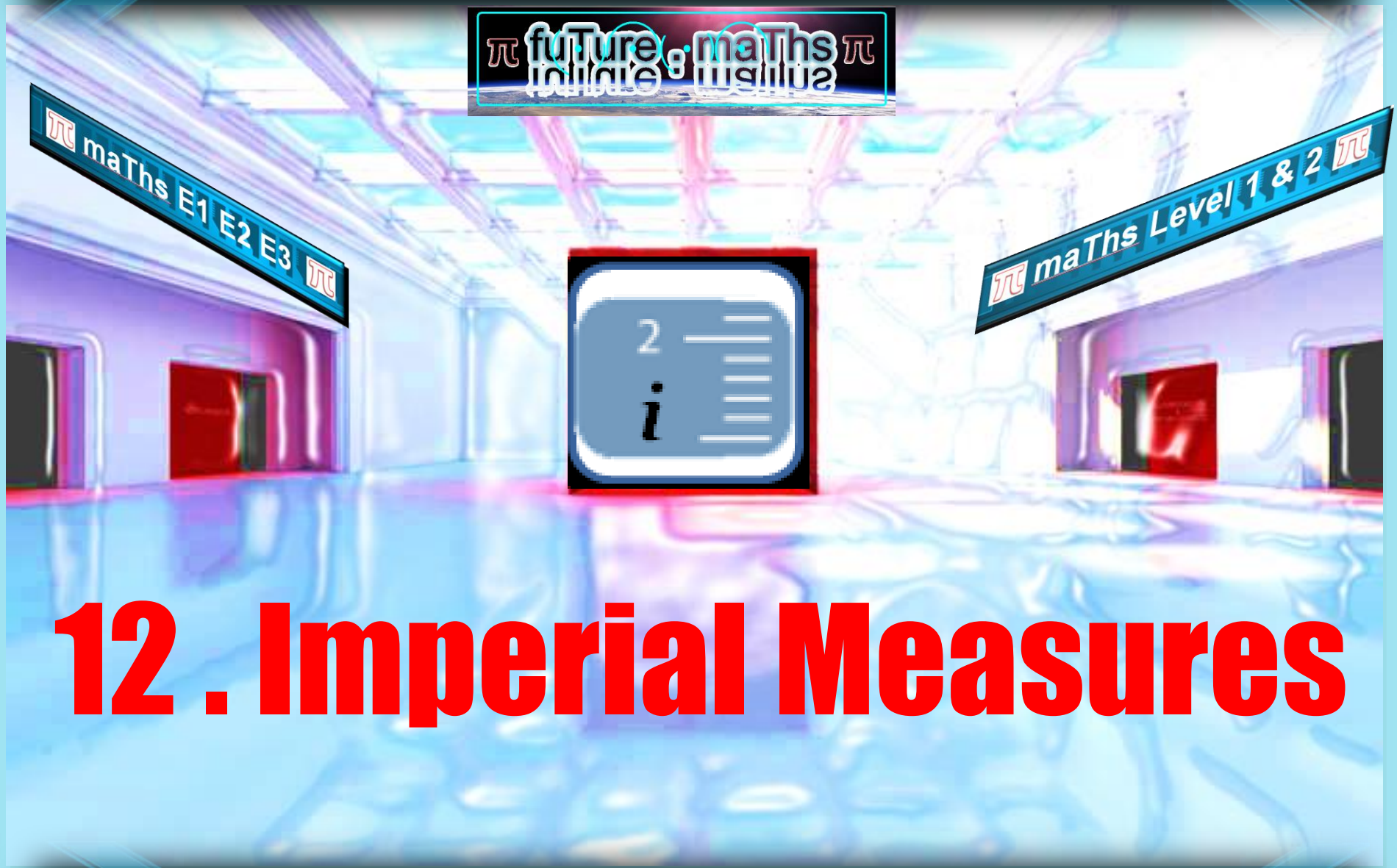


12 . Imperial Measures

Course Content: Choose your topic …

MATHS L1 to L2

Whole Number and Functions

place value

negative numbers

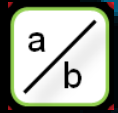
add and subtract

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 : Imperial Measurements

Imperial Measurements

The older form of measuring that many people still use today. This system of measuring lengths, weights and liquid capacities has been around for hundreds of years, being a first good attempt at developing a standard set of measurement units. We still use miles on the roads, think of a pint of beer in the pub and talk about an 8 ounce rump steak.

Nowadays, it is a choice to still continue to use these older measurement units as many have been replaced by the new metric system. There are conversion rates required to change between the two systems and your knowledge on how to use ratios is needed to change the measurements; go and study this topic first if required.

Choose an icon to select where to start

Imperial Measurements

Warm up Exercise 1

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

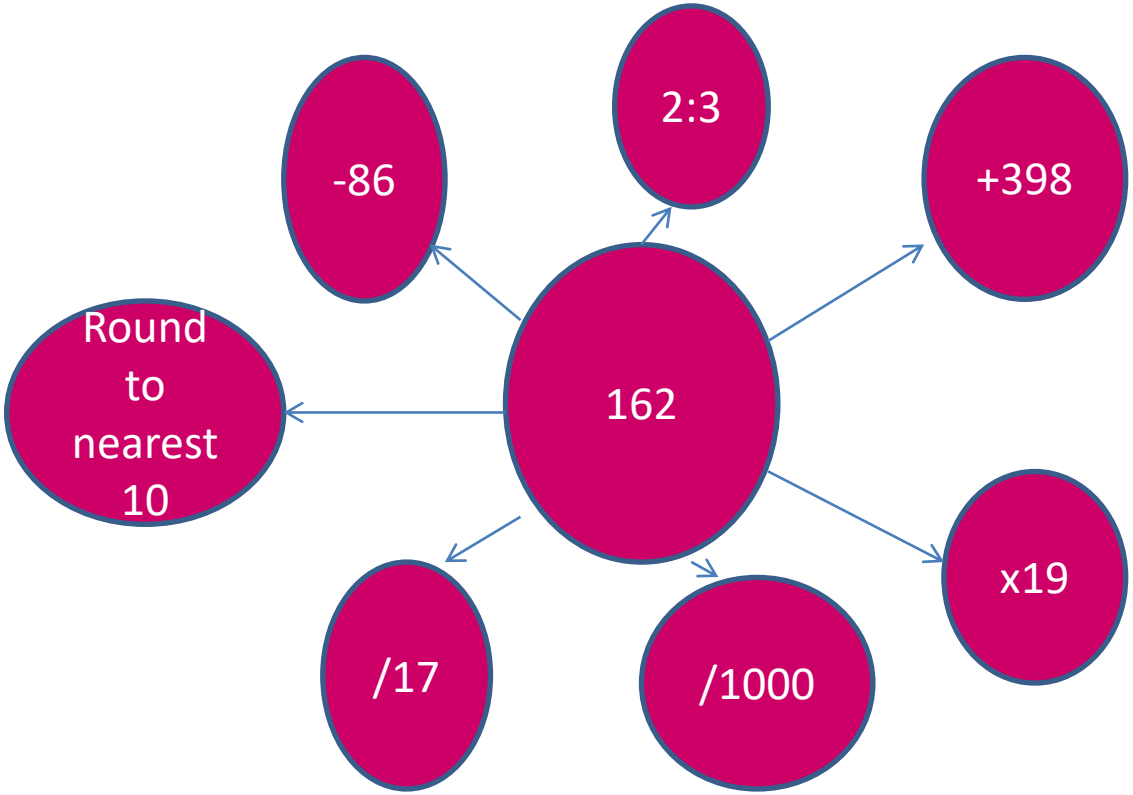
1	9	2	8	7	3	10	6	4	5
5									
2									
6									
10									
8									
7									
3									
9									
4									

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

Imperial Measurements

Warm up Exercise 2

Bubble maths



Calculate the instruction on the central number

Warm up Exercise 3

Do-talk-record

L1

A

Whilst a young herring is growing up it gets 10x bigger every month until it is full grown in 3 months. The fry begins life at 1mm big.

The herring is .....?

a) 1 metre long when fully grown
b) 1000 cm when fully grown
c) 1cm at 1 month old
d) 100cm at 2 months old
e) 100mm at 2 months old

Explain why each statement is either true or false

Warm up Exercise 4

Do-talk-record

L2

A

There are 10 bacteria in a test tube which multiply ten fold every hour

After ..... hours there are ..... bacteria?

a) 1 hour 20 bacteria
b) 1hour 100 bacteria
c) 2 hours 30 bacteria
d) 3 hours 10,000 bacteria
e) 5 hours 1 million bacteria

Explain why each statement is either true or false

Progress Checker 1

What do you already know about Imperial Measures ?

How would you rate your skills in using Imperial measures?

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

My aims for today are…

A To recognise the correct Imperial units for lengths, weights and capacity measurements

B Convert between different Imperial Measurement units

C Convert between the new Metric units and Imperial units

Imperial Conversion Table
1 foot = 12 inches
1 yard = 3 feet = 36 inches
1 mile = 1760 yards = 5280 feet

Introductory Video and Discussion

What is the difference between the Imperial system of measuring and the new metric system ?

Which is the best system of measuring to use ?

Does it matter if you use the imperial, metric or other system when measuring in and around your own home ?

Why do people choose to use the Imperial system of measuring ?

How do you convert from the Imperial to the Metric system ?

Watch the introductory video and then discuss the above

Your thoughts..

Vocabulary and Jobs

Unit
Convert
Imperial System
Ratio
Conversion rate
Pounds
Pints
Miles
Stone
Ounce
Feet
Inch
Fluide ounces

These are the words you will be using in this topic

Builder
Architect
Designer
Plumber
Electrician
Sports
Pilot
Manufacturer
Carpet fitter
Transport …. Can you think of more?
……
……

Lesson: Main Teach 1

Mile	Yard	Foot	Inch
Stone	Pound	Ounce	
Gallon	Pint	Fluid Ounce	

x1760 x3 x12

x14 x16

x8 x20

Lesson: Main Teach 2

Imperial conversions….

Metric is the new system for measurements. The old system was Imperial.
To convert between them you need a 'Conversion Ratio'.
This just means measure the same
thing but with both systems.
eg.

The bag of sugar weighs the same amount but the units are different. Therefore 1kg = 2.2 lbs

Imperial conversion ratios Length.

Metric		Imperial
1 millimetre [mm]		0.03937 in
1 centimetre [cm]	10 mm	0.3937 in
1 metre [m]	100 cm	1.0936 yd
1 kilometre [km]	1000 m	0.6214 mile

Imperial		Metric
1 inch [in]		2.54 cm
1 foot [ft]	12 in	0.3048 m
1 yard [yd]	3 ft	0.9144 m
1 mile	1760 yd	1.6093 km
1 int nautical mile	2025.4 yd	1.853 km

example, convert 6miles to Km
1 mile = 1.6 km
so 6 miles = 6 x 1.6 km

Lesson: Main Teach 3

Imperial conversion ratios Weight

Metric		Imperial
1 milligram [mg]		0.0154 grain
1 gram [g]	1,000 mg	0.0353 oz
1 kilogram [kg]	1,000 g	2.2046 lb
1 tonne [t]	1,000 kg	0.9842 ton

Imperial		Metric
1 ounce [oz]	437.5 grain	28.35 g
1 pound [lb]	16 oz	0.4536 kg
1 stone	14 lb	6.3503 kg
1 hundredweight [cwt]	112 lb	50.802 kg
1 long ton (uk)	20 cwt	1.016 t

example, convert 120g into ozs

1g = about 0.04 ozs

so 120g = about 120 x 0.04ozs

Imperial conversion ratios Capacity

Metric		Imperial
1 litre [l]	1 dm3	1.76 pt

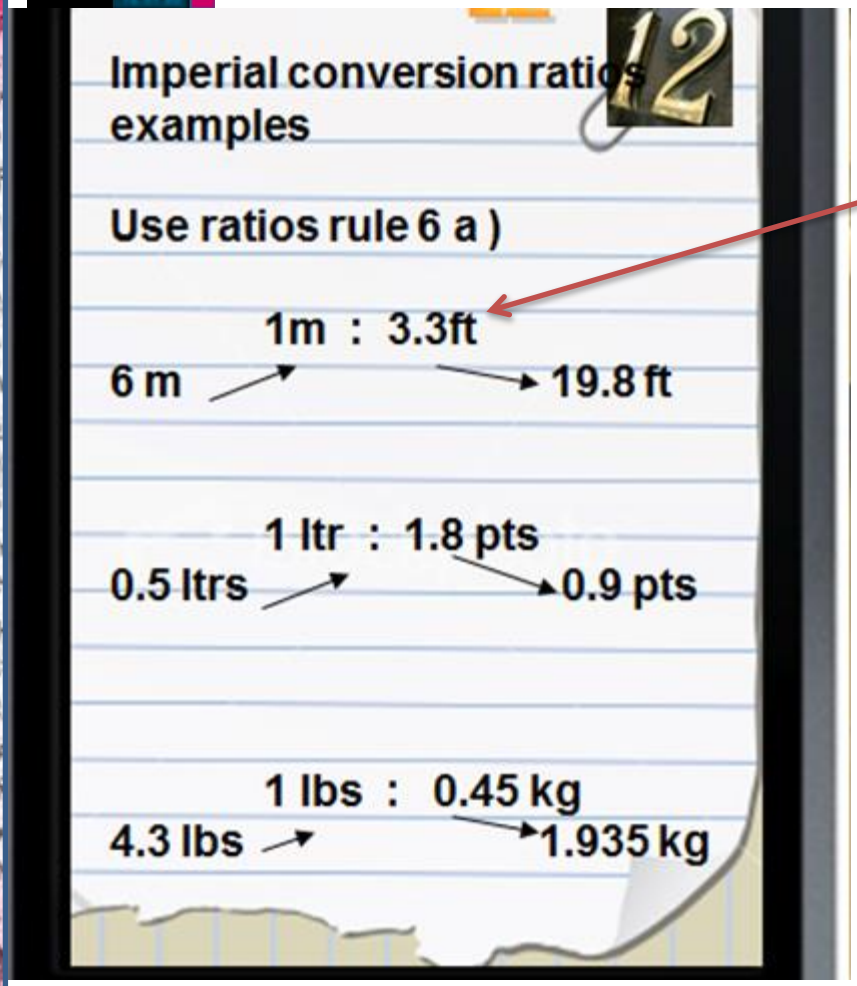
Imperial		Metric
1 fluid ounce [fl oz]		28.413 ml
1 pint [pt]	20 fl oz	0.5683 l
1 gallon [gal]	8 pt	4.5461 l

example, convert 2pts into ltrs

1pt = about 0.6 ltrs

2pts = about 2 x 0.6 ltrs

Lesson: Main Teach 4



How to convert imperial units to other units

1) Find the conversion rate between the two units you want to convert between (can be found online, in maths books, in diaries or cook books etc)

2) Write down this conversion rate as a RATIO in a 'Ratio Box' (as shown by the methods in the Ratio lesson)

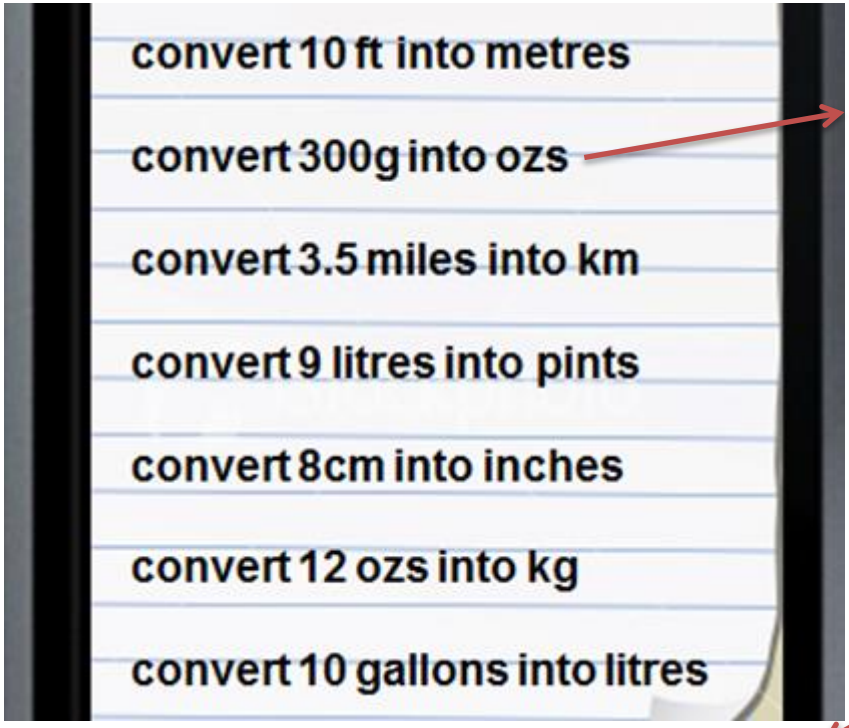
3) Place the value you want to convert ABOVE the original unit (at the top of the ratio box)

4) Find the **scale factor** (how many times more or less you have compared to the original unit)

5) Multiply or divide the other units original value by the same **scale factor** to find the new unit value

That's it, you're done, you now have your converted amount !

Lesson: Main Teach 5



Lets try some !

How about 300 g into ozs .....

ok lets start at step 1, writing a ratio box
we need to know the ratio between grams and ounces

1 gram is about 0.04 ounces

Now we can write out our ratio box

1	0.04
grams	ounces

Next write in how many grams we have, our new amount is 300g. So the scale factor is x300 as 1g x 300 = 300g

300	??
1	0.04
grams	ounces

Lastly we use the scale factor of x200 on the ounces to find our answer

300 x 1	300 x 0.04 = 12 ounces
1	0.04
grams	ounces

Lesson: Try out

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

Try these, 1) 2 pounds = ... ounces 2) ..... Fluid ounces = 1 pint

3) 4 feet = ... Inches 4) 6 miles = ... yards

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

5) 12 pints = ... litres 6) 120 km = ... Miles

7) 20 kg = ... Pounds 8) 16 ounces = ... grams

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

9) 0.47 miles = ... km 10) ¼ pound ..... grams

11) 1.53 flozs = ... litres 12) half an inch = ... mm

Imperial Measurements

Lesson: Websites and links

Conversion website	http://www.thecalculatorsite.com/conversions/
BBC Bitesize website for imperial conversions	http://www.bbc.co.uk/schools/gcsebitesize/maths/geometry/measuresrev2.shtml
Great online conversion programe	http://www.initium.demon.co.uk/converts/metimp.htm
Basics of the imperial measures with help on how to convert and examples	http://www.cimt.plymouth.ac.uk/projects/mepres/book8/bk8i17/bk8_17i4.htm
Find the correct answer conversion game	http://www.sporcle.com/games/nametaken/metric-imperial-conversions
A fun poke at the complicated world of Imperial Measurement units - vid	http://www.youtube.com/watch?v=r7x-RGfd0Yk
Matching card game with mixture of Metric and Imperial units	http://www.transum.org/software/SW/Starter_of_the_day/Students/Measuring_Units_Matching.asp

Imperial Measurements

Lesson: Practice – just the numbers

Place the units in order H to L

1) Pound, Ounce, Kilo
2) Mile, Millimetre, Foot
3) Flozs, Litre, Pint

Write each unit in full

4) In
5) Ft
6) m
7) Lbs
8) Ozs
9) Pt

Convert

10) ..... Feet = 1 yard
11) ..... Inches = foot
12) ..... Fluid ounces = pint
13) ..... Ounces = pound
14) ..... Pounds = 3 stone

Convert

15) 6 pounds = ... Kg
16) 5 miles = ... Km
17) ..... cm = 10 inches
18) 3 pints = ... fluid ounces
19) ..... grams = 15 ounces
20) 13 metres = ... Feet

Convert

21) 0.7m to feet
22) 1.3 miles to km
23) 0.4 kg to pounds
24) 0.25 pints to fluid ounces
25) 4.8 ounces to grams

Add (there's 2 possible answers !)

26) 2 kg + 1 pound =
27) 8 pints + ½ litre =
28) 4 miles + 3 km =

Subtract (2 possible answers !)

29) 18 miles – 2 km =
30) 20 stone – 1 kg =
31) 2 fluid ounces – 10 ml =

Multiply

32) 18.3 lbs x 4
33) 36 ounces x 12
34) 9 miles x 20
35) 120 feet x 16

Divide

36) 126 pounds / 4
37) 2.3 yards / 7

Round

38) 19.834 miles to 2dps
39) 0.3594 fl ozs to 1dps

Lesson: Practice – Word Problems

1) A dog weighing 3 stone had an operation. A half pound lump was removed from the dogs belly. How much did the dog weigh after the operation?

2) Two cars in a race drive from the same starting point. Car A gets to 2.8 miles from the start at the same time as car B gets to 3.4 km. Which car has travelled the furthest in the time?

3) When I get home from shopping I pour out of the 3 pint milk plastic bottle into a smaller 1 litre milk container to use and freeze the rest of the milk. How much milk is frozen for another day?

4) An aircraft is flying at 15,000 feet and needs to drop to 2.5 miles on approach to the runway. How many feet does the aircraft have to drop by?

5) A gallon drum of oil is leaking 1 millilitre every second. How long will it take before the drum is empty?

6) A par 5 golf hole has its distance to the green on a sign on the course. The distance to the hole is 512 yards. When I use my driver I know I can hit the ball around 200 metres. Using 1yd = 0.9m, how many hits with the driver can be used without overshooting the hole?

Lesson: Practice – Making it Functional 1

Pargester Transport have a fleet of lorries delivering to the UK and Europe. They are transporting boxes of food items.

- Scheduled Deliveries from Milton Keynes
- Manchester 120 miles
- Leeds 127 miles
- Glasgow 300 miles
- Brussels 232 miles
- Madrid 815 miles
- Plymouth 186 miles
- Amsterdam 238 miles
- Newcastle 207 miles

- Lorry measurements
- Width 2.25 metres
- Height 2.20 metres
- Length 5.95 metres

- Boxes of food items 20 inches wide, 12 inches high and 25 inches in length.

Lesson: Practice – Making it Functional 2

Use the information on the previous page

- The distance for the deliveries is in miles, but to meet regulations, they also have to be listed in km.
- 1. a) Convert the miles into km. (1 mile = 1.6 km) Answers to nearest km.
- b) The drivers are not allowed to drive more than 400 km in one day. How many destinations require an overnight stop before delivery? List them.
- c) Is there a destination that needs more than one overnight stop?
- d) Are there any destinations where the driver can deliver and return to the depot in the same day?

Lesson: Practice – Making it Functional 2

Use the information on previous pages

- 2. The measurements for the lorry have been listed in metres, but the boxes of food items are listed in inches.
- a) Convert the lorry measurements into inches. (1 inch = 2.5 cm)
- b) Using the information you have obtained and the measurements of the boxes, calculate how many boxes of food can be transported on each lorry.
- c) The boxes of food items are not fragile and can be loaded by any method to maximise the number of boxes the lorries can deliver. Is there a way of fitting in more boxes?

Imperial Measurements

TOPIC ANSWERS 1- just the sums

Skills try out answers
Block 1

1) 32 ounces
2) 20 fluid ozs
3) 48 inches
4) 10,560 yards

Block 2

5) 6.8 litres (1dp)
6) 74.6 miles (1dp)
7) 44 pounds
8) 453.6 g (1dp)

Block 3

9) 0.76 km (2dp)
10) 113.4 g (2dp)
11) 0.043 litres (3dp)
12) 12.7 mm

Just the numbers answers

Kilo pounds ounces
Miles feet millimetres
Litre pint fluid ounce

Inches
Feet
Metres (or Miles)
Pounds
Ounces
Pints

3
12
20
16
42

2.72 kg (2dp)
8 km

25.4 cm
60 fluid ounces
425.2 g (1dp)
42.7 feet (1dp)

2.3 feet (1dp)
2.1 km (1dp)
0.9 pounds (1dp)
5 fluid ounces
136 g

5.4 pounds or 2.4 kg
5 litres or 8.8 pints
9.4 km or 5.8 miles

26.9km or 16.7 miles
126km or 19.8 stone
46.8ml or 1.6 flozs

73.2 lbs
432 ounces
180 miles

1920 feet

31.5 pounds
0.33 yards (2dp)

19.83 miles
0.4 flozs

Word Problems answers

1) 41.5 pounds or 2.96 st
2) Car A (travelled 4.5km)
3) 0.7 litres or 1.2 pints
4) 1800 feet
5) 4546 seconds or 1 hour 20 mins
6) 2 hits

TOPIC ANSWERS 2 – Word problems

Word Problems – answers

1) 41.5 lbs or 2stone, 13.5 lbs
2) Car A (2.8 miles is 4.8km)
3) 0.7 pints is frozen
4) 13,200 feet
5) 4546 seconds which is 75.8mins or 1hr 15.8mins
6) 2 hits

TOPIC ANSWERS 2 – functional skills

Imperial Measurements

- 1 a)

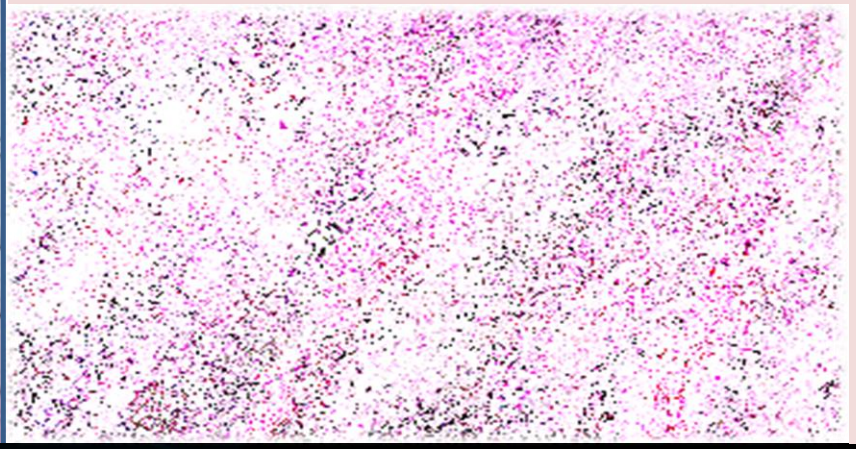
Scheduled Deliveries from Milton Keynes

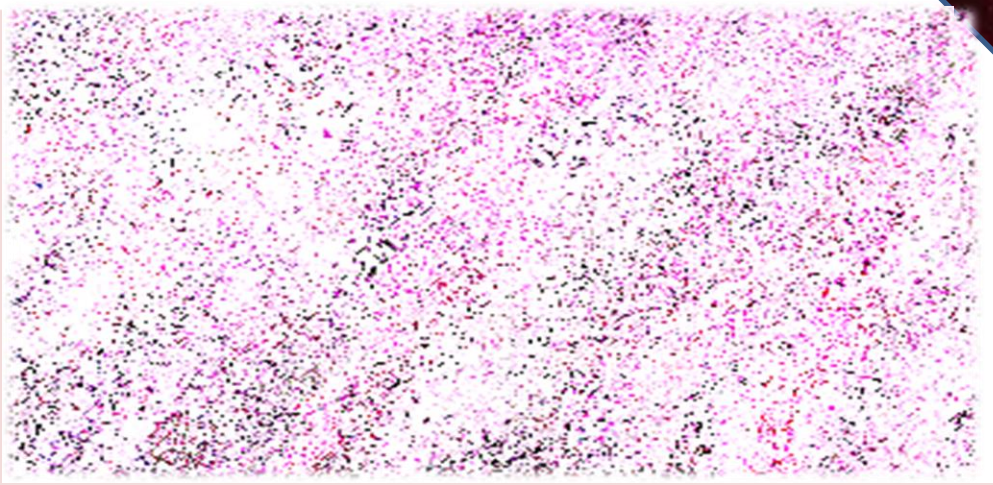
Manchester	120 miles	= **192 km**
Leeds	127 miles	= **203 km**
Glasgow	300 miles	= **480 km**
Brussels	232 miles	= **371 km**
Madrid	815 miles	= **1304 km**
Plymouth	186 miles	= **298 km**
Amsterdam	238 miles	= **381 km**
Newcastle	207 miles	= **331 km**

1. b) 2 destinations, **Glasgow and Madrid.**

1. c) **Madrid** will need 3 overnight stops.

1. d) **Manchester,** as the return distance will be 192 x 2 = 384km.





2. a) Width 2.25 metres = **90 inches**

Height 2.2 metres = **88 inches**

Length 5.95 metres = **238 inches**

b) Box width = 20 inches. 4 boxes can fit into 90 inches

Box height = 12 inches. 7 boxes can fit into 88 inches

Box length = 25 inches. 9 boxes can fit into 238 inches.

4 x 7 x 9 boxes = **252 boxes**

c) **No**. If the boxes are turned different ways the calculations are 19 x 3 x 4 = 228 boxes, or 11 x 3 x7 = 231 boxes

Progress Checker 2

What do you now know about Imperial Measures ?

How would you now rate your skills in using Imperial measures?

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

My aims for today were...

A To recognise the correct Imperial units for lengths, weights and capacity measurements

B Convert between different Imperial Measurement units

C Convert between the new Metric units and Imperial units

Imperial Conversion Table
1 foot = 12 inches
1 yard = 3 feet = 36 inches
1 mile = 1760 yards = 5280 feet

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?