area, time, capacity, mass and temperature
- Select appropriate tools and units of measurement
- Describe measures that fall between numbers on a measure scale (e.g. half/quarter a centimetre)
- Read and write analogue and digital time using intervals of 10 and 5 minutes.
- Read time using analogue clocks, to the nearest five minutes, and use digital clocks (e.g., 1:23 means twenty-three minutes after one o'clock)
- Understand the relationship between past & to
- Understand the relationship between seconds, minutes and hours.
- Estimate, measure, and record length, height, and distance, using standard units (centimetre, metre, kilometre) (e.g. How long is a metre? Draw or paste strips of paper together to estimate a metre).
- Investigate meaning of prefixes: kilo-, centi-, milli-, etc. and how this relates to place value.
- Estimate, measure, and record the perimeter, through investigation using standard units (e.g. What is the perimeter of our football field / desk / notebook?)
- Estimate, measure and record area. (e.g. using centimetre grid paper, arrays),
- Introduce square centimetres and square meters.

- Choose benchmarks for a kilogram and a litre to help them perform measurement tasks (e.g. a half-litre bottle of water)
- Estimate, measure, and record the mass and capacity of objects using the standard unit of the kilogram and gram / litre and millilitre.
- Select the appropriate tool and unit of measurement to solve real life problems
- Begin to compare and classify angles: acute, right, obtuse, reflex [From Shape and Space]
- Begin to estimate, measure and compare angles using degrees.
- Understand an angle by comparing and describing rotations (e.g. whole, half, quarter turn as related to north, south, east and west on a compass) [From Shape and Space]
- Identify right angles, recognise that 2 right angles make a half-turn, 3 make three-quarters of a turn and 4 a complete turn
- Identify angles greater than, less than or equal to right angles
- Estimate, read and record temperatures to the nearest degree Celsius
- Identify benchmarks for freezing, cold, cool, warm, hot, and boiling temperatures as they relate to water and for cold, cool, warm, and hot temperatures as they relate to air (e.g., water freezes at 0°C; the air temperature on a warm day is about ~°C);
- Investigate real-life problems involving money, using addition, subtraction, multiplication and division.
- Identify coins and notes and compare their values

Shape and Space

Conceptual understandings

Changing the position of a shape does not alter its properties. Shapes can be transformed in different ways. Geometric shapes and vocabulary are useful for representing and describing objects and events in real-world situations.

2D and 3D Shapes

- Identify and describe the geometric properties of 2D and 3D shapes (e.g. base, edge, vertex, face, surface)
- Create symmetrical patterns, including tessellation
- Identify lines and axes of reflective and rotational symmetry (including where shapes are partitioned and for shapes within shapes)
- Identify horizontal and vertical lines and pairs of perpendicular and parallel lines
- Understand the properties of regular and irregular polygons
- Represent shapes from different viewpoints or orientations

Location, Direction and Movement

- Understand an angle by comparing and describing rotations (e.g. whole, half, quarter turn as related to north, south, east and west on a compass [Included in Angles, Measurement])
- Locate and plot features on a grid using simple coordinates in the first quadrant.
- Create simple maps, plans and grids
- Identify different ways to represent movement on maps, plans and grids
- Provide representations of pathways on maps, plans or grids for others to follow
- Evaluate the ease of interpreting directions given by peers
- Visualise and create representations of alternative pathways to the same location

Conceptual understandings

Data can be collected, organized, displayed and analysed in different ways. Different graph forms highlight different aspects of data more efficiently. Probability can be based on experimental events in daily life. Probability can be expressed in numerical notations.

- Design a survey process, make hypotheses, record data and interpret results.
- Collect and display data in tally charts, pictograph, bar and line graphs and interpret results.
- Use the scale on a vertical axis to represent large quantities.
- Compare two related sets of data.
- Pose and answer questions and draw conclusions about data presented in charts, tables and graphs
- Use IT to create simple graphs and record data (e.g. Microsoft Excel, etc.)
- Use probability to determine mathematically fair games and to explain possible outcomes.
- Express probability using simple fractions (e.g. There is a 1 in 6 chance of rolling a four on a regular die, etc.)