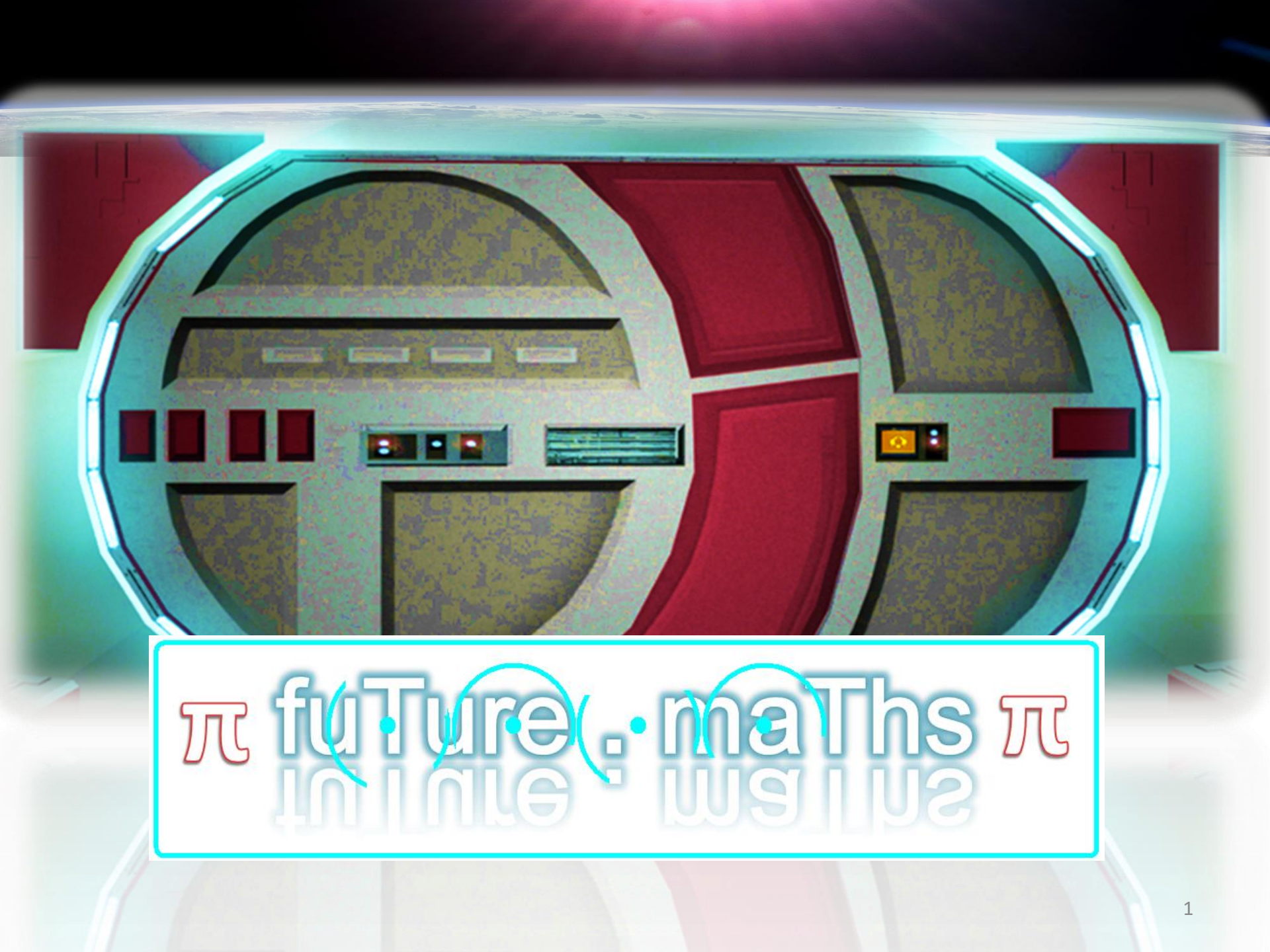

π fuTure . maThs π

FRACTIONS L1 / L2

Course Content: Choose your topic …

MATHS L1 to L2

Whole Number and Functions

place value

negative numbers

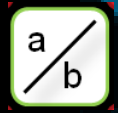

add and subtract


multiply divide

round numbers

ratio scale

Parts of a whole



fraction

decimal numbers


percent

percent decimal fraction

Measure and Shape

metric measure

imperial measure

perimeter

area

volume

formulae bodmas

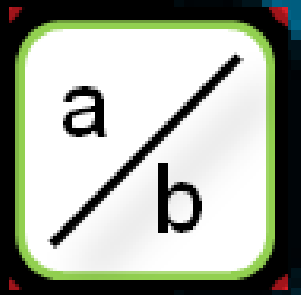
Handling Data


charts data

averages


prob-ability

Topic Introduction : Fractions



FRACTIONS

This topic introduces and explores the way in which we can create values that show how much we have when we have less than one, or part of something. This is an old Egyptian method using two digits telling you how many pieces one whole amount has been cut up into and also how many of those pieces you have.

You will learn how to use these two numbers, how they look in pictures, their uses, how to keep it simple by using the smallest numbers possible to show your fractional amount and how to calculate using fractions.

Get really good at this topic as future topics rely lots on fractions. You will also need to remember how to divide as fracturing really just means dividing.

Choose an icon to select where to start

Warm up Exercise 1

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

	1	4	3	7	10	6	5	9	2	8
6										
3										
7										
2										
9										
8										
4										
10										
5										

Lets start today by revising ! Complete the above sums and multiplication grid

Warm up Exercise 2

Do-talk-record

A

L2/L1

L2. A ratio of 5:8 is the same as?

a) 25: ? because.....
b) 1: ? because.....
c) ?: 24 because.....
a) ?:1.6 because.....

L1. A ratio of 3:15 means ...?

A) there are 15parts because.....
B) there are 18parts because.....
C) is the same as 4:18 because....
D) is the same as 1:5 because.....

Warm up Exercise 3

Do-talk-record

L1/L2 **B**

297mm A3 Paper

....mm?

Paper has a ratio of 1: $\sqrt{2}$ (1.414)

L1.The longer side measures?

a) 297x 1.414 because.....
b) 420mm because....
c) $\sqrt{2}$x 297 because....
d) $\sqrt{2}$x 1.414 because....

L2 A4 paper measures...?

A) long side is 210mm because.....
B) short side is 210mm because.....
C) short side is 297÷$\sqrt{2}$ because.....
D) 297mm by 210mm because.....

Warm up Exercise 4

Do-talk-record

C

L2/L1

In a school of 660 pupils the ratio of tutors to girls to boys is 1:18:15.

L2. are there....?

a) 180 girls because.....
b) 360 girls because.....
c) 21 tutors because.....
d) 300 boys because.....

Coffee for 1 person is 1sp coffee, 2sp sugar, 25ml milk and 100ml water

L1. I need ....for 20 people?

A) 0.5L milk because.....
B) 500ml milk because.....
C) 2L water because.....
D) 20sp sugar because.....

Progress Checker 1

What do you already know about Fractions ? What did you learn during the week? Examples....

How would you rate your skills with fractions ?

1) **Excellent ability**
2) **Good ability, but working to improve**
3) **Ok, making a start but I know I have lots to still learn**

The date I started studying : **My aims are...**

A Write a fraction using digits and relate to a real life object, item, score etc...

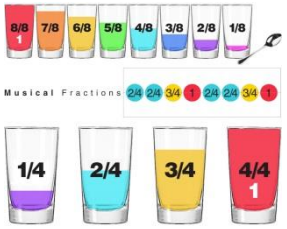
B Change a fraction to an equivalent or simplest form

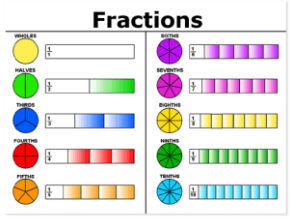
C Find a fraction of a value and calculate using fractions (+, -, x, /)

$$\frac{24}{40} \overset{\div 2}{=} \frac{12}{20}$$

or $\frac{24}{40} \overset{\div 4}{=} \frac{6}{10}$

or $\frac{24}{40} \overset{\div 8}{=} \frac{3}{5}$





Introductory Video and Discussion

Can you divide up a fraction into even smaller pieces ?
How do you change from one fraction to another ?

When do we use fractions ?
Is using fractions better or worse than other number systems ?

What do the top and bottom numbers mean in a fraction ?
Can you add/subtract/multiply/divide one fraction with another ?

Watch the introductory video and then discuss the above

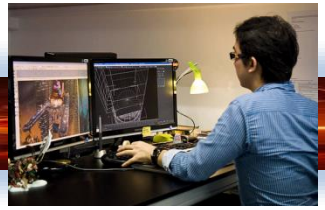
Your thoughts..

Vocabulary and Jobs

Fraction
Divide
Split
Factor/Factorise
Numerator
Denominator
Equivalent
Simplify
Part
Portion
Whole

Accountants
Builders
Scientists
Engineers
Chef
Retail
Researcher
Game designer
Carpenter
…. Can you think of more?
……
……

These are the words you will be using in this topic

Lesson: Concept Activity

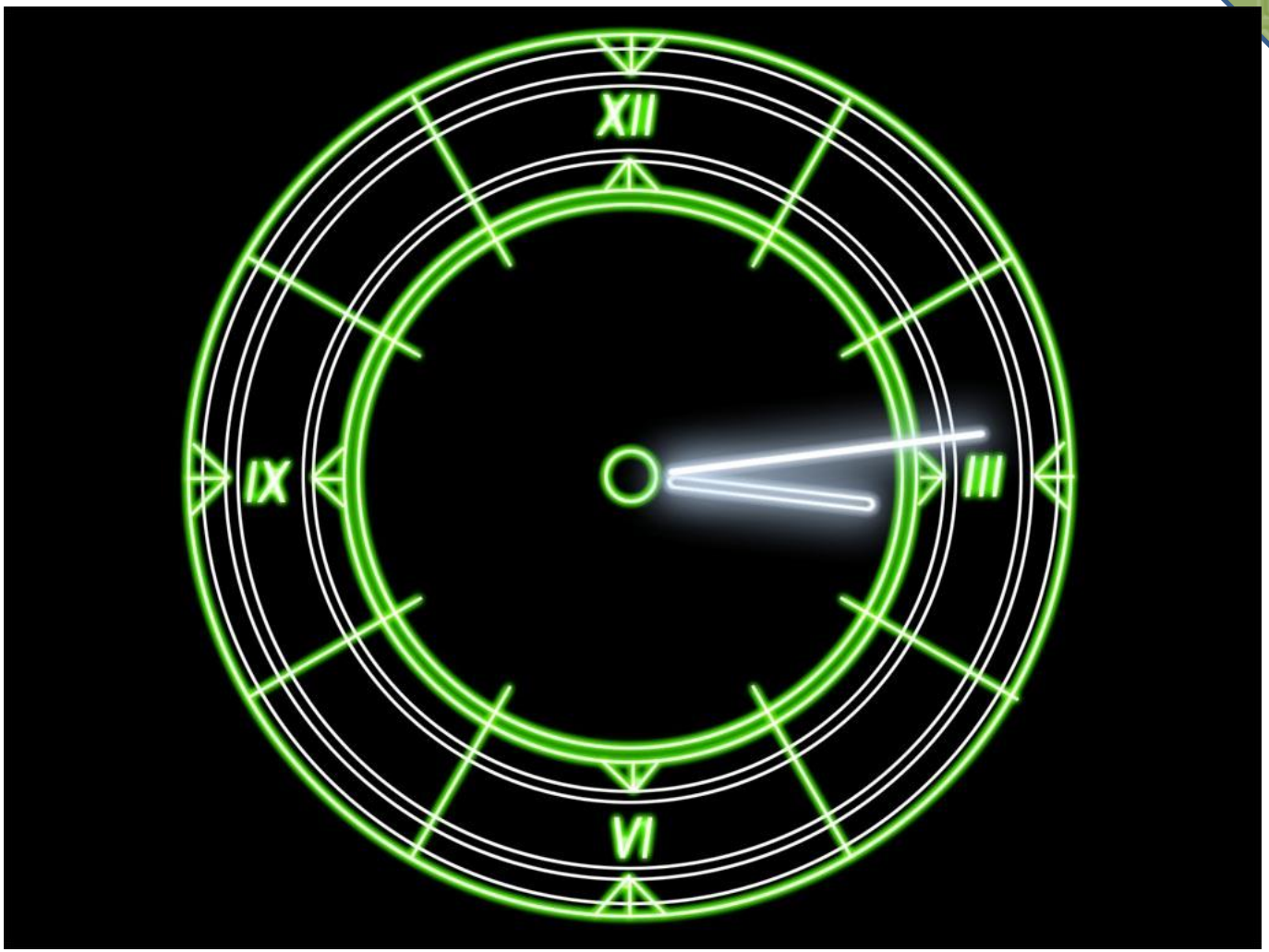
Draw a circle

Divide it up into 24 hours of the day

Work together to write the name of each slice of the clock as a fraction of the whole 24 hours

Can you simplify?

Can you show how to add/subtract/ Multiply or divide up the slices?

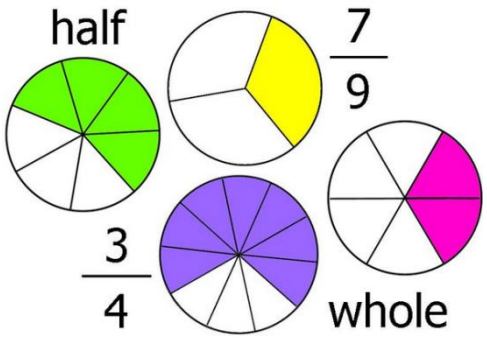


Fraction Rule 1 – Writing a Fraction

The Egyptians invented this number system to help them build the pyramids!

It is a simple system where you count up all of the 'items' you have (called the WHOLE amount) and write this number under a line. Then you count up the PARTS you have out of the whole amount and write this number on top of the line. There.....you have a fraction!

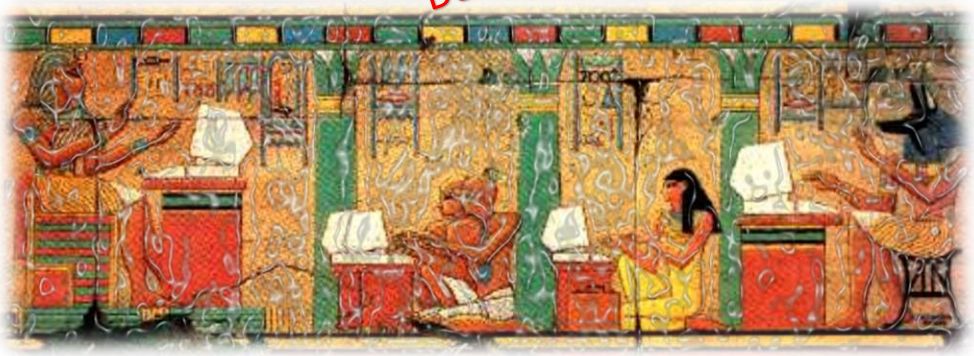
Fraction examples !



- The top number is the number of pieces you have — Numerator

- The bottom number shows the number of pieces the whole has been cut into — Denominator

$$\frac{1}{2}$$



Fraction Rule 2 –

As fractions are just about cutting things up they are just another way of saying 'dividing'.

Therefore, the number on the bottom of the fraction shows the number parts you are dividing the whole amount into.

When finding a fraction of a value such as a third of a sum of money, a third means 'divide by three'.

The top number is how many of those pieces you want, so once you have found one piece just multiply that value by the top number.

- Calculating fraction parts

To calculate a fractional part you divide by the number on the bottom of the fraction,

then multiply by the number on the top

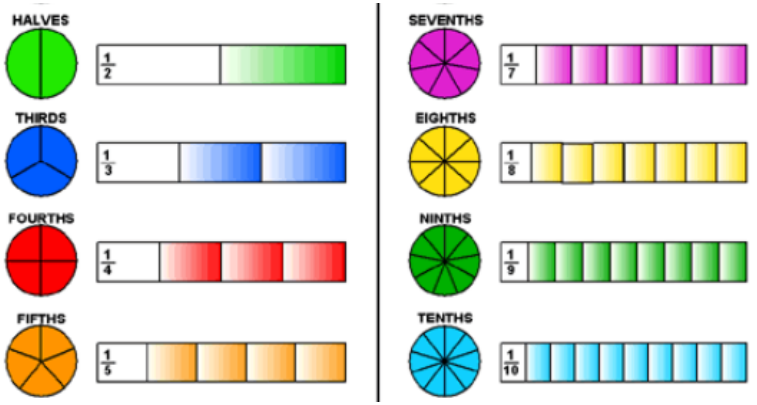
$$\frac{1}{2}$$

Half of £60

Third of 90m

Quarter of 16 people

Three fifths of a day

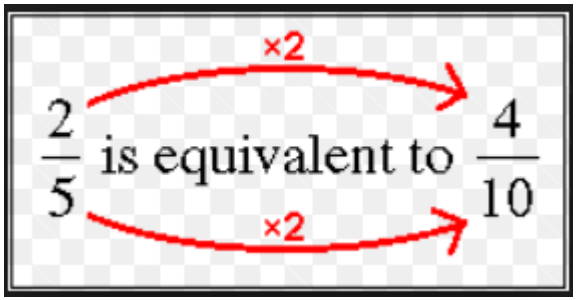


Fraction Rule 3 –

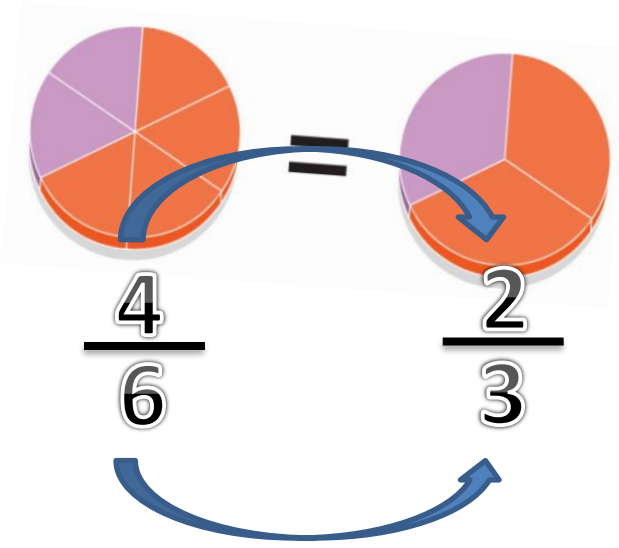
To simplify/change a fraction look back at the lesson on 'RATIOS'

The top and bottom numbers both change by a factor (in the topic of ratios is called SF).

Find a factor of both the top and bottom numbers of the fraction and either multiply or divide both numbers by this factor



These fractions are all the same size



Here you divide both numbers by 2

Fraction Rule 4 – Adding/Subtracting Fractions a)

To add and subtract fractions first you need to see if they are the 'same' fraction size. This means you need to look at both fractions bottom numbers and see if they are the same number.

Addition and subtraction of fractions of the same size is easy, just add or subtract the top number of one fraction to the other !!

If the fractions are different sizes (ie the bottom numbers are different) you will need to make them both the same by using 'RULE 3' to change them. Then you can add or subtract them.

$$\frac{3}{4} + \frac{1}{3} = \frac{3 \times 3}{4 \times 3} + \frac{1 \times 4}{3 \times 4}$$

$$= \frac{9}{12} + \frac{4}{12}$$

$$= \frac{13}{12} = 1\frac{1}{12}$$

Level 2

Fraction Rule 5 – Multiplying Fractions

To multiply a fraction by another its easy !!

Just multiply the top numbers of both fractions to produce the top number of the answer. Then multiply the bottom numbers of both fractions to produce the new bottom number in the answer.

That's it, easy !!

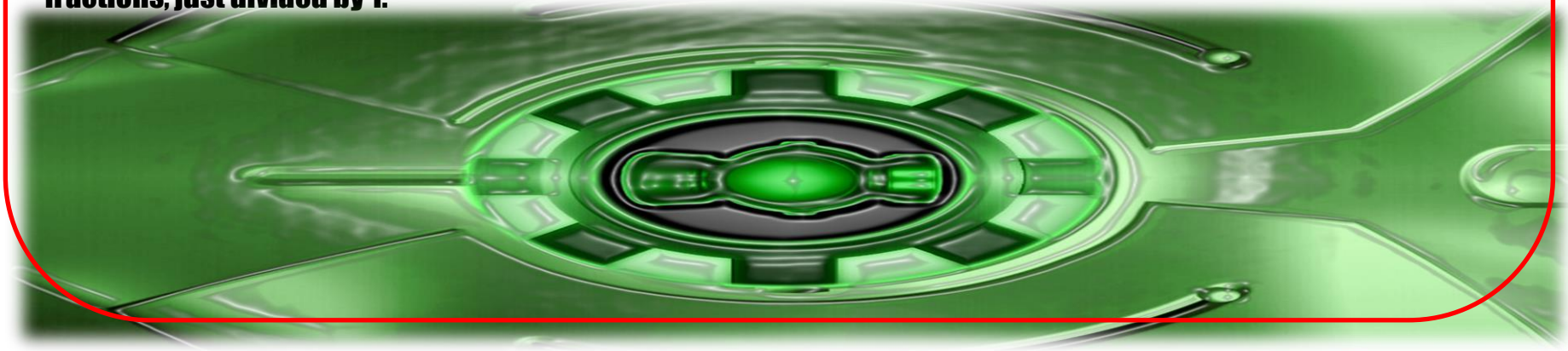
Don't forget that 'whole' numbers can become fractions, just divided by 1.

Multiply the numerators

$$\frac{2}{5} \times \frac{3}{4} = \frac{6}{\ }$$

Multiply the denominators

$$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$$



Fraction Rule 6 – Dividing Fractions

To divide a fraction by another there is a 'strange' rule which gets you to 'flip' the fraction you are dividing by upside down and then just use 'RULE 5' to multiply instead!!

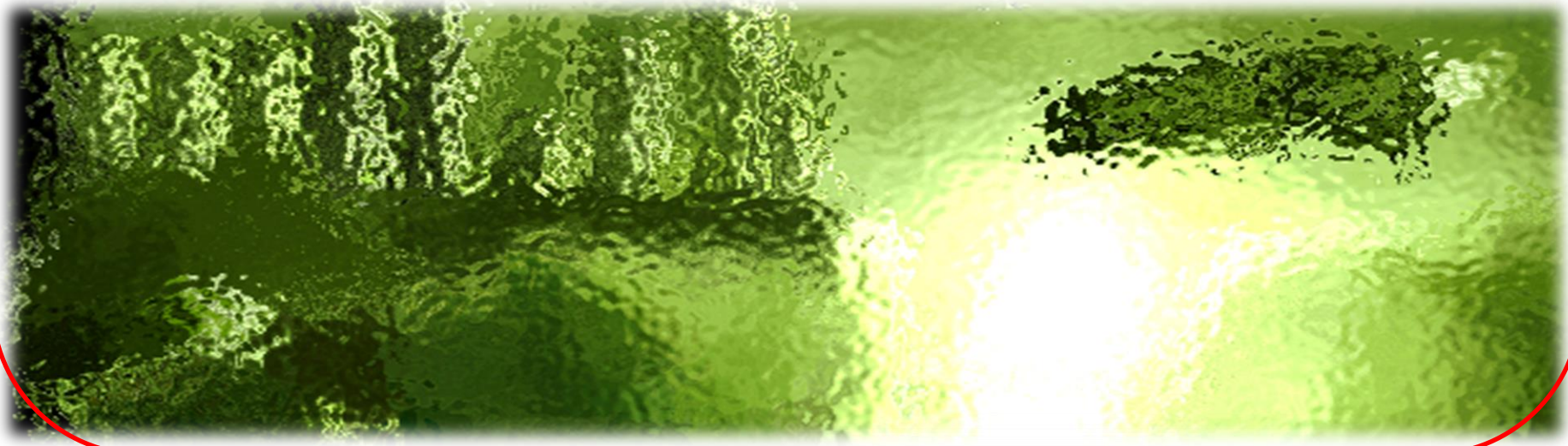
Level 2

Invert the fraction that you are dividing by

$$\frac{4}{5} \div \frac{2}{3} = \frac{4}{5} \times \frac{3}{2}$$

Multiply the numerators and denominators

$$\frac{4}{5} \times \frac{3}{2} = \frac{12}{10}$$



Lesson: Try out

Block 1 : Watch tutor led demo (in class or on video)

Try these, 1) Write one half in digits..... 2) Write two thirds in digits.....

3) Write three quarters in digits..... 4) Write a tenth in digits.....

5) Write four fifths in digits..... 6) Write one and a half in digits.....

Block 2 : Watch tutor led demo (in class or on video)

Try these, 7) Simplify 4/8 ..... 8) Simplify 10/30.....

9) Simplify 14/52..... 10) Write this mixed number in top heavy form 1 2/5 .....

11) Write this top heavy fraction as a mixed number 14/12 12) Find ¾ of 200

13) Find 1/5 of 300 14) Put in order, highest first 2/5, 3/7, 6/10

Block 3 : Watch tutor led demo (in class or on video)

Try these, 15) Add ½ + ¾ ..... 16) Add 6/5 + 2/10 .....

17) Subtract ¾ from 7/8 ..... 18) Subtract 2/3 from 8/9 .....

19) Convert all these fractions into twelfths 1/3 , 2/4 , 7/6

20) Multiply 4/5 by 7/8

21) Multiply 1 and ½ by 2 and 3/7

22) Divide 10/4 by ½

23) Divide 3 and 1/3 by 9/2

Level 2

Lesson: Websites and links

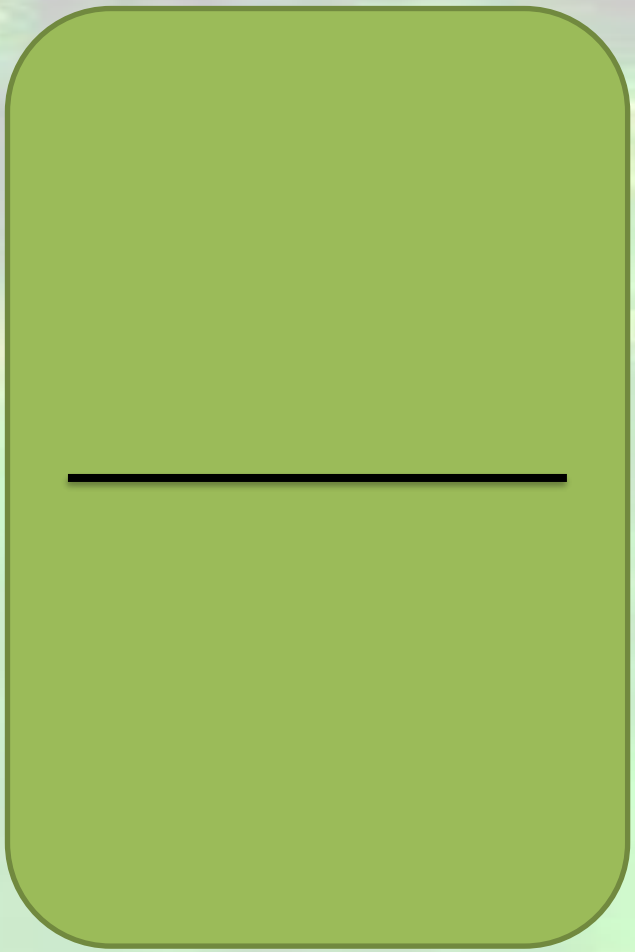
fractions and equivalent fractions	http://www.freewebs.com/weddell/equivalent.swf
Add/Sub fractions, 3 different ways to solve on a web page!	http://www.mathsisfun.com/fractions_addition.html
fractions games	http://themathgames.com/
fraction website with explanations and examples of fraction rules	http://www.aaamath.com/fra.htm
fraction basics visuals using pizza	http://www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/ks2/maths/fractions/
Another website with fraction help	http://www.mathsisfun.com/fractions-menu.html
Visualisations of fractions and equivalent fractions	http://nlvm.usu.edu/en/nav/category_g_1_t_1.html
Variety of fraction games	http://www.math-play.com/math-fractions-games.html

Lesson: Activity A

Match the cards to the correct height on the bottles. 1) try finding the amount of liquid at the fraction amount 2) try writing the fraction in a different way 3) try adding/subtracting one amount to another 4) try multiplying or dividing a fractional amount by another

L1 **1250ml**	L1 2/3
L1 **10ml**	L1 5/6
L1 **1750ml**	L1 4/7

CREATE YOUR FRACTIONS BELOW

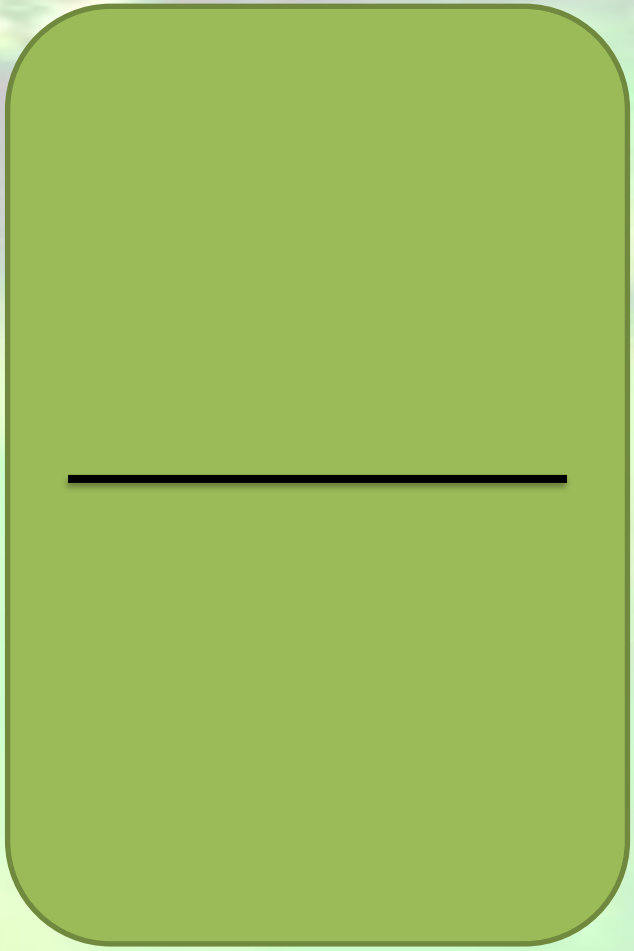


+

-

X

/



Lesson: Activity B

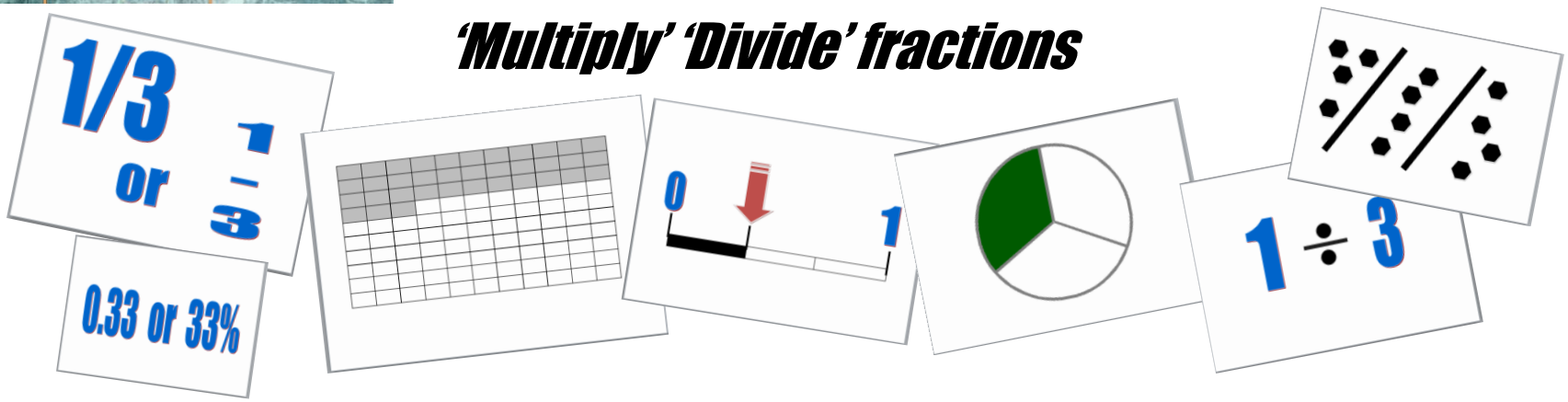
Activity	find an equivalent fraction to the one picked	Draw the fraction picked	roll 2, 3 or 4 dice and find the fraction value using the fraction picked	pick 2 fractions and add them	pick 2 fractions and take the smaller from the larger	pick 2 fractions and multiply them	pick 2 fractions and divide the largest by the smallest
	CHANGE	DRAW	VALUE	ADD	SUBTRACT	MULTIPLY	DIVIDE
Level One	1 or 2	3 or 4	5 or 6				
Level Two	5 or 10	4 or 9	3 or 8	2 or 7	6 or 11	any even double	any odd double

Level 2

Design a Fractions Poster !

1) Cut out a fraction circle
2) Put the fraction circle on the poster
3) Write the fraction in different ways

Ext: show visually using one or more fraction circles how to 'Add' 'Subtract' 'Multiply' 'Divide' fractions



Lesson: Activity D

Use a spreadsheet to produce formulae that will :

Level 2

1. *Find equivalent fractions*
2. *Add and subtract fractions together*
3. *Multiply fractions or divide them*
4. *Find a fraction of another value*

$$7.48181818\ldots = 7.3 + 0.18181818\ldots$$
$$= \frac{73}{10} + \frac{18}{99} = \frac{73}{10} + \frac{9\times 2}{9\times 11} = \frac{73}{10} + \frac{2}{11}$$
$$= \frac{11\times 73 + 10\times 2}{10\times 11} = \frac{823}{110}$$

Lesson: Activity D

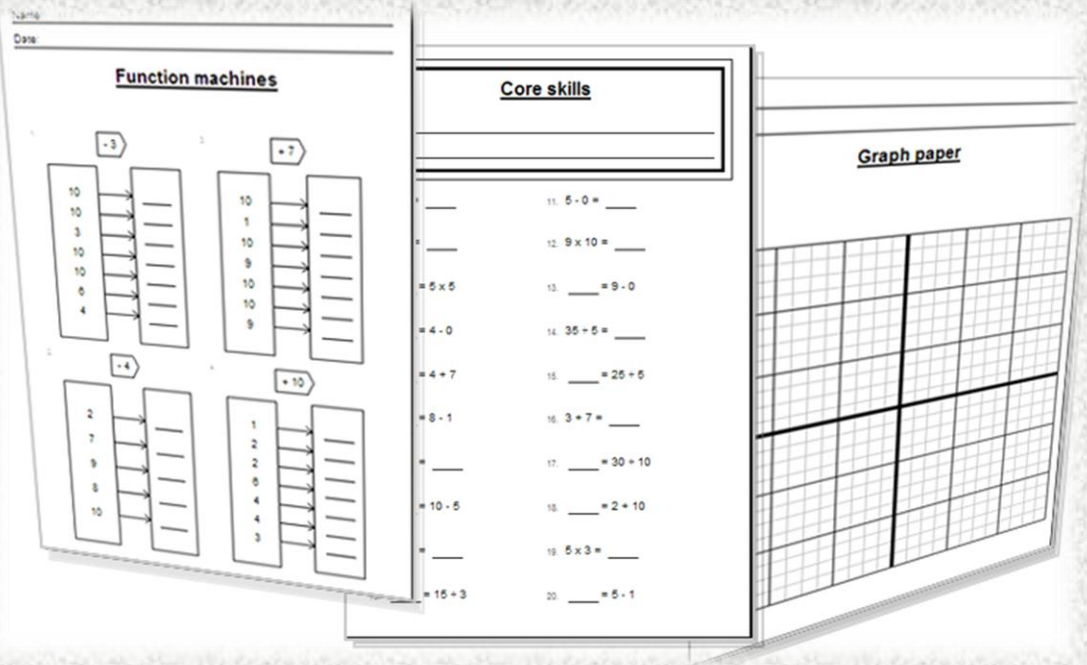
Try a variety of written practice

Worksheets

Workbooks

Practice Exam Papers

Maths Problems



Lesson: Practice – just the numbers

A Write the answer as a fraction

1) One cut into three =
2) One split into five =
3) One divided by ten =
4) One cut into seven =
5) One divided by fifteen =

6) Two cut into three =
7) Four divided by six =
8) Eight split into nine =
9) Ten cut into twenty =
10) Six divided into one hundred =

B Find fractions of a value

1) Find half of 20
2) 1/3 x 60
3) 4/5 of £100
4) 1/7 x 210kg
5) 1/10 of 1K
6) 2/3 of 18
7) 1/8 x 240
8) 3/6 of 40
9) 1/15 x 45
10) 7/9 of 63

C Complete the following fraction sums

1) Add ½ and ¼
2) Add ¾ and 3/8
3) Add 2/3 and 7/9
4) Add 2/5 and 3/10
5) Add 4/6 and 15/18

6) Subtract 1/3 from 5/6
7) Subtract 2/5 from 9/10
8) Subtract 19/20 from 99/100
9) Subtract ¾ from 16/20
10) Subtract 4/7 from 17/21

11) Multiply 8/10 and 2/3
12) Multiply 2/7 and 2/8
13) Multiply 4/5 and 1/11
14) Multiply 3/8 and 2/5
15) Multiply 6/1 and 20/1
16) Multiply 1/5 and 1/7

17) Divide 2/3 by 1/6
18) Divide 1/5 by 2/3
19) Divide 8/9 by ½
20) Divide 3 and 2/4 by 4/5
21) Divide 3/7 by 10/1K

Level 2

D Simplify the following

1) 8/10
2) 2/4
3) 14/16
4) 90/100
5) 1K/1M
6) 40/60
7) 5/15
8) 20/60
9) 7/56
10) 77/88

E Convert these mixed fractions into top heavy fractions

1) 3 ½
2) 1 4/5
3) 2 ¾
4) 5 2/3
5) 3 7/9

Level 2

F Convert these top heavy fractions into mixed fractions

1) 18/7
2) 29/4
3) 5/3

Lesson: Practice – Word Problems

Q1 I watched a film lasting two and a half hours straight after watching another that was on for an hour and a quarter. What is the total viewing time for the two movies together?

Q2 A fifth of a plane journey was disturbed by turbulence. The flight was for four and a half hours. How long did the turbulence last?

Q3 Firemen worked on a fire in a building that spread to a quarter of its 840 rooms. How many rooms did not catch fire?

Q4 Two and a half pizzas were used at a party. Each pizza was cut into eighths. How many eighths were able to be cut from the two and a half pizzas?

Level 2

Q5 A survey had 79 people out of a hundred give a positive score for a hotel. Using a suitable approximation and an equivalent fraction, give the hotel a rating out of five stars.

Q6 A large tractor tyre turns a full turn and travels 3m along the ground. How many turns does it take for the wheel to travel 10 and a half metres?

Lesson: Practice – Making it Functional 1

Programmes on BBC 1 Wednesday 23rd October

06:00 Breakfast	(News)
09:15 Fake Britain	(Consumer)
10:00 Homes under the Hammer	(Auction)
11:00 Real Rescue	(Factual)
11:45 Britain's Empty Homes	(Factual)
12:15 Bargain Hunt	(Auction)
13:00 BBC News	(News)
13:30 South East Today	(News)
13:45 Doctors	(Soap)
14:15 Keeping up Appearances	(Comedy)
15:15 Perfection	(Quiz)
16:00 Escape to the Country-Moving House	(Consumer)
16:30 Put your Money where your Mouth is	(Auction)
17.15 Pointless (until 6pm)	(Quiz)

Programmes from 6am until 6pm (12 hours)

Lesson: Practice – Making it Functional 2

1) What fraction of the day's tv hours (out of 12 hours) are 'News' programmes?

2) You watch 'Perfection' each week for 5 weeks on the same day. Find the total number of hours watching this programme showing your workings as multiplication of fractions and leave your answer as a fraction.

3) a) Write down the number of hours 'Fake Britain' is on for as a fraction of an hour
b) Show, using division of fractions, how long each part of the programme is on for if there are 2 five minute advert breaks in the programme time.

4) Draw a pie chart to show the TYPES of programmes available to watch on Oct 23rd showing the fraction of each slice of the pie

Quiz to assess LEVEL 1

1 Level One

End of Session Quiz

FRACTIONS

1) Which is larger? 2/3 4/5 1/2

2) How would you write three fifths as a fraction?

3) 7/10 What is the value of this fraction in words?

4) Find 1/3 of £63.00

5) Find 1/10 of 500m

6) Find 3/5 of 900g

7) There are three men and four women in a lift. What fraction are women?

8) Seven of a class will pass their maths exam. If the class consists of 18 students, how many will fail?

9) $\frac{3}{5} = \frac{?}{10}$

10)

6	8	4
cats	dogs	rabbits

What fraction of the kennel do the dogs occupy?

6/18 4/9 8/9 4/18

How well did you do??

Score (out of ten)

Quiz to assess LEVEL 2

End of Session Quiz 2 Level Two

FRACTIONS

1) Find 7/11 of £50 to 1dps

2) Which is larger? 156/597 or 2016/3992

3) Find 15/30 of £60

4) Which is smaller? 71/209 or 11/50

5) Find 2/8 of £400

6) Which is larger? 5/11, 120/365 or 1/7

7) Add 6/10 to 4/15

8) Subtract 1/2 from 18/24

9) Multiply 7/12 and 2/3

10) How many 1/5 are there in 90/100 ?

How well did you do??

Score (out of ten)

TOPIC ANSWERS 1

Block 1

1) ½
2) 2/3
3) ¾
4) 1/10
5) 4/5
6) 1 ½

7) ½
8) 1/3
9) 7/26
10) 7/5
11) 1 1/6
12) 150
13) 60
14) 6/10, 3/7, 2/5

15) 7/4
16) 14/10 or 7/5
17) 1/8
18) 2/9
19) 4/12, 6/12, 14/12
20) 28/40 or 14/20 or 7/10
21) 51/14
22) 20/4 or 10/2 or 5
23) 20/27

A Write the answer as a fraction

1) 1/3
2) 1/5
3) 1/10
4) 1/7
5) 1/15

6) 2/3
7) 4/6
8) 8/9
9) 10/20
10) 6/100

B Find fractions of a value

1) 10
2) 20
3) £80
4) 30kg
5) 100
6) 12
7) 30
8) 20
9) 3
10) 49

C Complete the following fraction sums

1) 3/4
2) 9/8
3) 13/9
4) 7/10
5) 27/18

6) 3/6 or 1/2
7) 5/10 or 1/2
8) 5/100
9) 1/20
10) 5/21

11) 16/30 or 8/15
12) 4/56 or 1/14
13) 4/55
14) 6/40 or 3/20
15) 120
16) 1/35

17) 12/3 or 4
18) 3/10
19) 16/9
20) 35/8
21) 300/7

TOPIC ANSWERS 2

D Simplify the following

1) 4/5
2) 1/2
3) 7/8
4) 9/10
5) 1/1000
6) 2/3
7) 1/3
8) 1/3
9) 1/8
10) 7/8

E Convert these mixed fractions into top heavy fractions

1) 7/2
2) 9/5
3) 11/4
4) 17/3
5) 34/9

F Convert these top heavy fractions into mixed fractions

1) 2 4/7
2) 7 1/4
3) 1 2/3

Word Problems

1) 2 ½ + 1 ¼ = 3 ¾

2) 1/5 x 4 ½ = 1/5 x 9/2 = 9/10 of an hour

3) ¾ x 840 rooms = 630 rooms

4) 2 ½ pizzas / 1/8 = 5/2 x 8/1 = 40/2 = 20 slices can be cut

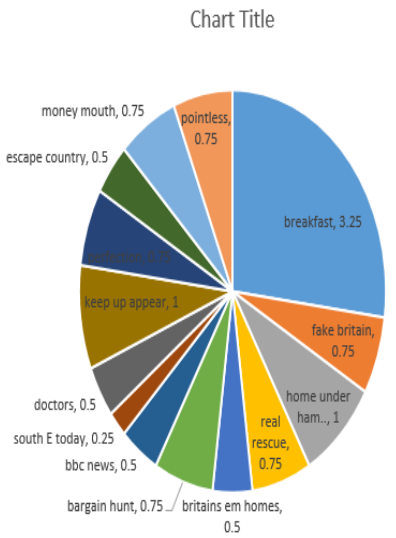
5) 79/100 is nearly 80/100 = 8/10 = 4/5 rating

6) 10 ½ metres / 3 meters = 21/2 / 3/1 = 21/2 x 1/3 = 21/6 turns (or 3 and ½ turns)

Making it Functional

1) ½ hour out of 12 hours is... 1/24
2) ¾ hour x 5 days = 15/4 hours or 3hrs ¾
3) a) ¾ hour
   b) 2 breaks means 3 parts to the programme
So... ¾ hour is divided by 3.... ¾ x 1/3 = 3/12 or ¼ hour each part
4) Pie chart opposite...

breakfast	3.25
fake britai	0.75
home und	1
real rescu	0.75
britains e	0.5
bargain hu	0.75
bbc news	0.5
south E to	0.25
doctors	0.5
keep up a	1
perfectior	0.75
escape co	0.5
money mo	0.75
pointless	0.75



TOPIC ANSWERS 2

1 Level One

End of Session Quiz

FRACTIONS answers

1) 4/5
2) 3/5
3) seven tenths
4) £21
5) 50m
6) 540g
7) 4/7
8) 11
9) 6
10) 4/9

2 Level Two

End of Session Quiz

FRACTIONS answers

1) £31.80
2) nearly 2000/4000 = 1/2
3) £30
4) nearly 10/50 = 1/5
5) £100
6) nearly 5/10 = 1/2

7) 26/30 or 13/15
8) 6/24 or 1/4
9) 14/36 or 7/18
10) 450/100 or 45/10 or 4.5 (there are four and a half fifths in 90/100)

Progress Checker 2

What do you now know about Fractions ? What did you learn during the session? Examples....

How would you now rate your skills with fractions ?

1) **Excellent ability**
2) **Good ability, but working to improve**
3) **Ok, making a start but I know I have lots to still learn**

The date I finished studying : **My aims were...**

A Write a fraction using digits and relate to a real life object, item, score etc...

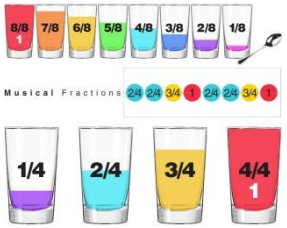
B Change a fraction to an equivalent or simplest form

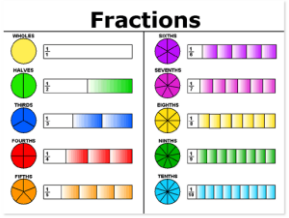
C Find a fraction of a value and calculate using fractions (+, -, x, /)

$$\frac{24}{40} \overset{\div 2}{=} \frac{12}{20}$$

or $\frac{24}{40} \overset{\div 4}{=} \frac{6}{10}$

or $\frac{24}{40} \overset{\div 8}{=} \frac{3}{5}$





Continuing to Study and Learn

What else can you do to help yourself to learn and practice? Here are ten suggestions, record which you do each week and also record your progress.

Internet websites
Repeat the lesson, make notes, organise a folder, revise

Own maths workbook
Study together with a friend or family member

Finish activities in this book
Complete class handouts or tasks

Practice exams / past papers
Use maths skills learnt at home or at work in real situations

Play games
Experiment yourself, try new things ask yourself questions

Try making a graph of number of practice methods you use against your progress score in each topic. Are you showing more practice gives better results?