National Curriculum Links

Links to the National Curriculum in England

# Chapter 21: Concepts and principles of measurement

Pupils should be taught to:

## Year 1

* compare, describe and solve practical problems for:
  + lengths and heights [e.g., long/short, longer/shorter, tall/short, double/half
  + mass/weight [e.g., heavy/light, heavier than, lighter than]
  + capacity and volume [e.g., full/empty, more than, less than, half, half full, quarter]
  + time [e.g., quicker, slower, earlier, later]
* measure and begin to record the following:
  + lengths and heights
  + mass/weight
  + capacity and volume
  + time (hours, minutes, seconds)
* sequence events in chronological order using language [e.g., before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
* recognize and use language relating to dates, including days of the week, weeks, months and years
* tell the time to the hour and half past the hour and draw the hands on a clock face to show these times

## Year 2

* choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels
* compare and order lengths, mass, volume/capacity and record the results using >, < and =
* compare and sequence intervals of time
* tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times
* know the number of minutes in an hour and the number of hours in a day

## Year 3

* measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
* tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks
* estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o’clock, a.m./p.m., morning, afternoon, noon and midnight
* know the number of seconds in a minute and the number of days in each month, year and leap year
* compare durations of events [e.g., to calculate the time taken by particular events or tasks]

## Year 4

* convert between different units of measure [e.g., kilometre to metre; hour to minute]
* estimate, compare and calculate different measures
* read, write and convert time between analogue and digital 12-hour and 24-hour clocks
* solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days

## Year 5

* convert between different units of metric measure [e.g., kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre]
* understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
* estimate capacity [e.g., using water]
* solve problems involving converting between units of time
* use all four operations to solve problems involving measure [e.g., length, mass, volume, money] using decimal notation, including scaling

## Year 6

* solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
* use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
* convert between miles and kilometres

Links to Curriculum for Excellence in Numeracy and Mathematics in Scotland

# Chapter 21: Concepts and principles of measurement

## Early

***Experiences and outcomes:*** *I have experimented with everyday items as units of measure to investigate and compare sizes and amounts in my environment, sharing my findings with others.* ***MNU 0-11a***

***Benchmark:***

* shares relevant experiences in which measurements of lengths, heights, mass and capacities are used, for example, in baking
* describes common objects using appropriate measurement language, including tall, heavy and empty
* compares and describes lengths, heights, mass and capacities using everyday language, including longer, shorter, taller, heavier, lighter, more and less
* estimates, then measures, the length, height, mass and capacity of familiar objects using a range of appropriate non-standard units

## First

***Experiences and outcomes:*** *I can estimate how long or heavy an object is, or what amount it holds, using everyday things as a guide, then measure or weigh it using appropriate instruments and units.* ***MNU 1-11a***

***Benchmark:***

* uses knowledge of everyday objects to provide reasonable estimates of length, height, mass and capacity
* makes accurate use of a range of instruments including rulers, metre sticks, digital scales and measuring jugs when measuring lengths, heights, mass and capacities using the most appropriate instrument for the task
* records measurements of length, height, mass and capacity to the nearest standard unit, for example, millimetres (mm), centimetres (cm), grams (g), kilograms (kg), millilitres (ml), litres (l)
* compares measures with estimates
* uses knowledge of relationships between units of measure to make simple conversions, for example, 1 m 58 cm = 158 cm
* reads a variety of scales on measuring devices including those with simple fractions, for example, 1/2 litre

## Second

***Experiences and outcomes:*** *I can use my knowledge of the sizes of familiar objects or places to assist me when making an estimate of measure.* ***MNU 2-11a***

*I can use the common units of measure, convert between related units of the metric system and carry out calculations when solving problems.* ***MNU 2-11b***

***Benchmark:***

* uses the comparative size of familiar objects to make reasonable estimations of length, mass, area and capacity
* estimates to the nearest appropriate unit, then measures accurately: length, height and distance in millimetres (mm), centimetres (cm), metres (m) and kilometres (km); mass in grams (g) and kilograms (kg); and capacity in millilitres (ml) and litres (l)
* converts between common units of measurement using decimal notation, for example, 550 cm = 5·5 m; 3·009 kg = 3009 g
* chooses the most appropriate measuring device for a given task and carries out the required calculation, recording results in the correct unit
* reads a variety of scales accurately
* demonstrates understanding of the conservation of measurement …
* shows awareness of imperial units used in everyday life, for example, miles or stones

Links to Curriculum for Wales: Programme of Study for Mathematics, Key Stages 2–4

# Chapter 21: Concepts and principles of measurement

Learners should be taught to:

## Year 1

* use non-standard units to measure:
* length, height and distance
* weight/mass
* capacity
* use the concept of time in terms of their daily and weekly activities and the seasons of the year
* understand and order the days of the week, the months and seasons of the year in meaningful contexts
* use standard units of time to read ‘o’clock’ using both analogue and 12‑hour digital clocks
* use descriptive words for a range of temperatures, *e.g. cooler/warmer*

## Year 2

* use standard units to measure:
* length, height and distance: metres, half metres or centimetres
* weight/mass: kilograms or 10 gram weights
* capacity: litres
* use symbols related to length, weight/mass and capacity
* read hours and minutes on a 12-hour digital clock
* record the days of the week, the months and seasons of the year
* read ‘half past’, ‘quarter past’ and ‘quarter to’ on an analogue clock
* compare daily temperatures using a thermometer (°C)

## Year 3

* use standard units to estimate and measure: – length: measure on a ruler to the nearest ½ cm – weight/mass: use 5 g, 10 g and 100 g weights – capacity: use litres and half litres; measure to the nearest 100 ml
* choose between metric units to measure a length
* tell the time to the nearest 5 minutes on an analogue clock and calculate how long it is to the next hour
* read hours and minutes on a 12-hour digital clock using am/pm conventions
* calculate start times, finish times and durations using hours, 30-minute intervals and 15-minute intervals
* take temperature readings using thermometers and interpret readings above and below 0°C

## Year 4

* select and use appropriate standard units to estimate and measure length, weight/mass and capacity
* measure on a ruler to the nearest mm and record using a mix of units, e.g. 1 cm 3 mm
* use weighing scales with divisions to weigh objects to the nearest 5 g, 10 g, 25 g or 100 g
* measure capacities to the nearest 50 ml or 100 ml
* convert metric units of length to smaller units, e.g. cm to mm, m to cm, km to m
* choose appropriate metric units to measure length, weight/mass and capacity
* tell the time to the nearest minute on analogue clocks
* read hours and minutes on a 24-hour digital clock
* time and order events in seconds
* use calendars to plan events
* calculate start times, finish times and durations using 5-minute intervals
* convert between 12- and 24-hour clock times
* estimate the number of minutes everyday activities take to complete
* take temperature readings using thermometers and interpret readings above and below 0°C

## Year 5

* make estimates of length, weight/mass and capacity based on knowledge of the size of real-life objects
* use measuring instruments with 10 equal divisions between each major unit, and record using decimal notation, e.g. 4.2 cm, 1.3 kg
* make use of conversions, e.g. ¼ of a km = 250 m
* recognize the appropriateness of units in different contexts
* read and use analogue and digital clocks
* time events in minutes and seconds, and order the results
* calculate start times, finish times and durations using hours and minutes
* carry out practical activities involving timed events and explain which unit of time is the most appropriate
* estimate the length of time everyday activities take to complete, extending to hours and quarters of hours
* measure and record temperatures involving positive and negative readings
* calculate temperature differences, including those involving temperature rise and fall across 0°C

## Year 6

* read and interpret scales or divisions on a range of measuring instruments
* make estimates of length, weight/mass and capacity based on knowledge of the size of real-life objects, recognizing the appropriateness of units in different contexts
* record measurements in different ways, e.g. 1.3 kg = 1 kg 300 g
* use the language of imperial units in daily use, e.g. miles, pints
* use and interpret timetables and schedules to plan events and activities and make calculations as part of the planning process
* estimate how long a journey takes
* time events in minutes and seconds to the nearest tenth of a second
* convert between standard units of time
* estimate the length of time everyday activities take to complete with increasing accuracy
* measure and record temperatures involving positive and negative readings
* calculate temperature differences, including those involving temperature rise and fall across 0°C

Australian Curriculum for Mathematics

This maps entries in the **Australian Mathematics Curriculum (from Foundation Stage to Year 7)** to the content of chapters of Haylock, *Mathematics Explained for Primary Teachers*, 6th edition.

# Chapter 21: Concepts and principles of measurement

## Foundation Year

* Use direct and indirect comparisons to decide which is longer, heavier or holds more, and explain reasoning in everyday language
* Compare and order the duration of events using the everyday language of time
* Connect days of the week to familiar events and actions

## Year 1

* Measure and compare the lengths and capacities of pairs of objects using uniform informal units
* Tell time to the half-hour
* Describe duration using months, weeks, days and hours

## Year 2

* Compare and order several shapes and objects based on length, area, volume and capacity using appropriate uniform informal units
* Compare masses of objects using balance scales
* Tell time to the quarter-hour, using the language of ‘past’ and ‘to’
* Name and order months and seasons
* Use a calendar to identify the date and determine the number of days in each month

## Year 3

* Measure, order and compare objects using familiar metric units of length, mass and capacity
* Tell time to the minute and investigate the relationship between units of time

## Year 4

* Use scaled instruments to measure and compare lengths, masses, capacities and temperatures
* Convert between units of time
* Use am and pm notation and solve simple time problems

## Year 5

* Choose appropriate units of measurement for length, … capacity and mass
* Compare 12- and 24-hour time systems and convert between them

## Year 6

* Convert between common metric units of length, mass and capacity
* Connect decimal representations to the metric system
* Solve problems involving the comparison of lengths … using appropriate units
* Interpret and use timetables