Quick Curriculum Guide (Year Six)

We understand that children as well as parents of children that are home from school may be feeling a bit stressed at the current time. Our aim is to try to make mathematics a little more accessible for you. We have put together a simple overview of some of the Australian Mathematics Curriculum, for each year level from Foundation to Year 6. Please note, most States and territories have made some adjustments to the Curriculum.

About Year 6:

- In Year 6 children do far more work with fractions, decimals and percentages, making application of them within their work - in particular they're now doing calculations with them.
- Year 6 is the first time children do operations (+ - ÷ ×) with decimal numbers.
- Probability and Statistics take a far more prevalent role.

For Teachers:

- You are welcome to send home these cards and activities to parents. A great way of organising your term might be cutting up the cards and adding to the activities ideas.
- Please see the important note below.

For Parents:

- Keep in mind this is what children learn over the **whole year,** not just in one term.
- All children are different, so expectations will vary even between children within the same year level.
- For the listed activities, we think these are all worth trying / could be managed in a home setting even for those inexperienced with teaching at home. We have tried to avoid specialty equipment.
- Even if you're not too sure about teaching, just introducing the idea and some related vocabulary can be a great help.
- Regular routines are beneficial for children. Many of these activities can be repeated, which will help the children retain what they learn. You can do the activity the same way or make slight changes to keep it interesting. It is better to pick one or two activities and repeat them than it is to try them all once!
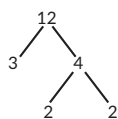

#1 Year Six (Number) ⭐

The Australian National Curriculum Says:
Identify and describe properties of prime, composite numbers ...

What this means
A prime number has only 2 factors, itself and 1; e.g. 2, 3, 5, 7, 11, 13, ...
A composite number has 3 or more factors; e.g. 12 has four factors (numbers that exactly divide into it: 1, 2, 3, 4, 6 & 12.)

Activity Idea
Make Factor Trees.

Teaching at Home - Quick Guide   www.drpaulswan.com.au

A sample card

Note the features of these cards:

- The star in the top right.
  - Filled in: this means this is a topic that in our opinion is vital, perhaps as a building block to concepts in later years.
  - Not filled in: while still important, Linda and I consider these secondary to the starred topics.
- A simplified explanation of what the curriculum is describing and often some clarifications on terms used.
- A single activity or game idea. Some will reference free games and downloadables that you can find on www.drpaulswan.com.au

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Note: Although we have put the entries of the Australian Curriculum in one box each, they are not equal in terms of their importance or the amount of time needed to provide an understanding. Some entries will only need one of two learning sessions. Others will benefit from more, and need re-visiting a number of times throughout the year. Some entries, after an initial learning session, can be given incidental mention as the occasion arises. Teachers will use their professional judgements when deciding how long to allow for each of the entries; often combining some of them within one or more learning sessions.
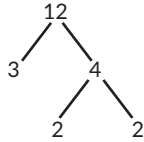
#1 Year Six (Number)

The Australian National Curriculum Says:
Identify and describe properties of prime, composite numbers ...

What this means
A prime number has only 2 factors, itself and 1; e.g. 2, 3, 5, 7, 11, 13, ...
A composite number has 3 or more factors; e.g. 12 has six factors (numbers that exactly divide into it: 1, 2, 3, 4, 6 & 12.)

Activity Idea
Make Factor Trees.

```
      12
     /  \
    3    4
        / \
       2   2
```

#2 Year Six (Number)

The Australian National Curriculum Says:
Identify and describe properties of ... square and triangular numbers

What this means
A square number is obtained by multiplying a number by itself; e.g. 9 is a square number as 3 x 3 = 9.
Triangular numbers can be represented by symbols arranged in a triangle; e.g.

1   3   6   ...

Activity Idea
Use counters or draw diagrams to represent all square numbers from 1 to 25. Predict the next 3 numbers in the series.

#3 Year Six (Number)

The Australian National Curriculum Says:
Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems using all four operations with whole numbers.

What this means
- *Efficient strategies:* Does not get bogged down in too many steps or forget where they're up to (for example counting in ones for large amounts).
- Four operations: +, -, ÷, ×
- *Written strategies:* There is no one standard strategy used across Australia for this. We would favour methods that involve an understanding of Place Value and avoid reliance on 'tricks'.

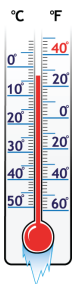## #4 Year Six (Number)

The Australian National Curriculum Says:
Investigate everyday situations that use integers. Locate and represent these numbers on a number line.

What this means
Integers are the set of counting numbers, their opposites and zero, i.e. ... -2, -1, 0, 1, 2, ...

Activity Idea
Looking at temperatures in different climates is a good way to use negative numbers; e.g. it was -3° C in Canberra yesterday.

#5 Year Six (Number)

The Australian National Curriculum Says:
Solve problems involving addition and subtraction of fractions with the same or related denominators

What this means
- The denominator is the bottom number; it indicates the fraction name; e.g. in $^1/_3$, the denominator is 3 which tells us that the whole has been divided into 3 equal parts, and each part is called one third.

Related denominators:
- *Halves, Fourths & Eighths*
- *Halves, Thirds & Sixths*

#6 Year Six (Number)

The Australian National Curriculum Says:
Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies

What this means
- Simple fractions would be halves, thirds, quarters (fourths), fifths, sixths, eighths and tenths.
- Example: $^1/_3$ of 24 = 8

Activity Idea
Play any of the following free games from www.drpaulswan.com.au: "Halving Games set", "Quarter Games set", "One Tenth Games set", "One Eighth Games set"

#7 Year Six (Number)

The Australian National Curriculum Says:
Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers.

What this means

If doing a written calculation, it is important to line up the decimal places, e.g. Add 3.51 and 12.07

    3.51
    12.07
    = 15.58

Activity Idea

Try to find real-life examples, e.g. the edges of a rectangle are 2.7m and 1.45 m, what is its perimeter?

#8 Year Six (Number)

The Australian National Curriculum Says:
Multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimas with and without digital technologies.

What this means

A terminating decimal has a finite number after the decimal point, e.g. ¼ = 0.25. In a recurring decimal, there is no end to the numbers after the decimal point, e.g. 1/3 = 0.33333 …

Activity Idea

Money is a good context for this, e.g. "five bottles of juice at $3.45 a bottle" or "I spent $2.85 on 3 chocolate bars, how much did one bar cost?"

#9 Year Six (Number)

The Australian National Curriculum Says:
Multiply and divide decimals by powers of 10

What this means

Powers of ten are:

10^0 (equals 1), $10^1 = 10$,

10^2 (10 x 10 =100), 10^3 (10 x 10 x 10 = 1000),
etc.

Activity Idea

Converting from metres to centimetres (and vice versa) involves multiplication/division by 100 (10^2)
Converting kg to g involves multiplying by 1000 (10^3).

#10 Year Six (Number)

The Australian National Curriculum Says:
Make connections between equivalent fractions, decimals and percentages

What this means

- Understand that 'one quarter' can be represented as $^1/_4$, 0.25 and 25%.

Activity Idea

Play "Fraction Decimal Percentage Match" from www.drpaulswan.com.au

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#11 Year Six (Number)

The Australian National Curriculum Says:
Investigate and calculate percentage discounts of 10%, 25% and 50% on sale items, with and without digital technologies.

What this means

- For example: 10% of $200 is $20, the discount is $20, the amount paid would be $180.
- This is an application of Card #6, *Fractions of a Quantity* and related to Card #10.

Activity Idea

Calculate the percentage discount used in shopping catalogues.

#12 Year Six (Measurement)

The Australian National Curriculum Says:
Connect decimal representations to the metric system

What this means

- Simply recognise that two measurements are equivalent such as 1 metre and 100 centimetres.
- Basis for converting (as per Cards #9 and #13)

Activity Idea

Measure a length with a tape measure, record it in both metres and centimetres.

#13 Year Six (Measurement)

The Australian National Curriculum Says:
Convert between common metric units of length, mass and capacity

What this means

Length: 1000 millimetres = 1 metre

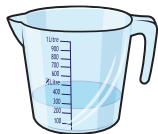Mass: 1000 grams = 1 kilogram

Capacity: 1000 millilitres = 1 litre

- See also Card #9 on multiplying and dividing by powers of 10.

Activity Idea

Observe the scale when measuring:
e.g. 1000 mL = 1L

#14 Year Six (Measurement)

The Australian National Curriculum Says:
Solve problems involving the comparison of lengths and areas using appropriate units

What this means

- From this investigation of comparing lengths and areas the student should conclude there is no direct relationship between the two.

Activity Idea

Try the "Chicken Pen" problem: The farmer has enough wire to fence a perimeter of 36 metres. What are the different areas that can be fenced? Download grid paper from drpaulswan.com.au

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#15 Year Six (Measurement)

The Australian National Curriculum Says:
Connect volume and capacity and their units of measurement

What this means

- The *volume* of an object is the total space occupied by it. The *capacity* of a container is the amount it can hold. They are not always the same (e.g. your fridge's capacity!)
- 1 L of water has an equivalent volume of 1000 cubic centimetres. This could fit in a container that is 10 cm x 10 cm x 10 cm or 20 cm x 5 cm x 10 cm, etc.

Activity Idea

Pour 1 litre of water into different sized containers.

#16 Year Six (Measurement)

The Australian National Curriculum Says:
Interpret and use timetables

What this means

- Use both 12 and 24-hour timetables.

Activity Idea

Google timetables for train, buses or flights.

Play pretend, planning a simple holiday or outing.

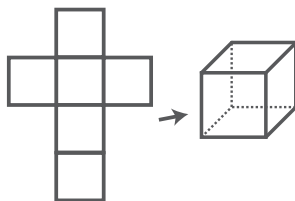
#17 Year Six (Geometry)

The Australian National Curriculum Says:
Construct simple prisms and pyramids

What this means

- A net is a flat 2D pattern that can be cut out and folded to make a 3D shape.

Activity Ideas

- Make 3D Objects using blu-tack and toothpicks.
- Make 3D Objects from paper/card nets.
- Cut up boxes and see how they fit together (nets).

#18 Year Six (Geometry)

The Australian National Curriculum Says:
Investigate combinations of translations, reflections and rotations with and without the use of digital technologies

What this means

- Translations, reflections and rotations do not change the shape or size of an object. A translation is a slide that changes position in a particular direction. It remains the same way up. A reflection is a flip that gives a mirror image. A rotation is a turn around a fixed point through a given angle.

Activity Idea

Play Tetris online (translations - across, rotations)
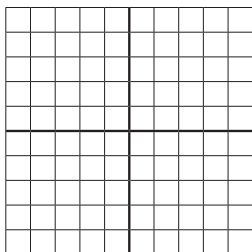
#19 Year Six (Geometry)

The Australian National Curriculum Says:
Introduce the cartesian coordinate system using all four quadrants

What this means

- In Year 6 we use all four quadrants with 0, 0 at the centre. It has positive and negative numbers.
- Read horizontally then vertically.

Activity Idea

Play Battleships from the "Dr Paul Swan Game Pack (Year 7)" free download .
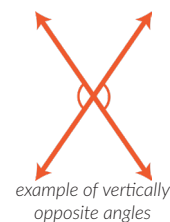

#20 Year Six (Geometry)

The Australian National Curriculum Says:
Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles. Use results to find unknown angles.

What this means

Angle on a straight line is (sum to 180°).

Angles at a point (sum to 360°).

Vertically opposite angles (equal).

Activity Idea

Try the angles program at www.visnos.com/demos/basic-angles

example of vertically opposite angles

#21 Year Six (Stats & Probability)

The Australian National Curriculum Says:
Describe probabilities using fractions, decimals and percentages

What this means

- No probability at all (impossible) is a 0 chance. Absolute certain probability is 1. An equal change (tossing a head on a coin) is ½ or 50%.

```
                      0.5
                      1/2
  0%                  50%                100%
  |-------------------|-------------------|
  Impossible                          Certain
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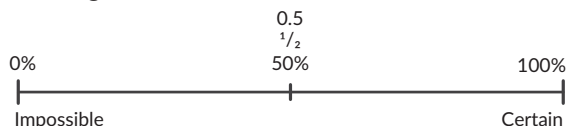
Activity Idea

What's the probability of getting a 6 on a ten-sided dice: $^1/_{10}$ or 0.1 or 10%.

#22 Year Six (Stats & Probability)

The Australian National Curriculum Says:
Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies

What this means

There can be a lot of variance in results when only conducing a few trials (e.g. tossing a coin). The more trials conducted, the more likely the result will be close to the theoretical probability (in this case 50% heads, 50% tails).

Activity Idea

Try the adjustable spinner www.nctm.org/adjustablespinner

#23 Year Six (Stats & Probability)

The Australian National Curriculum Says:
Compare observed frequencies across experiments with expected frequencies

What this means

- See Card #22

Activity Idea

In an experiment tossing a coin the *expected frequencies* are 50% heads and 50% tails. Compare this with what you got when you did the experiment (*observed frequencies*).

#24 Year Six (Stats & Probability)

The Australian National Curriculum Says:
Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables

What this means

A categorical variable is one whose categories are separate or distinct; e.g. with a mobile phone, looking at texts vs calls.

Activity Idea

Compare standard water/power/phone bills that show a this-year vs. last-year comparison. Has the usage increased or decreased?

#25 Year Six (Stats & Probability)

The Australian National Curriculum Says:
Interpret secondary data presented in digital media and elsewhere

What this means
Secondary data is where someone else has collected it. Sports results are often shown in graphical form. Special consideration should also be given to identifying and investigating misleading graphs such as those missing an axis.

Activity Idea
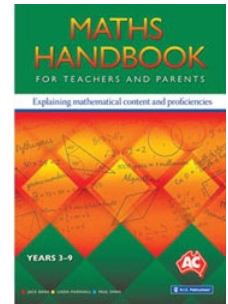Look at newspaper graphs/tables and compare with the article/headline.

Further Support

Maths Terms and Tables

Maths Handbook for Teachers and Parents
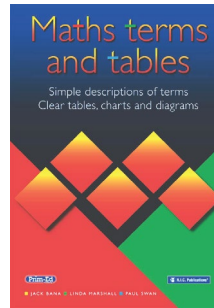
Definitions of mathematical terms

Explains mathematical content

Further Support: Enrichment

Extend students' thinking using **Maths Enrichment topics for Years 5 - 8** written by Jack Bana, Linda Marshall and Paul Swan.

Maths
ENRICHMENT TOPICS
FOR YEARS 5 - 8

Jack Bana
Linda Marshall
Paul Swan

Free Further Support: Fraction Games

Download these free year 6 fraction games from www.drpaulswan.com.au

Free Further Support: Problem Solving

The **Check the Clues Samplers** booklets feature co-operative group problem solving cards. These two free sample booklets focus on Number problems.

CHECK THE CLUES
A **Find My Number** Style Question Set
SAMPLER 2 (YEARS 2-7)
DR PAUL SWAN
DAVID DUNSTAN

CHECK THE CLUES
A **Find My Number** Style Question Set
SAMPLER 1 (YEARS 2 - 5)
DR PAUL SWAN
DAVID DUNSTAN
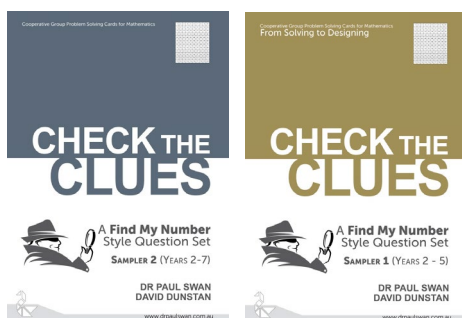
Further Support: Problem Solving

These **Check the Clues** books are part of a whole school series on problem solving that range from Foundation level up to Secondary. They cover a variety of topics.

Check the **Clues D** — Years 5 & 6

Check the **Clues E** — Years Secondary

Dr Paul Swan
David Dunstan