How Maths Progress maps to DfE and NCETM Mathematics Guidance: KS3 (September 2021)

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Pearson

Introduction

The order of topics in **Maths Progress for KS3** is not the same as the sample curriculum framework given in **Mathematics Guidance: Key Stage 3** (September 2021). However, as that document makes clear, 'there are many ways to organise the curriculum, and individual schools will make their own decisions' (page 10).

Here we show you how the curriculum underpinning **Maths Progress for KS3** has been designed to ensure it is coherent and connected, and follows the principles outlined in the Guidance.

The following principles are particularly important for coherent curriculum design:

- Certain images, techniques and concepts are **important precursors** to later ideas; sequencing these correctly is an important aspect of planning and teaching.
- When introducing new ideas, it is important to **make connections** with earlier ideas that are already well understood.
- When something has been deeply understood and mastered, it can and should be **used in the next steps of learning**.

From page 10 of ***Mathematics Guidance: Key Stage 3*** (September 2021)

How we designed the Maths Progress for KS3 Curriculum

1. Our aims

- Strong subject knowledge
- Mathematical fluency
- Deep understanding
- Student engagement
- Mathematical resilience/confidence
- Well-rounded, happy students
- Manageable amount of content
- Problem-solving skills and confidence
- Good starting point for GCSE
- Reasoning
- Reflection
- Right amount of stretch
- Right amount of support
- View into the wider world

2. Our key goal

To build confidence by:

- Teaching content in a logical order
- Progressing in small steps

Clear progression in small steps, and formative assessment, help us sequence topics by starting with something students already know and then building upon it.

This gave us the firm foundation and structure into which we could incorporate all our aims from the beginning of the curriculum design, rather than trying to add them in later.

The result is, in Ofsted's words, a **'coherently planned curriculum, sequenced towards cumulatively sufficient knowledge'**.

Ofsted Education Inspection Framework, Ofsted May 2019.

3. Creating a logical teaching order for the content

- We started with the programme of study for Key Stage 3, and broke it down into:
  - **Topics > Subtopics > Small steps** within those.
- We ordered the small steps to give clear progression through a topic, each step building upon the previous one.
- We mapped connections between topics.

Algebra

Pupils should be taught to:

- use and interpret algebraic notation, including:
  - ab in place of $a \times b$
  - $3y$ in place of $y + y + y$ and $3 \times y$
  - a^2 in place of $a \times a$, a^3 in place of $a \times a \times a$; a^2b in place of $a \times a \times b$
  - $\frac{a}{b}$ in place of $a \div b$
  - coefficients written as fractions rather than as decimals
  - brackets
- substitute numerical values into formulae and expressions, including scientific formulae
- understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors

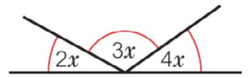
Small steps:

simplifying algebraic expressions → writing and solving equations → rearranging formulae

Connections:

Students need to learn to solve equations before they are given angle problems like this:

Find the size of each angle.



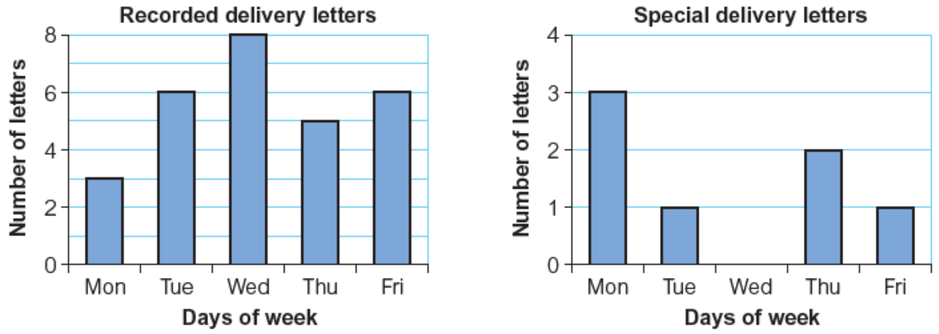
This allowed us to:

- **Plan clear progression** through a topic – such as algebra, proportional reasoning, angles – across the whole of KS3 and to a clearly defined 'endpoint', building towards cumulative sufficient knowledge and skills to start the GCSE course.
- **Identify the required prior knowledge** to help order the topics from different curriculum strands.
- **Identify connections** with other areas of mathematics and order topics appropriately to make the most of those connections: using topics already learned and understood in the next steps of learning.

Making connections

Bringing together concepts that are not traditionally taught together, allows students to apply their understanding to a range of contexts.

1 **Problem-solving / Reasoning** The bar graphs show the number of recorded delivery and special delivery letters a company sends during one week.

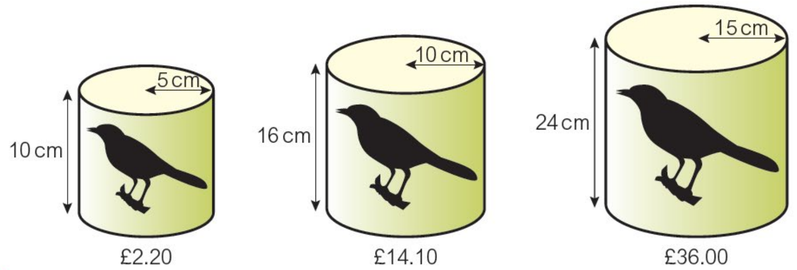


What is the ratio of recorded delivery to special delivery letters?
Write your answer in its simplest form.

Q1 hint What do you need to work out

This question in a ‘ratio’ lesson revisits data skills and embeds understanding of ratio by applying it in a different context.

Challenge A garden centre sells bird food in cylindrical tubs.
Which tub provides the best value for money?
Which is the worst value?

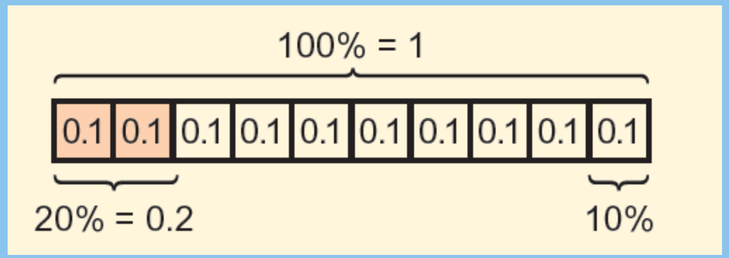


This question connects Proportional reasoning/best buys and volume of cylinder.

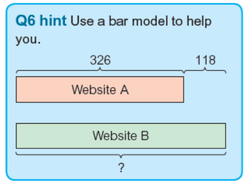
Images and representations

Good representations make the mathematical structure clear. Using these representations consistently within and across **Maths Progress for KS3** builds understanding and gives students strategies of diagrams they can use themselves.

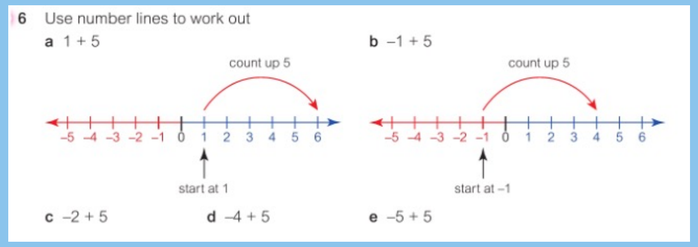
Bar models help students to visualise mathematical structures



6 **Problem-solving** Website A has 326 hits on Monday. On the same day, Website B has 118 more hits than Website A.
How many hits does Website B have?



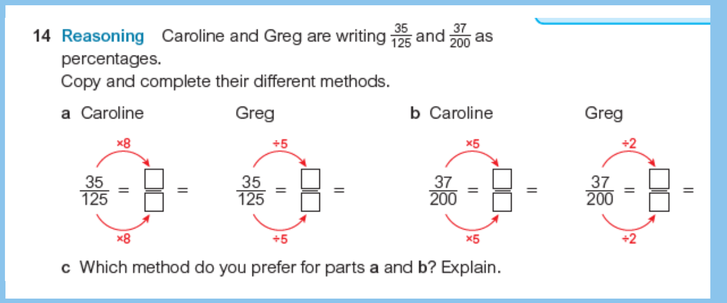
Number lines to visualise calculation strategies

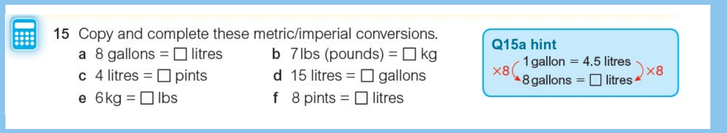


Representations used in lessons **expose the mathematical structure** being taught, the aim being that students can do the maths without recourse to the representation.

Source: **NCETM**

Arrow diagrams to show multiplicative relationships





Conclusion

Maths Progress for KS3 follows the Guidance for designing a maths curriculum for Key Stage 3 and follows a scheme of work that meets the recommendations.

We have created a mapping that shows you how **Maths Progress for KS3** covers all the elements in the sample curriculum framework. You can find the mapping **here**.

The mapping table is an opportunity for you to delve into the detailed sequencing. It shows you how each unit in **Maths Progress for KS3:**

- **Builds upon concepts** covered in previous units (or for Year 7, in the Year 6 'ready-to-progress' criteria) and revisits and consolidates ideas.
- **Builds towards concepts** covered in future units.
- **Makes connections** across mathematics topics and other curriculum subjects.
- **Makes use of images/representations** to develop understanding.

We recommend that you follow **Maths Progress for KS3** in the order in which it is created, because it is a coherently planned curriculum.