

Preview

An investigation-based approach to numeracy

Everything you need to: plan |teach | investigate | assess www.imaths.com.au



Plan Teach Investigate Assess

What is iMaths?

iMaths is an investigation-based numeracy program, written for the Australian Curriculum. The program provides everything you need to plan, implement and assess a comprehensive maths program that meets the individual requirements of any classroom.

By using investigations to consolidate traditional teaching practices, students develop a deeper understanding of maths concepts and improve problem solving skills.

The complete iMaths program is made up of four components: Student Book, Tracker Book, Teacher Book and iMaths Online.

Watch your Year 7 class come alive with iMaths Investigations

Investigations

Students use maths to solve real-life problems.

Written for the Australian Curriculum

All content and proficiency strands covered.

Interactive online resources

From projectable pages to BLMs – no more trawling the web for mismatched resources.

Assessment made easy!

Effectively capture and report your students' results.

PD and support

We're here to help you make the most of your iMaths program.



Everything you need to plan, teach, investigate and assess



Student Book

Engage students in learning with:

- 4 Investigations
- Topics that cover the three content strands
- Extended Problem Solving Tasks.

Teacher Book

All the tools teachers need, including:

- Notes, solutions, strategies, worked examples and an A–E rubric for each Investigation
- Answers to Student Book Topics
- Solutions to Problem Solving Tasks
- Answers to Tracker Book assessment items.

Student Tracker Book

Capture and report students' results with:

- A readiness test
- Assessment items for each Topic
- A student assessment profile.

iMaths Online

Make your classroom interactive with:

- Projectable Student Book pages
- Downloadable rubrics for Investigations
- iMaths weblink URLs
- Student logins to imathskids.com.au.

The iMaths 7 program has been carefully designed to cover all of the content and proficiency strands of the Australian Curriculum in a structured, linear fashion.

The grid below shows the suggested yearly plan for iMaths 7. Feel free to follow this plan, or create one that suits the unique needs of your class.

	TERM 1	
	Investigation, Topics and Problem Solving Tasks	
	NA1 Positive and negative integers	
	NA2 Add and subtract integers	
	Problem solving task 1: Positives and negatives	
	NA3 Decimal multiplication	
	NA4 Decimal division	
	NA5 Decimals – the four operations	
	NA6 Rounding decimals	
	SP1 Discrete and continuous data	
	SP2 Dot plots	
	SP3 Histograms	
	SP4 Stem and leaf plots	
	SP5 Average – the mean	
	SP6 Mean, median and mode	
	SP7 Mean vs median	
	INVESTIGATION 1: How mean are you?	
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	NA8 Kates	
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TERM 3 Investigation, Topics and Problem Solving Tasks MG9 Reflection, translation, rotation MG10 Transformation with coordinates Problem solving task 6: Lost in translation NA11 Line graphs NA12 Patterns and general rules NA13 General trends NA14 Extrapolation NA15 Ordered pairs NA16 Factor trees **INVESTIGATION 3: Sand Boxes** NA17 Exponential notation NA18 Square roots NA19 The distributive law Problem solving task 7: Rules for squares NA20 Order of operations 2 NA21 Backtracking Semester Problem solving task 8: Back order Term assessment **TERM 4** Investigation, Topics and Problem Solving Tasks MG11 Area of triangles MG12 Area of combination shapes MG13 Classify triangles Problem solving task 9: Triangle tangle NA22 Equivalent fractions NA23 Improper fractions NA24 Fraction addition NA25 Fraction subtraction NA26 Multiply fractions NA27 Divide fractions NA28 Renaming percents as fractions **SP8** Probability SP9 Judgments INVESTIGATION 4: It's a toss-up! NA29 Balancing equations NA30 Equations solve problems Problem solving task 10: Balancing act Term assessment

• Denotes sample pages included in this preview.

The iMaths 7 program is linear - the Topics, Problem Solving Tasks and Investigations are sequenced to fit together in a graduated program that promotes deeper understanding of maths concepts. It has been designed to assist students in the transition to high school.

TERM 1

Investigation, Topics and Problem Solving Tasks **NA1** Positive and negative integers NA2 Add and subtract integers

- Problem solving task 1: Positives and negatives
 - NA3 Decimal multiplication
 - NA4 Decimal division
- NA5 Decimals the four operations
- **NA6** Rounding decimals
- SP1 Discrete and continuous data
- SP2 Dot plots

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- **SP3** Histograms SP4 Stem and leaf plots
- SP5 Average the mean **SP6** Mean, median and mode
- SP7 Mean vs median
- **INVESTIGATION 1: How mean are you?** •••••• NA7 Ratio and proportion
 - NA8 Rates
- i.. Problem solving task 2: What's your speed?
 - NA9 Best buys
- Ì., Problem solving task 3: Cheaper by the dozens Term assessment

Every term contains a suite of Topics, extended Problem Solving Tasks, an Investigation and a Term Assessment.

Topics are ordered so students can systematically learn the maths concepts necessary to complete the Problem Solving Tasks and Investigation in each term.



Maths Topics are taught as discrete, scaffolded units. Teaching all of the Topics ensures the content strands of the Australian Curriculum are covered.



The extended **Problem Solving Tasks** apply the knowledge taught in the Topics that immediately precede them.



The Investigations, of which there is one per term, consolidate and apply the knowledge of the Topics taught to date.

Plan | Teach | Investigate | Assess

The iMaths 7 Topics comprehensively address the three content strands of the Australian Curriculum – Number and Algebra, Measurement and Geometry, and Statistics and Probability.

The linear order of the Topics in the Student Book allows students to progressively develop their understanding, while the Tracker Books assesses that understanding, and how it is applied.

On this page you'll find Student Book Topic **NA1 Positive and negative integers** and its matching Tracker Book assessment page.



Australian Curriculum covered!

This Topic covers the Number and Algebra sub strand: Compare, order, add and subtract integers (ACMNA280).

Need help teaching the Topics?

Teacher Book

The *iMaths 7 Teacher Book* contains Teaching notes for each Topic, which include worked examples of Topic Activities.

Answers to all Student Book activities are provided in the Teacher Book. Answers are also given for Problem Solving Tasks, Challenges and Tracker Book activities.

iMaths Online

The iMaths Online Teacher Area has projectable versions of all Student Book Topics, which are compatible with digital projectors and electronic whiteboards.

You will also find Teaching and Learning pages for the Topics, which can be projected for scaffolded teaching sessions. Student Book Topic





iMaths 7 Preview © Chris Linthorne, Firefly Education 2012 7

Plan | Teach | Investigate | Assess

Developing the problem solving performance of students is a major objective of the Australian Curriculum: Mathematics. The ability to solve problems involves the application of previously acquired mathematical skills and processes in new or unfamiliar contexts.

iMaths 7 contains 10 extended Problem Solving Tasks, which require students to use strategies to solve tasks that apply the knowledge taught in the preceding Topics.

The iMaths problem solving strategies

1 Guess and check

This is the simplest of all problem solving strategies, and one that some students rely on exclusively.

2 Make a table or chart

When confronted with a problem that contains a lot of information or data, the best way to see the information more clearly is to sort the information by drawing a table or chart.

3 Draw a picture or diagram

This strategy is used to turn an abstract concept into a visual representation.



Use iMaths Online to project the Problem Solving Tasks in your classroom, enabling whole-class discussions about the appropriate strategies to use.

You'll find the answers to the Problem Solving Tasks in the Teacher Book.

Student Book Problem Solving Task



Problem solving Task 1: Positives and negatives

Topics Before doing the Problem Solving Task you need to know... NAI Positive and negative integers NA2 Add and subtract integers

Tricky triangles

Place the positive and negative numbers in the triangle so that each side totals I. Use each number once only.

-2 - 10 (12)

Explain your calculations and reasoning.



Working!

The Student Book provides ample working space for students to solve the Problem Solving Tasks.

10 iMaths 7 Student Book

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4 Act out the problem

This strategy is used when an abstract concept is solved by using people and objects, making the problem real or concrete.

- 5 Find a pattern or use a rule The use of this strategy demonstrates sophisticated, logical problem solving skills.
- 6 Check for relevant or irrelevant information The relevant information is extracted from the rest of the information, and placed in a table.
- 7 Find smaller parts of a large problem This strategy involves breaking a problem down into manageable parts.

8 Make an organised list

By placing the information in an organised list, all possibilities can be listed and no information will be left out.

9 Solve a simpler problem

An easy way to solve these problems with large and complex numbers is to change the large numbers into smaller or simpler ones.

10 Work backwards

This strategy involves using the data from the end of the information and systematically working back to solve the problem.



Plan Teach Investigate Assess

Investigations are the core of the iMaths program. Investigations foster a deep understanding of maths concepts, as students use critical and creative thinking skills within real-life mathematical contexts.

In iMaths 7, there are four high-interest and engaging maths Investigations (one per term), which consolidate the concepts taught in the preceding Topics.

All resources needed to conduct the Investigations are available by using a combination of the Student Book, Teacher Book and iMaths Online.



Pre-requisite Topics

Before conducting Investigations, the relevant Student Book Topics should be taught. The Investigation allows students to revise and practise these Topics in a meaningful context.

All the help you need to conduct an investigation.

Teacher Book

The Teacher Book contains teaching notes that describe how to guide students through each Investigation, as well as providing planning information, problem solving opportunities, worked examples and solutions.

iMaths Online

The iMaths Online Student Area provides your students with direct access to essential downloadable resources and projectable Student Book pages, as well as links to relevant websites.

The iMaths Online Teacher Area provides teachers with access to downloadable resources, website links and planning tools that make Investigations easy to conduct. Student Book Investigation



Investigation 1 How mean are you?

The mean is a measure of average, so how mean are you?

Perhaps there are things about you that you would describe as 'average'. Maybe it's your height or the number of people in your family. Investigate what the average student in your class is really like.

Measure and collect data about certain characteristics of students to allow you to describe the 'average student' in your class.

Teacher note Comprehensive lesson notes, suggestions and resources are available in *iMaths 7 Teacher Book*.

✓ Topics

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Before starting the Investigation you need to know	ow.
NA3 Decimal multiplicationp12	2
NA4 Decimal divisionp	4
NA5 Decimals – the four operations	5
NA6 Rounding decimalsp18	3
SPI Discrete and continuous data)
SP2 Dot plotsp22	2
SP3 Stem and leaf plotsp24	4
SP4 Histogramsp26	5
SP5 Average – the meanp28	3
SP6 Mean, median and modep30)
SP7 Mean vs medianp32	2



Investigation checklist

You will need to hand in..

- A completed Cover Page
- A completed Investigation Plan
- A personal data table showing the measurements for ten characteristics
- A whole class data table of the ten characteristics showing:
 - the measurements for each student
 - the class average for each characteristic the type of average used
- A histogram, a dot plot and a stem and leaf plot representing three of the characteristics
- A written comparison with labelled illustrations
- The Investigation rubric.

Assessing Investigations

The Teacher Book makes assessment easy with an A-E rubric for each Investigation. These rubrics allow teachers to assess students' proficiency in understanding, fluency, problem solving and reasoning.

The rubrics can be used to help students understand the criteria by which they will be assessed and enable self-improvement. They are also a great reporting tool, to keep parents informed of their child's progress.

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Explicit Investigations

Investigations have been extended to four pages in the *iMaths 7* Student Book to give students all the help they need while they

Each Investigation contains an Inquiry, which is an open-ended extension of the Investigation, requiring higher-order thinking skills and provides an extra challenge for students.