Level 3 Award in Mathematics for Numeracy Teaching: Session 1 Induction workshop

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Session aims and outcomes

Aims:

To discuss course expectations and structure **https://ccpathways.co.uk/level-3-maths-online/**

To conduct further initial and diagnostic assessment

Outcomes

By the end of the session you will have:

1. Reflected upon personal maths abilities and identified areas for development

2. Reviewed mathematical concepts to be covered in the initial assessment

3. Begun an individual learning plan

4. Used a variety of techniques to solve problems

5. Started to think about mathematical modelling and where it is used.

Session dates

- Session 1 (**induction**), 27 Feb 18

- Session 2 (**number)**, 20 March 18

- Session 3 (**algebra**), 3 April 18

- Session 4 (**shape and space**), 17 April 18

- Session 5 (**handling data**), TBA

- 09:30 - 11:30 online + 1 hour self study from 11:30 - 12:30, but we often go over into the hour self study

For each session please bring along

Calculator

Pencil (plus sharpener)

Eraser

Pen

Scrap paper and note pad

Rule, protractor, pair of compasses etc

Perhaps a cup of tea? We are learning together we need to be relaxed and help each other out.

Between sessions

Self study

We can't cover everything in the sessions and each one of you comes with different backgrounds and level of understanding.

See induction page to view the indicative content.

Initial and ongoing self-assessment

Have you had a chance to look at the self evaluation tool?

https://www.foundationonline.org.uk/course/index.php?categoryid=13

Our website also has a tool you can look at.

Scaling

- Look at a list of mathematical topics on the next slide. Scale yourself from 1 – 5 about your confidence for each of these:

0 (not at all confident)   (very confident) 5
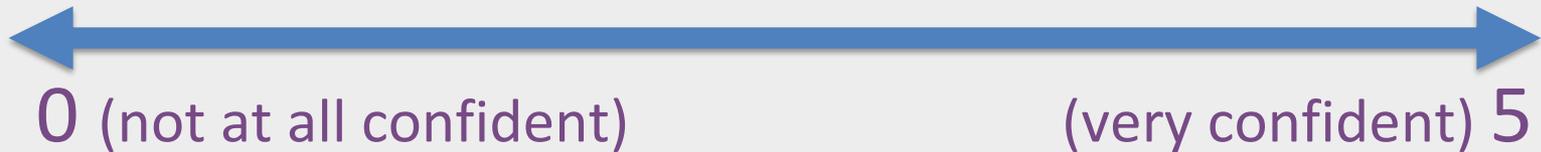
- What it might take to move 1 point up the scale? If you rated yourself 5, what makes you feel this confident?

Diagnostic activities

- Matching formulae and words

- Cumulative frequency

- Proportional reasoning

- Shapes

- Standard form

- Substitutions and manipulating equations

- Trigonometry

- Statistics e.g. correlations

How confident are you?

Now try some activities focussing on these topics - would you like to revise your scoring? Add areas you would like to work on to your ILP.

Forming Equations

Use + - & to form a true equation for one of the sets allocated to you from below:

Set 1

8	64	7
17	2	$\sqrt[3]{}$

Set 2

27	216	13
50	2	$\sqrt[3]{}$

Set 3

19	16	81
8	2	$\sqrt[4]{}$

Doubling statements for 2D and 3D shapes 1

True or False?

Sometimes Always Never?

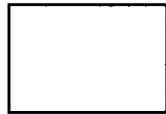|	
If you double the lengths of the edges of a cuboid, its volume doubles.	**If you double the lengths of the edges of a cuboid, its surface area doubles.**
If you double the radius of a circle, its area doubles.	**If you double the radius of a circle, its circumference doubles.**
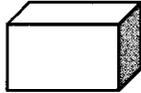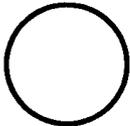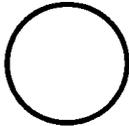
Doubling statements for 2D and 3D shapes 2

True or False?
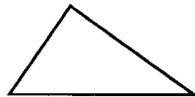
Sometimes Always Never?

If you double the lengths of the sides of a rectangle, its perimeter doubles.

If you double the lengths of the sides of a rectangle, its area doubles.

If you double the lengths of the sides of a triangle, its perimeter doubles.

If you double the lengths of the sides of a triangle, its area doubles.

Consolidation on enlargement

R12 Consolidation on Enlargement
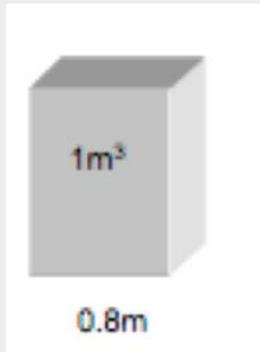
What is the volume each of the other 3 similar boxes?

$1m^3$

?   ?   ?

0.4m   0.8m   1.2m   2.0m

The boxes are not drawn to scale. The dimension given is the width of the base

Consolidation on enlargement

1m³

0.8m

1m³

0.8m   1.2m

What do we know about this box?

- Volume = $1m^3$
- One side is 0.8m

So what can we say about the other sides?
0.8 x h x w = $1m^3$

$$h \times w = \frac{1}{0.8} = 1.25m^2$$

If h = 2 and w = 0.625
Then 0.8x2x0.625 = $1m^3$

Ratio 0.8 : 1.2
Or   1 : 1.5

So (0.8x1.5) x (hx1.5) x (wx1.5) =
    (0.8x1.5) x (2x1.5) x (0.625 x 1.5) =
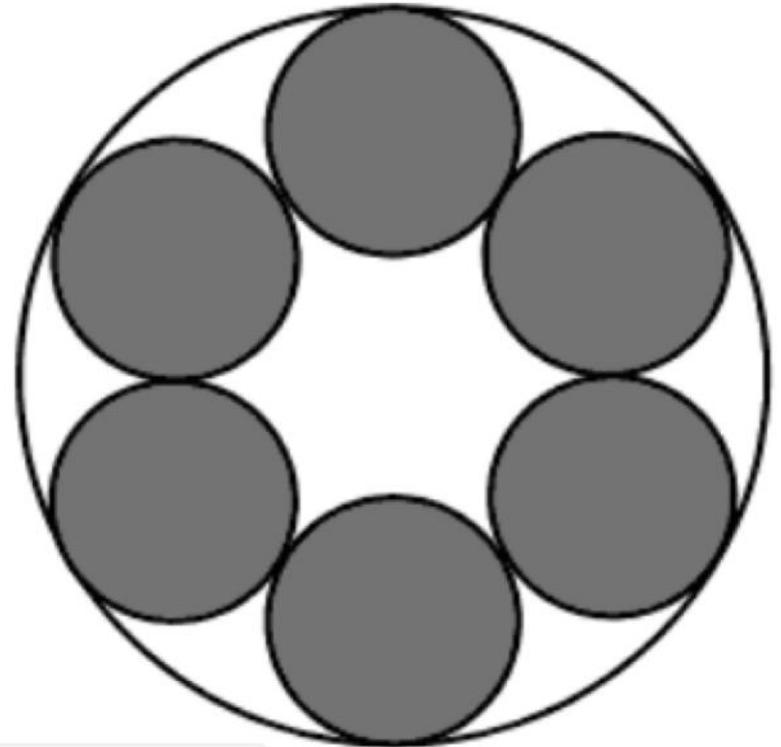   (1.2) x (3) x (0.9375) = $3.375m^3$
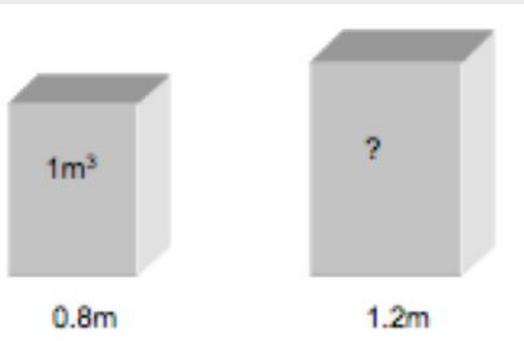
Consolidation on enlargement

What is the area of the smaller similar triangle?

180cm²

10cm   15cm
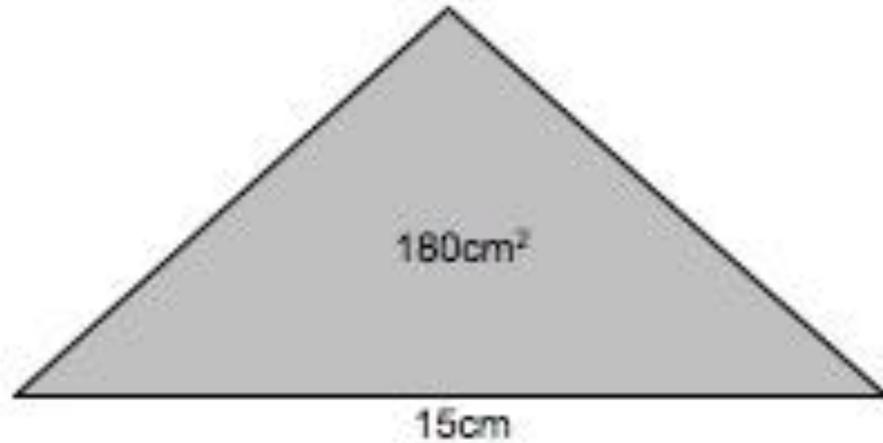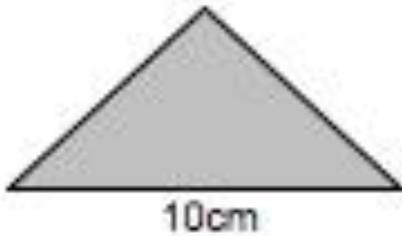
Consolidation on enlargement

What fraction of the area of the circle is coloured in each case?

15mm
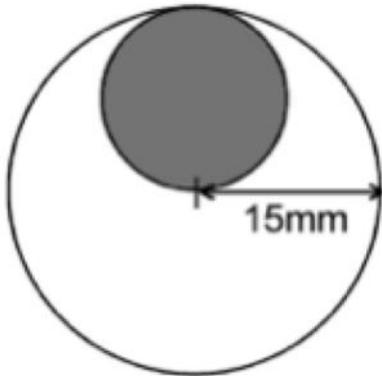
Practical application of shape and space

A chocolate manufacturer produces bars shaped in a triangular prism of length 12cm. The cross section of the bars is an equilateral triangle of side length 4cm.

- Design a net for the packaging of the individual bars.
- The packaged bars are to be put into boxes that are 40 x 40 x 40 cm^3. Find the maximum number of bars that can be packed into each box.

Practical application of shape and space

R14 Packing chocolates - task

A chocolate manufacturer produces bars shaped in a triangular prism of length 12cm. The cross section of the bars is an equilateral triangle of side length 4cm.

Design a net for the packaging of the individual bars.

The packaged bars are to be put into boxes that are 40 x 40 x 40 cm^3.

Find the maximum number of bars that can be packed into each box.

1. Draw a diagram of the package for the chocolate. Show all the measurements for the dimensions of the package.
2. Design a net to produce the package. Take care to add flaps that will be needed to stick edges together.
3. To fit the packages in the box, think about layers. How many packages would cover the base of the box? Being triangular prisms, some packages could go upside down to fit neatly on the packages that are covering the base. All of these make up one layer. How many packages in one layer?
4. Work out the height of a layer. How many layers fit in the box?
5. Is there any spare space for more packages to fit in? Consider the layers and the spare space and calculate the total number of packages that can fit in a 40 x 40 x 40 cm^3 box.

Working in breakout rooms
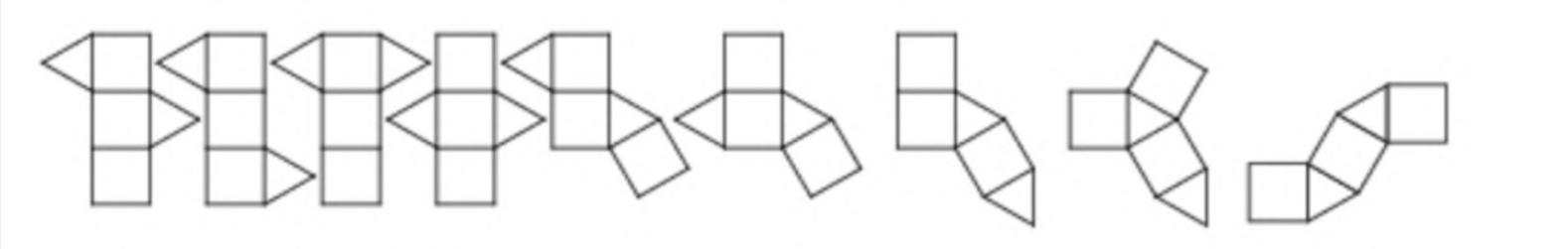
Download R14 Packing Chocolates

A challenge to work on together

- Discuss and make a list of knowledge and skills you would need to tackle the packaging question
- How will you evidence your understanding: drawings, sketches, calculations, explanations in words?
- Have a go.

Why might you choose one option over another?

R14 Packing chocolates – the real net

Forming equations

Use the following information to write an equation expressed in terms of one unknown (y).

In two weeks, Bill works 48 hours. In the second week he works a third of the hours he worked in the first week.

$$y + \left(\frac{y}{3}\right) = 48$$

Multiply both sides by 3

$$3y + y = 48 \times 3$$
$$4y = 144$$
$$y = 36$$

Forming equations

Use the following information to write an equation expressed in terms of one unknown (r).

The perimeter of a rectangle is 48cm. One side is 6cm longer than the other.

$$2(2r + 6) = 48$$

Divide both sides by 2

$$2r + 6 = 24$$
$$2r = 24 - 6$$
$$2r = 18$$
$$r = 9$$

Correlation – an example of working through a topic

"Correlation is not causation"

Where might we find correlation in a level 2 (GCSE) question?

We are working towards level 3 so what else might be included?

If this is an area you want to work on – where might you start?

- https://www.mathsisfun.com/data/correlation.html
- http://www.bbc.co.uk/schools/gcsebitesize/maths/statistics/scatterdiagramsrev2.shtml

Post session tasks if you haven't had a chance yet.
https://ccpathways.co.uk/l3-maths-induction/

- Diagnostic tasks R1 - R8
- ILP
- Initial assessment

Continue to use your ILP to record areas you want to develop

Already started

To undertake

To complete

Where to find support

Foundation online https://www.foundationonline.org.uk/
This is where you will find an online assessment test.

National Numeracy Challenge https://www.nnchallenge.org.uk/home/index.html

Mrbartonmaths.com – sign up for this free support – perhaps the weekly challenge question?

Citizen maths https://www.citizenmaths.com/ - perhaps for a level 2 brush up

NCETM https://www.ncetm.org.uk/ - self evaluation tool

Khan Academy https://www.khanacademy.org/

Open University (a very useful 'how to use a calculator' session)
http://www.open.edu/openlearn/science-maths-technology/mathematics-and-statistics/mathematics-education/using-scientific-calculator/content-section-0

Find what works for you. Take your time and be kind to yourself.

But before we go! The elephant in the room

How will the assessment work?

- A series of tasks which will expect you to apply your mathematical skills. Perhaps requiring you to show a number of ways to carry out the task.
- Show all your workings (scan them in if you are submitting electronically).
- Use Excel (or other spreadsheet package)
- Start thinking mathematically!

The focus is on **your** personal maths skills **not** your teaching skills. The questions are set in context and ask you to consider which maths techniques to use.

Self assessment

Each session I will give you some questions to look at.

These will prepare you for the summative assessment should you choose to take the assessments.

They are there to guide you in your studies.

Mathematical modelling

A model is a representation of a real situation. A real situation will invariably contain a rich variety of detail and any model of it will simplify reality by extracting those features which are considered to be most important.

A model is an approximation to reality!

Something for you to consider: Mathematical modelling

What key words come to your mind when thinking about MM?

Simulation

Forecast

Tool

Predict

Statistics

Can you think of some mathematical models that are used in everyday life?

Health e.g. pandemics and how they might spread

Natural sciences e.g. weather

Economics

Finance

Politics

Engineering

Business

Mathematical modelling

A model is an approximation to reality!

Look out for them and keep a note of them.

Review and close