

# Secondary Mathletics

## Years 7–11

# A Guide to Lesson Content in Mathletics

Using Mathletics content to deliver your lesson

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## Why

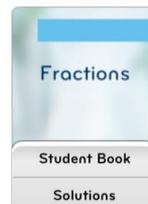
- **eBooks | eBooks** provide ‘scaffolded learning’
  - can be used as whole books or individual pages
- **eBooks | eBooks** provide a ‘teaching sequence’/‘learning sequence’
  - very helpful for teachers ‘teaching outside their subject area’



**eBOOKS**  
videos and interactives

## How they can be used

- Select eBook and use the navigation pane on the right to get an overview of:
  - the subtopics in the eBook
  - related Interactives
  - related Videos
- Print the whole book or particular pages for the class and use as class notes
- Save the eBook in the format of your IWB/tablet/laptop so that you can project it and write on it in class
- Print/download the worked solutions of the eBook for your own reference



### How does it work?

Proper Fractions  
Equivalent proper fractions  
Improper fractions and mixed numerals  
Fractions on the number line  
Reciprocal fractions

### Where does it work?

Comparing Fractions  
Adding and subtracting fractions  
Multiplying and dividing fractions  
Operations with mixed numerals

### What else can you do?

Fractions of an amount  
Two amounts as a fraction  
Word problems with fractions  
Reflection Time  
Cheat Sheet

### Solutions

Solutions  
How does it work?  
Where does it work?  
What else can you do?

### Interactives

Circle Fractions  
Circle Fractions - Related Interactive  
Random Squares  
Visualise Improper Fractions  
Visualise Mixed Numerals  
Overlap Multiplication

### Videos

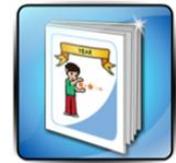
Conceptual: Intro to Fractions  
Conceptual: Finding a common denominator  
Conceptual: Multiplying Fractions  
Visualise Improper Fractions  
Visualise Mixed Numerals  
Overlap Multiplication

## Tips

- Books available in series – series letters indicate approximate level  
Series H = Year 7    Series I = Year 8    Series J = Year 9    Series K = Year 10    Series L = Year 11
- Series H & I (Years 7 & 8)
  - Student Books lists subtopics in 3 sections:
    - ‘How does it work?’                    notes + practice questions
    - ‘Where does it work?’                notes + practice questions
    - ‘What else can you do?’            notes + practice questions + cheat sheet
  - Answers are NOT contained in the Student Books
  - ‘Solutions’ Book contains fully worked solutions to Student Book
    - intended for teachers only
    - good for those teaching outside their subject area
- Series J & K (Years 9 & 10)
  - Student Books lists Subtopics in 4 sections:
    - ‘Basics’                                    notes + practice questions
    - ‘Knowing More’                        notes + practice questions
    - ‘Using Our Knowledge’            notes + practice questions
    - ‘Thinking more’                        notes + practice questions
- Series L (Year 11)
  - Student Books lists Subtopics in 4 sections:
    - ‘Basics’                                    notes + practice questions
    - ‘Knowing More’                        notes + practice questions
    - ‘Using Our Knowledge’            notes + practice questions
    - ‘Thinking more’                        notes + practice questions
    - ‘More Questions’                      practice questions
  - ‘Answers’ are contained within Student books for Series J, K & L (not fully-worked solutions).

## Why

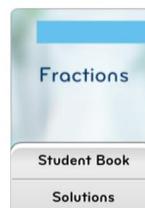
- **eBooks | Videos** have two types:
  - Conceptuals:
    - have the word ‘conceptual’ in the title
    - designed to introduce a topic/concept
  - Explanations of interactives
    - have a name that is identical to an interactive
    - designed to show how an interactive can be used to explain a concept



eBOOKS  
videos and interactives

## How they can be used

- Select the eBook and use the navigation pane on the right to get an overview of the videos
- Review the videos and work out where you will use them in your teaching sequence



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## Tips

- Conceptual videos can assist with:
  - enthusing students about a new topic
  - answering “why are we learning this?”/“when will I ever use this?”
- Explanations of interactives videos may be used
  - by the teacher only in their planning
  - in the classroom with students
  - outside of the classroom as a flipped learning resource

## Why

- eBooks | Interactives help students to visualise mathematical concepts



eBOOKS  
videos and interactives

## How they can be used

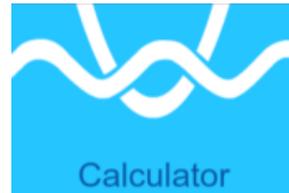
- Select the eBook and use the navigation pane on the right to get an overview of the interactives
- Review the interactives and work out where and how you will use them in your teaching sequence

## Tips

- Selecting an interactive brings up an interactive version of the Student Book
  - The page displayed shows the place where the interactive is most likely to be used in the teaching sequence
  - Note the page navigation guide at the bottom of the interactive version of Student Book
    - pages of the student book that contain interactives have page numbers that are highlighted in green



DEMONSTRATIONS  
teach with student view



## What does the Mathletics Calculator do?

The Mathletics Calculator is a tool to help students

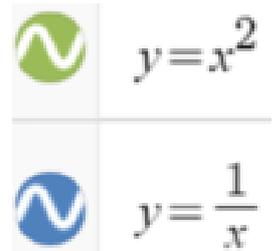
- **visualise and investigate** linear and non-linear relationships/functions
- **visualise and investigate** straight lines, parabolas, hyperbolas, circles, exponentials

## Interface

- **Intuitive, easy-to-use interface** for both teachers and students. Much easier to use than GeoGebra.

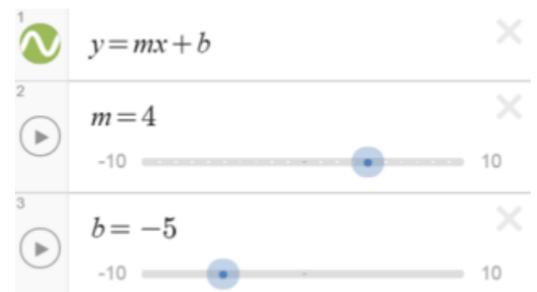
*Examples*

- to type the parabola  $y = ax^2$ , the calculator recognises the up-hat ^ to enter index/power of 2
- to type the hyperbola  $y = \frac{a}{x}$ , the calculator recognises the forward slash / to enter fractions



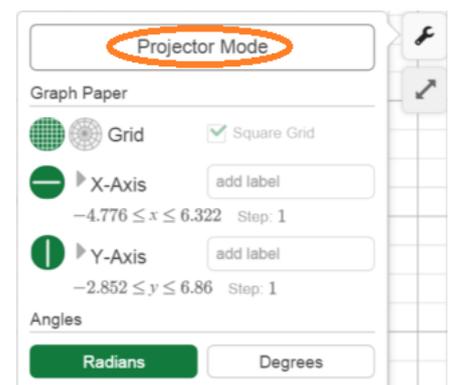
## Sliders

- **Sliders are great for visualisation and investigation** of functions. Make functions come alive.
- Sliders allow students to **instantly see the effect** of changing particular coefficients within functions.
- The great thing about the Mathletics Calculator is that the sliders are **set up automatically** when you type standard functions with variable coefficients such as the  $m$  and  $b$  in the straight line  $y = mx + b$ .



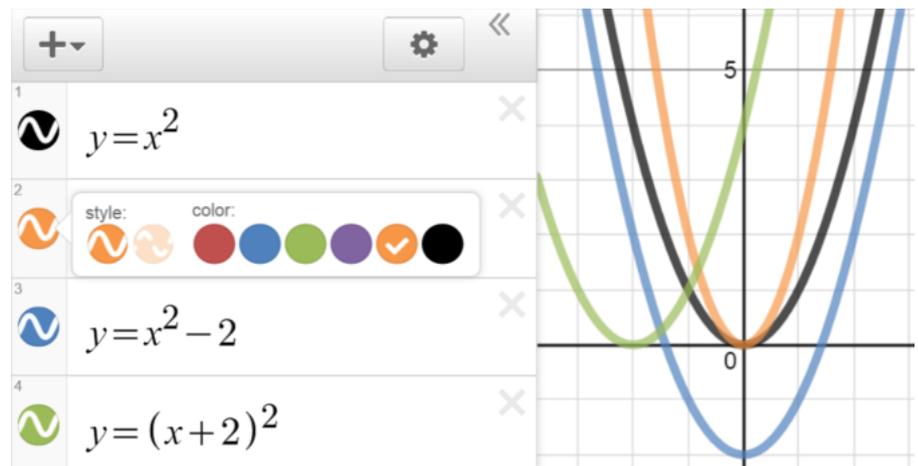
## Projector mode

- Projector mode **makes all axes and functions heavier** so that they can be seen more easily when using the projector in classroom.



## Colours

- Different **colours** are automatically assigned for each new function.
- Colours are **easy to change** using a long click on the colour/style circle.



## Taking students beyond Fluency

- Background:  
Remember that the National Curriculum in England aims to develop mathematical thinking through:

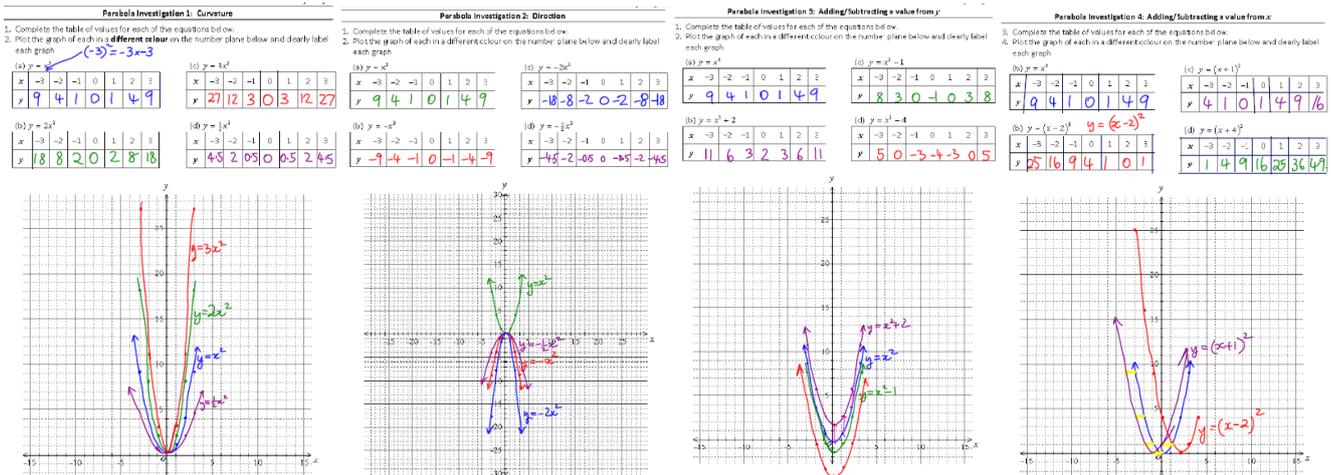
Fluency

Problem Solving

Reasoning

Typically, these proficiencies form a hierarchy in the order shown, ie Problem Solving and Reasoning are higher-order skills compared to Fluency.

- **Get to the higher level Mathematical Proficiencies of *Problem Solving* and *Reasoning* more quickly** with the Mathematics Calculator.
- Graph different functions quickly and then **concentrate on comparing their features**, such as the effect of changing the coefficient of  $x^2$  in a parabola or the gradient of a straight line.
- **You don't need to waste time** having students draw lots of similar graphs by completing multiple tables of values, plotting the points and drawing them with pen and paper as shown below.



Instead, either draw multiple functions quickly and easily, or draw one general function with sliders and you can get straight to a variety of richer problem solving/reasoning-type questions, such as

- 'What happens as the value of  $a$  increases in  $y = ax^2$ ?',
- 'What happens to the graph of  $y = mx + c$  when the value of  $m$  is negative?'