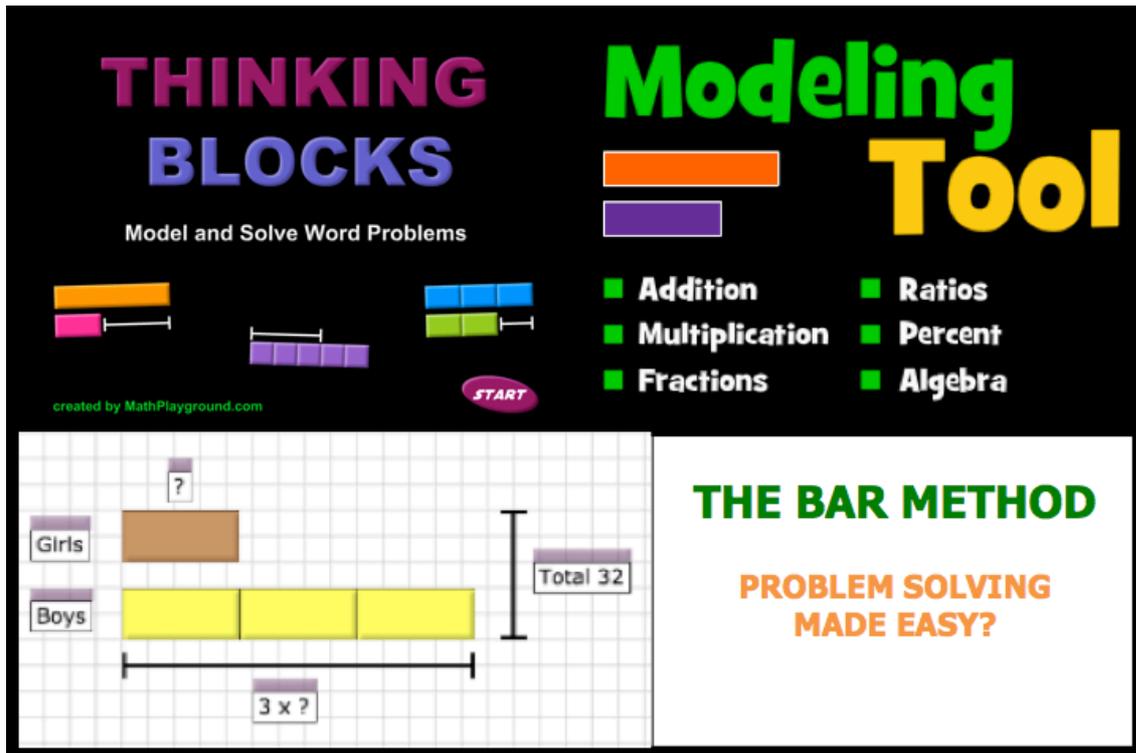


The Bar Method



THINKING BLOCKS
Model and Solve Word Problems

Modeling Tool

- Addition
- Multiplication
- Fractions
- Ratios
- Percent
- Algebra

created by MathPlayground.com

THE BAR METHOD
PROBLEM SOLVING MADE EASY?

The graphic shows a grid-based bar model for a word problem. It features two rows: 'Girls' with a brown bar and a question mark above it, and 'Boys' with a yellow bar divided into three equal segments. A bracket below the Boys bar is labeled '3 x ?'. A vertical bracket on the right side of the grid is labeled 'Total 32'. A 'START' button is visible in the top right of the grid area.

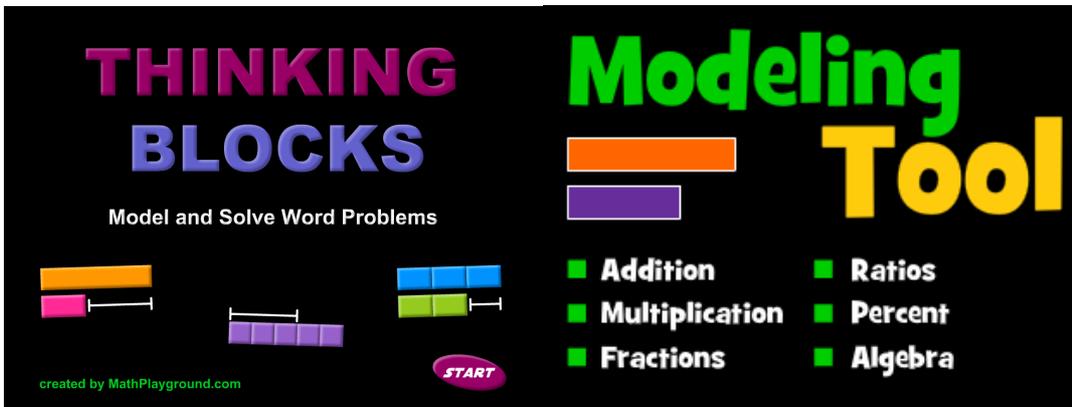
A Spire Maths Activity

<https://spiremaths.co.uk/bar/>

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Thinking Blocks Modeller



<http://bit.ly/barmethodvm>

The video help tools show/remind you how to use the tool. At present it does not look as though you can recall a question from the database.

ActivInspire file and Notebook files found at:

<https://spiremaths.co.uk/bar/>

The Spire Maths Interactives on Ratio and Proportion found in the Number section of the Spire Maths Interactive page contain examples that use bars. See

<http://bit.ly/ianumber>

8 Steps of Bar Model drawing

1. Read the problem
2. Decide who is involved
3. Decide what is involved
4. Draw unit bars
5. Read each sentence
6. Put the question mark
7. Work computation
8. Answer the question

(Suggested by Frostig Centre – see Web links later: the PowerPoint)

Problems for the Bar Method

1. Peter has four books. Harry has five times as many books as Peter. How many more books does Harry have?
2. There are 32 children in a class. There are 3 times as many boys as girls. How many girls?
3. A computer game was reduced in a sale by 20% and it now costs £48. What was the original price?
4. Ben spent $\frac{2}{5}$ of his money on a CD. The CD costs £10. How much money did he have at first?
5. Sam had 5 times as many marbles as Tom. If Sam gives 26 marbles to Tom, the two friends will have exactly the same amount. How many marbles do they have altogether?

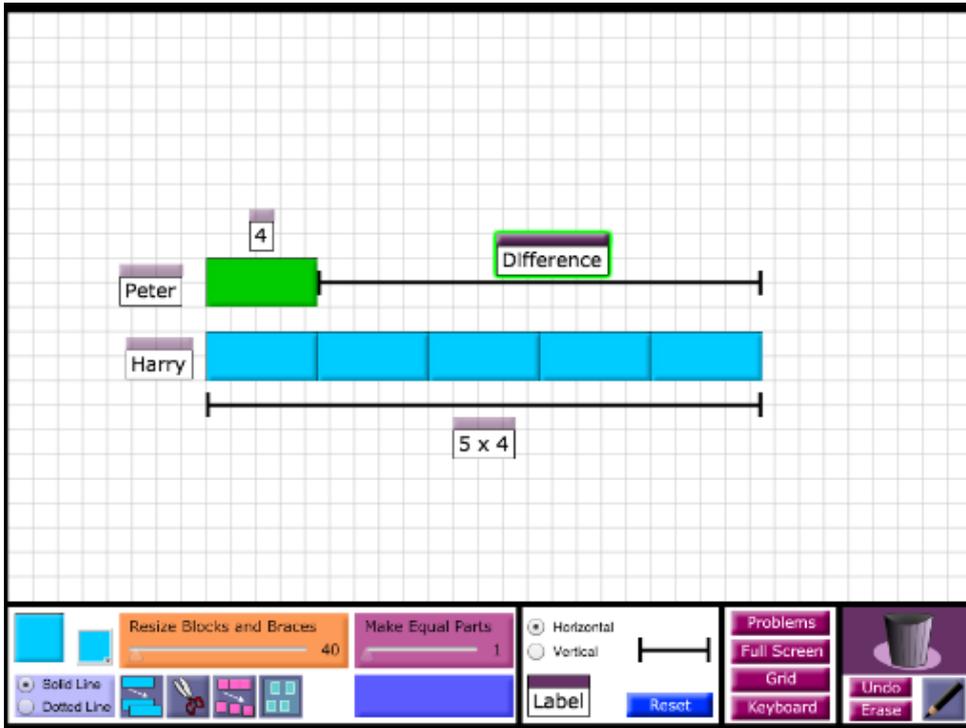
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6. Sophie made some cakes for the school fair. She sold $\frac{3}{5}$ of them in the morning and $\frac{1}{4}$ of what was left in the afternoon. If she sold 200 more cakes in the morning than in the afternoon, how many cakes did she make? (Adapted from Singapore textbook.)

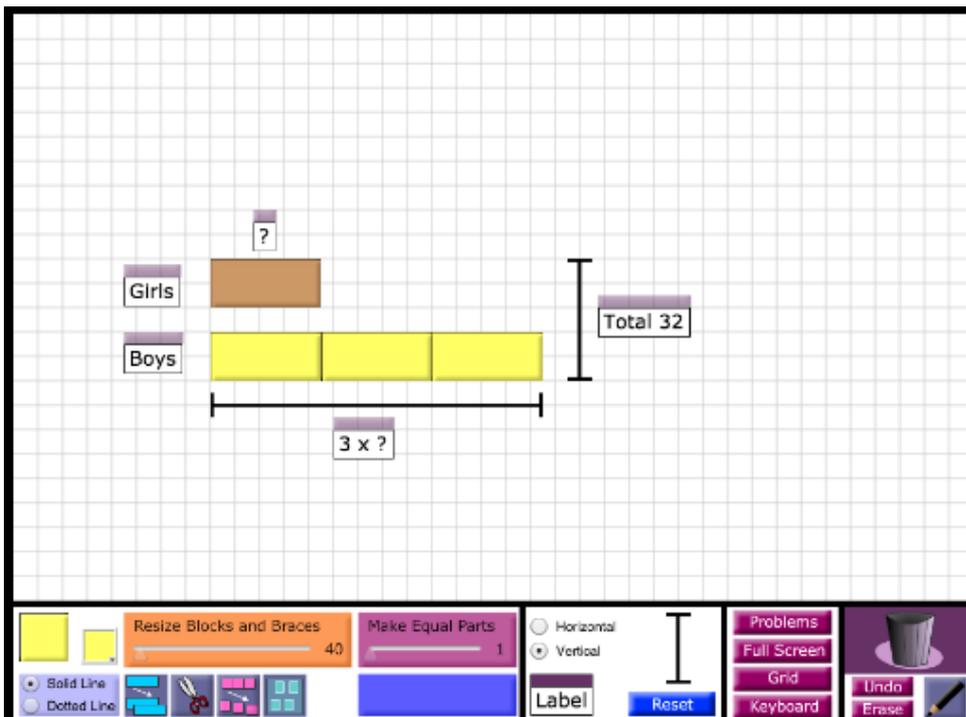
Solutions to the Problems for the Bar Method

Problem 1

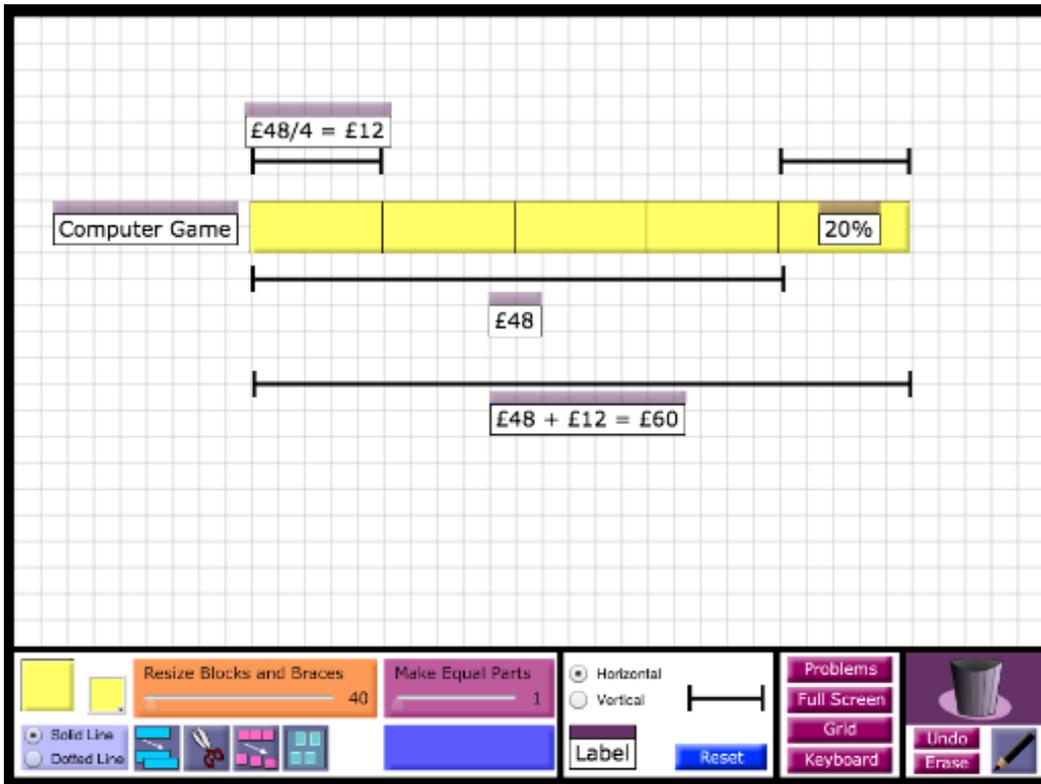
There are other ways to do all of these.



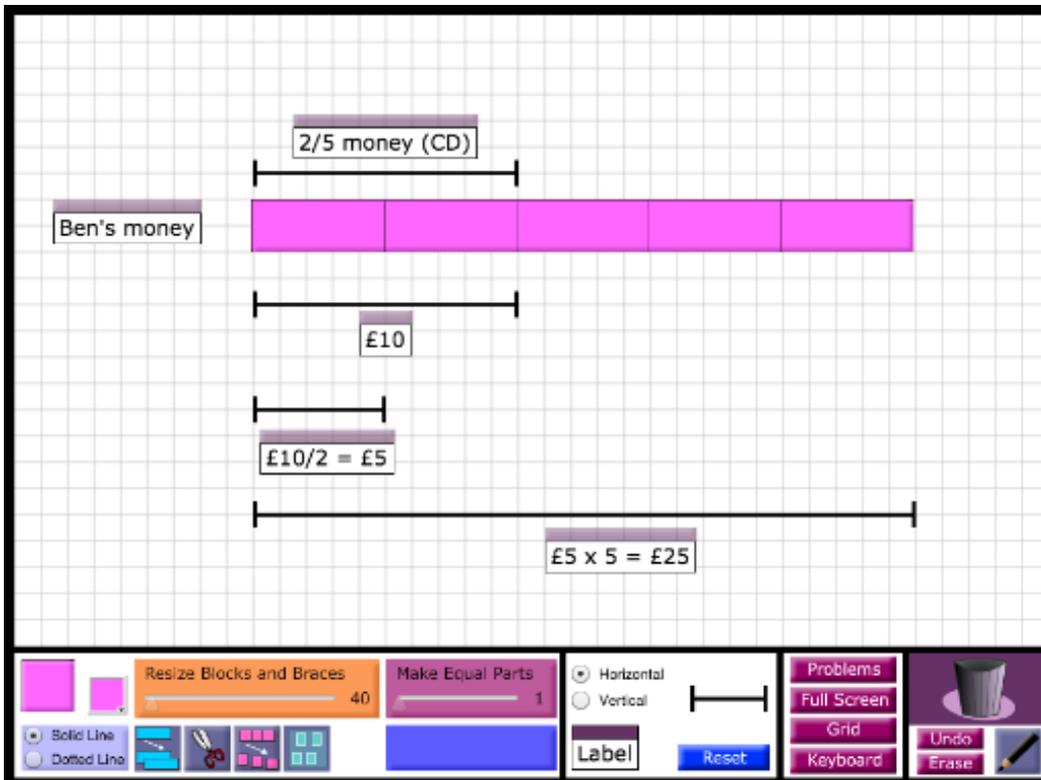
Problem 2



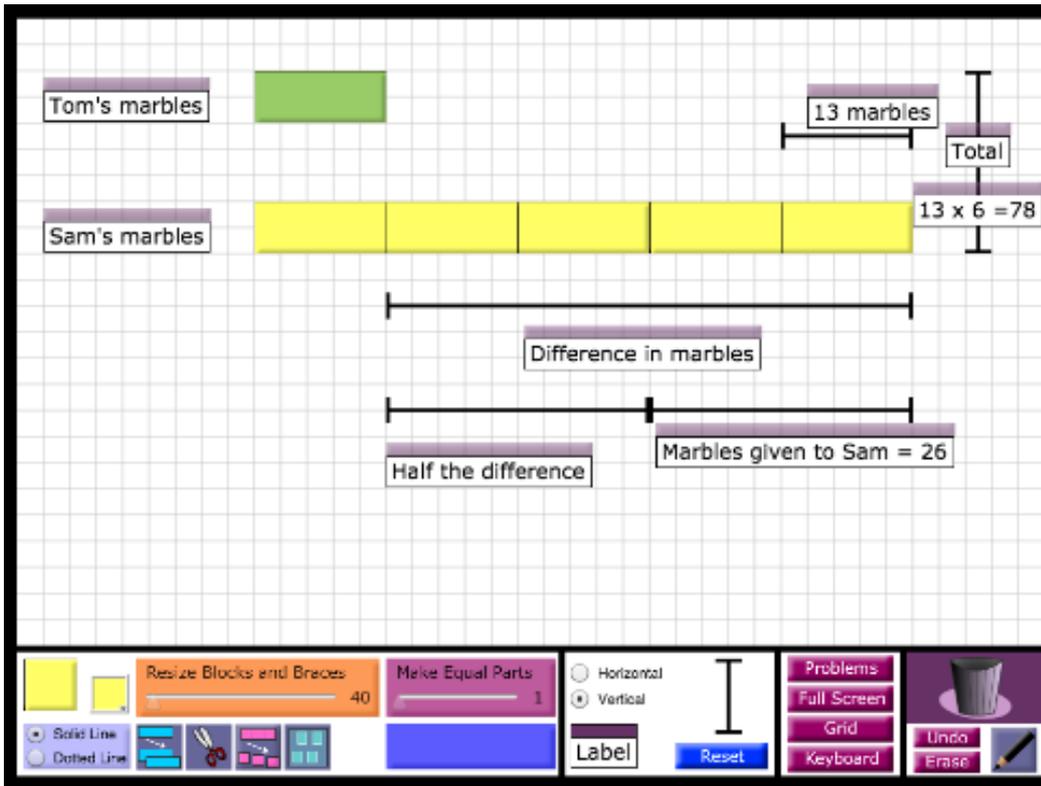
Problem 3



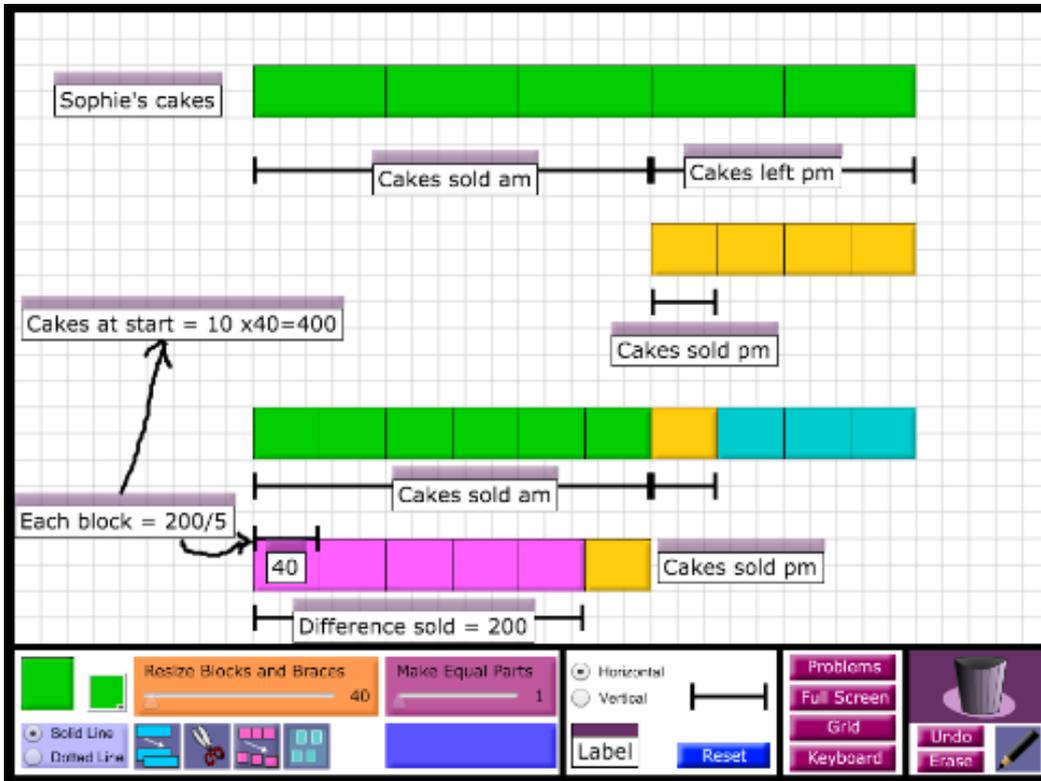
Problem 4



Problem 5



Problem 6



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More problems for the Bar Method

The website below has problems that are identified by type:

<http://www.thedailyriff.com/WordProblems.pdf>

Exam Question

24 In a class, 18 of the children are girls.

A quarter of the children in the class are boys.

Altogether, how many children are there in the class?

Show your working



Multiplication Problems

- Peter has 4 books. Harry has five times as many books as Peter. How many books has Harry?
- Henry ate 10 meatballs at the Christmas party. Shane ate 3 times as many meatballs as Henry. How many meatballs did they eat altogether?
- Helen has 9 times as many football cards as Sam. Together they have 150 cards. How many more cards does Helen have than Sam?
- The sum of 2 numbers is 60. One number is 9 times as big as the other. What is the bigger number?
- The sum of 2 numbers is 64. One number is 7 times as big as the other. What is the smaller number?

Developing Proportional Reasoning

The strip below represents £5:



- Where is: £3, £4, £3.50 and £3.59. What would the half way mark represent?
- Laura has £16. She spends $\frac{5}{8}$ of it on a pair of shoes. How much money does she have left?
- Tom spent $\frac{2}{5}$ of his money on a pair of Trainers. The trainers cost £24. How much money did he have at the start?

Solving Proportional Problems

- A Super Mario Game costs £45, it is reduced in price by 25%, how much does it cost now?

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16. A computer game was reduced in a sale by 20%; it now costs £40, what was the original price
17. A computer game was reduced in a sale by 40%; it now costs £60, what was the original cost?
18. Laura had £240. She spent $\frac{5}{8}$ of it. How much money did she have left?

Ratio

19. Tim and Sally share marbles in the ratio of 2:3. If Sally has 36 marbles, how many are there altogether?

More examples

20. In an election for class rep 5 out of 8 pupils voted for Sam. If 30 pupils voted for Sam, did Sam win? If he did, how many more votes did he receive?
21. A purse contains 10p, 20p and 50p coins. These are in the ratio 6:3:2. If there are 4 x 50p coins, how much money is in the purse?

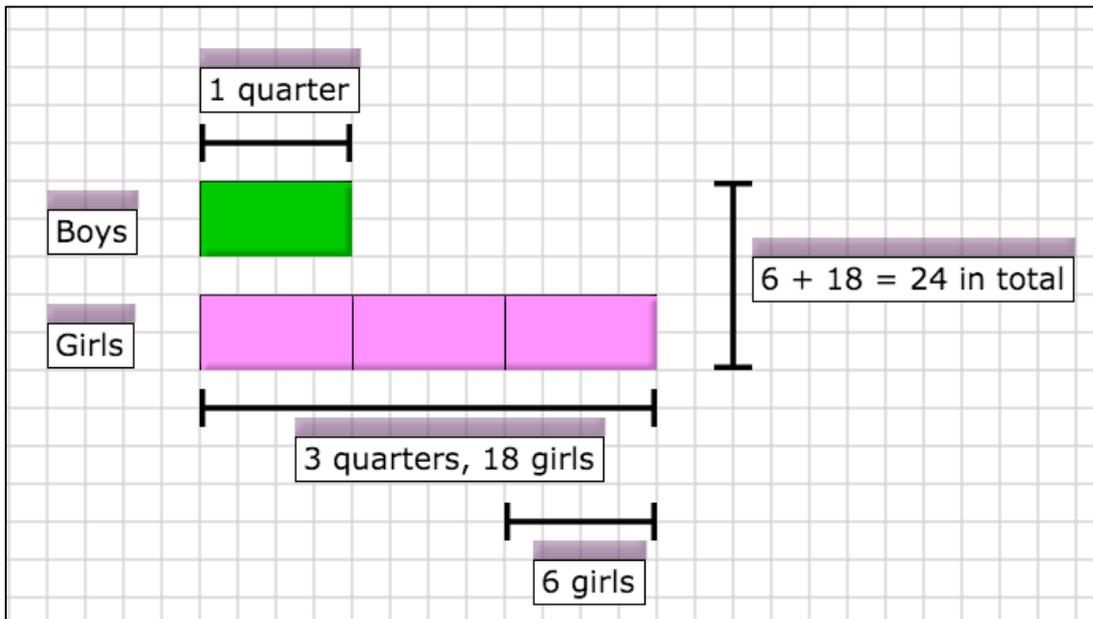
Percentage (not from the website)

22. An article in a shop is priced at £96 where VAT at 20% is included. What is the price without the VAT?
23. An article is in a sale priced at £9.60. The sale is a 20% sale. What is the original price?
24. In a garage a new car is for sale at £9600 +VAT. The VAT rate is 20%. What would you pay for the car.
25. An article in a shop has to be reduced by 20% in a sale. If it's original price is £9.60 what is the sale price?
26. Andy's Marbles from nRich is another good example to use:
<http://nrich.maths.org/2421>

Frostig Centre examples

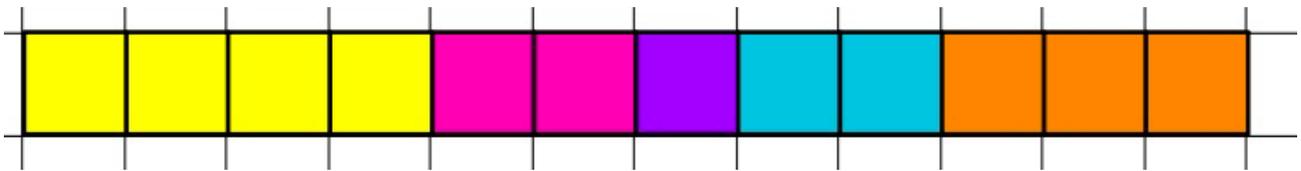
27. 40% of the school students went to the National History Museum for a field trip. 20% of students went to the zoo. 50% of the remaining students went to a farm. Only 60 students didn't have a field trip and stayed at school. How many students are there in this school?
28. Rosie baked 63 cookies. $\frac{3}{7}$ of them were chocolate chip cookies and the rest were sugar cookies. How many sugar cookies did Rosie bake?
29. $\frac{5}{8}$ of the students in my class are boys. $\frac{1}{5}$ of the boys have black hair. If 40 boys don't have black hair, how many students are in my class in all?
(Solutions to these in the PowerPoint at the end)

Exam Question Solution



Andy's Marbles Solution

Here is a diagram that can be built up to solve this problem.



Web Links for More Examples and Further Reading

- <http://www.greatmathsteachingideas.com/2014/12/26/bar-modelling-a-powerful-visual-approach-for-introducing-number-topics/>
- http://iss.k12.nc.us/cms/lib4/NC01000579/Centricity/Domain/67/Singapore%20Math_Model%20Drawing_CForsten.pdf
- <http://www.frostig.org/wp-content/downloads/IARLD2010.ppt>
- <https://www.dropbox.com/sh/rehuwif7a2xi2x/AAC8TrUYdS3s4j7ZGPg5c8XGa/0%20Bar%20Modeling/BarModels%20Algebra%20P13-35.pdf?dl=0>
- <https://www.tes.com/teaching-resource/solving-linear-equations-using-the-bar-method-11000712>
(though you may have to login/register for this)

Alternative Bar Modeller (by Mathsbot)

<http://mathsbot.com/activities/bar>

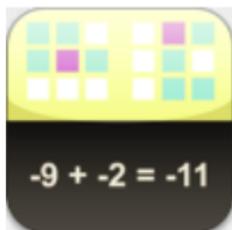
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Our iPad and iPhone resources

Search for Jamtec on the AppStore. We also have other non-mathematics apps. Prices correct at 5 March 2017.



[Age-ulator](#) Free: [Randomised](#) £0.99



[Directed Numbers](#) £0.99: [Equivalents](#) £0.99: [Multiplication Pairs](#) £0.99



[Maths Charts for Jenny Eather](#) Free:
[Maths Charts for Jenny Eather \(Deluxe version\)](#) £4.99



[GeoDraw](#) £0.99 (iPad only)

Education APPs from Apple

[Half price for volume purchase of some Education APPs](#)

All non-free APPs above are eligible for this discount.

AdBlocker software for browsers

Many mathematics sites unfortunately have adverts: we really like the AdBlocker software which we download from Softonic at: <http://bit.ly/adblocmw>

SPIRE MATHS

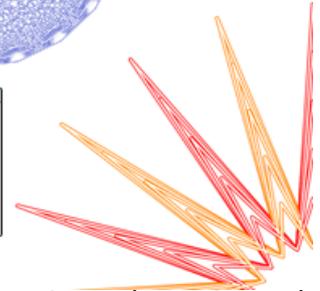
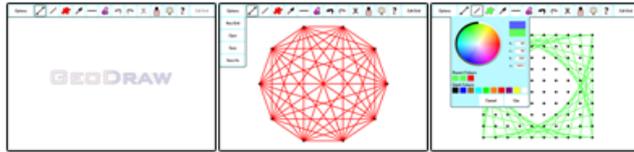
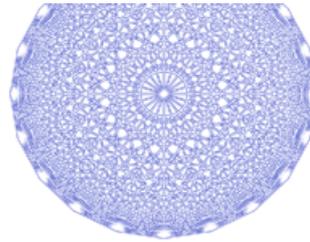


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Maths APPs for iPads and iPhones



GEO DRAW

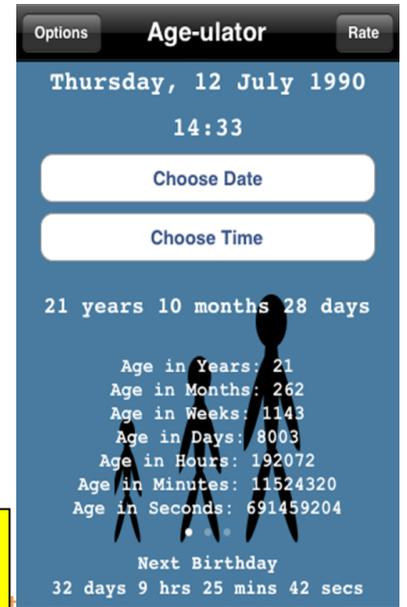
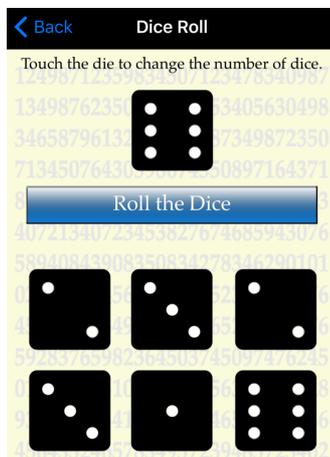
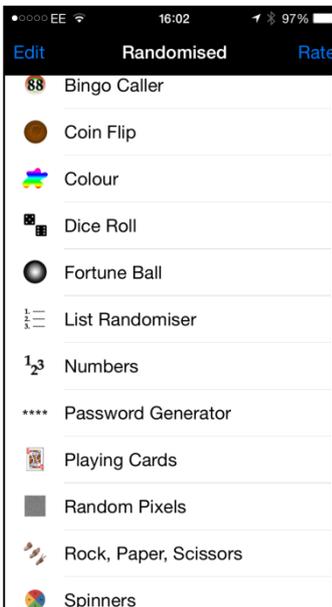
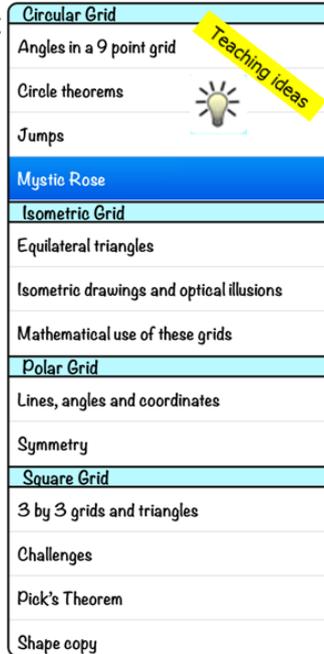
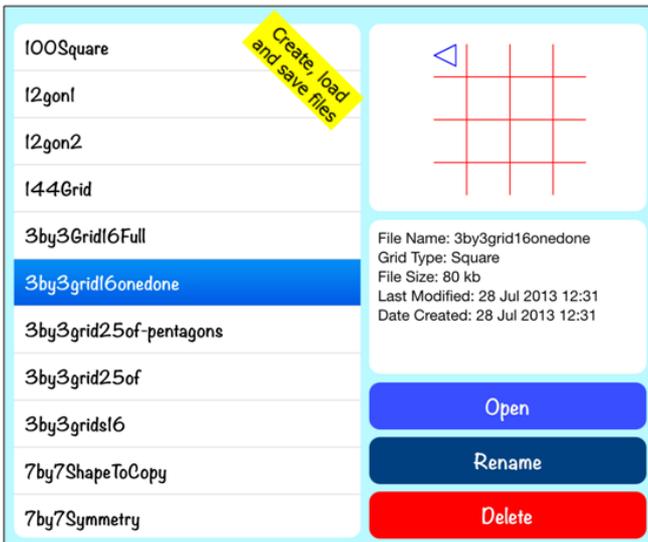
Available on iPad iOS 5.0 or (iPad only)



Change
 Number of grid points
 Grid point size
 Line thickness
 Line colour

- GeoDraw offers users a choice of 5 grids for use in mathematics and D&T lessons. Send/export images with/without grid using: Bluetooth, Email, Facebook, Twitter and into Pages or Keynote.

Eligible for VPP discount (see next page).



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Age-ulator (free): for large number work and problem solving.

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We've teamed up with Jenny Eather to bring her Maths Charts web resources to the iPad/iPhone. Try Maths Charts by Jenny Eather for free, then buy full Deluxe version for £4.99 (half this if you sign up for VPP with Apple and buy 20 or more copies).

Volume Purchase Programme (VPP) lets you buy Apple apps at discount rate of half price for 20 or more of the same app.

Maths Charts

Decimals

- Ordering decimals
- Expanding decimals
- Adding decimals
- Subtracting decimals
- Multiplying decimals
- Dividing decimals
- Rounding decimals
- Decimals, percentages, fractions
- Decimals, percentages, fractions, ...

Triangles

A triangle is a polygon with three sides and three angles. The total of the interior angles of a triangle is 180°.

Types of triangles

- equilateral triangles - all three sides and all three angles are equal
- isosceles triangles - 2 equal sides and 2 equal angles
- obtuse triangles - one obtuse angle (more than 90°)
- acute triangles - all three angles are less than 90°
- right-angled triangles - one right angle of 90°

Area of a triangle

The area of a triangle is half the base multiplied by the height.

Area - metric units

The square metre is the base unit of area in the international metric system.

Examples:

- 1 square centimetre = 10,000 square millimetres
- 1 square metre = 10,000 square centimetres
- 1 square kilometre = 100 hectares

24-hour time

24-hour clocks

Hours Minutes Seconds

8:15:52

Welcome!

Over 250 printable Maths Charts or maths posters suitable for interactive whiteboards, classroom displays, maths walls, display boards, student handouts, homework help, concept introduction and consolidation and other maths reference needs.

Maths Pairs (£1.99) – three App bundle: eligible for VPP discount Directed Number, Equivalent and Multiplication Pairs (or 99p each).

$\frac{3}{8}$ $\frac{4}{5}$ $\frac{5}{8}$ $\frac{16}{36}$ $\frac{24}{30}$ $\frac{35}{63}$

$\frac{1}{9}$ $\frac{4}{9}$ $\frac{5}{9}$ $\frac{27}{36}$ $\frac{8}{72}$ $\frac{21}{56}$

7 x 1 = Show
7 x 2 = Show
7 x 3 = Show
7 x 4 = Show
7 x 5 = Show
7 x 6 = Show
7 x 7 = Show
7 x 8 = Show
7 x 9 = Show
7 x 10 = Show
7 x 11 = Show
7 x 12 = Show

Change format Show All

MULTIPLICATION PAIRS

- All Tables 2 - 12
- All Tables 2 - 10
- Reverse Tables 2 - 12
- Reverse Tables 2 - 10
- Learn Tables

EQUIVALENT NUMBER

- Addition and Subtraction
- Multiplication and Division
- Mixed Questions
- Substitution in Expressions

Equivalent Fractions
Fractions and Decimals
Fractions and Percentages
Percentages and Decimals

$a = -2$
 $a = -4$
 $a = -1$
 $a = -4$
 $a = -4, b = 0$
 $a = 3$
 $a = 2$
 $-5a + 5b$
 $5 - 5a^2$
 $-2a^2 + 4$

Contact and further details:
In school training can be arranged to support implementation. www.jamtecstoke.co.uk
contact@iamtecstoke.co.uk

64 ÷ 8 72 ÷ 12 48 ÷ 8 9 6 5

40 ÷ 8 70 ÷ 7 20 ÷ 4 10 9 5

72 ÷ 8 21 ÷ 3 81 ÷ 9 8 6 7