

# Year 8

## Ratio and Proportion

### Autumn 2

### Level Ladder

All students are expected to master at least the Level 5 content by the end of the half term.

Check Arbor or ask your child what their current working and target level is in Maths

**EG:**

5A - mastered all of the Level 5 content

5B - mastered some of the Level 5 content

5C - mastered all of the Level 4 content and beginning to master some Level 5 content

3	★ Recognise a ratio and the symbols involved
4	★ Begins to understand simple ratio. ★ Given a selection of red and blue cubes, write the ratio of red cubes to blue cubes, and the ratio of blue cubes to red cubes. ★ Of a team of 10 people, 3 are male. What is the ratio of males to females in the team? ★ Show me a set of coloured pencils that are in the ratio 2:3

	<ul style="list-style-type: none"> <li>★ True/Never/Sometimes: The ratio 1:4 is the same as the ratio 4:1, the bigger number comes first in a ratio</li> <li>★ What is the same/different about: The ratio 1:4 and the ratio 4:1</li> </ul>
5	<ul style="list-style-type: none"> <li>★ Write 16:12 in its simplest form</li> <li>★ A teaspoon holds 5ml of medicine and a bottle holds 100ml of medicine. Find the ratio of the capacity of the teaspoon to the capacity of the bottle. Write the answer in its simplest form</li> <li>★ Understand the meaning of 'mix sand and cement in the ratio 5:1'</li> <li>★ Show me a ratio which simplifies to 2:7</li> <li>★ What is wrong: To simplify the ratio 32:48 keep dividing both sides by 2 until you can't do it any more</li> <li>★ True / Never / Sometimes: To simplify the ratios keep dividing both sides by 2 until you can't do it any more</li> <li>★ What is the same / different: 4:5 and £4:500p, 2:3, 34:51 and 3:2</li> <li>★ Convince me that <math>19:95 \equiv 1:5</math></li> <li>★ Draw and use a conversion graph for pounds and Euros</li> <li>★ Show me an example of a line graph where the intermediate values do not have a meaning.</li> <li>★ What is wrong with this graph? (a line graph where the intermediate values do not have a meaning)</li> <li>★ Convince me that you can use this graph (conversion graph between litres and gallons – up as far as 20 gallons) to find out how many litres are roughly equivalent to 75 gallons.</li> <li>★ Complete each of the following: <ul style="list-style-type: none"> <li>0.2 litres <math>\equiv</math> ____ ml                      658 cm <math>\equiv</math> ____ metres                      56 grams <math>\equiv</math> ____ kg</li> <li>____ cm <math>\equiv</math> 73 mm                      293 mm <math>\equiv</math> ____ metres                      ____ mg <math>\equiv</math> 2.4 grams</li> </ul> </li> <li>★ Complete each of the following:</li> </ul>

8 inches » \_\_\_\_ cm

44 lbs » \_\_\_\_ kg

90 litres » \_\_\_\_ gallons

6

- ★ Use the equivalence of fractions, decimals and percentages to compare proportions
- ★ Divide a quantity into 2 or more parts in a given ratio. Divide 80cm in the ratio 3 : 7
- ★ Solve harder problems involving ratio and direct proportion
- ★ Use proportional reasoning to solve a problem
- ★ Potting compost is made from loam, peat and sand in the ratio 7:3:2 respectively. A gardener used 1.5 litres of peat to make compost. How much loam did she use? How much sand?
- ★ The angles in a triangle are in the ratio 6:5:7. Find the sizes of the three angles.
- ★ Show me a quantity divided correctly into a ratio of three parts.
- ★ Show me how pupils could be in a school if the ratio of pupils with brown hair, blond hair, black hair in a school is 4:2:5.
- ★ What is the same/different about: 2:7, 3:4:2, 1:4:4
- ★ Convince me that if the ratio of pupils in a school with brown hair, blond hair, black hair in a school is 4:2:5 then there cannot be 122 pupils in the school.
- ★ Convince me that if the ratio of pupils in a school with brown hair, blond hair, black hair in a school is 4:2:5 and there are 24 pupils with blond hair, the number of pupils in the school is 132.
- ★ The graph below shows information about a race between two animals – the hare (red) and the tortoise (blue). Who was ahead after 2 minutes? What happened at 3 minutes? At what time did the tortoise draw level with the hare? Between what times was the tortoise travelling fastest? By how much distance did the tortoise win the race?
- ★ Show me a description of a journey that produces a distance/ time graph with a shape similar to a trapezium.

	<ul style="list-style-type: none"> <li>★ True/never/sometimes: On a distance/ time graph, if the graph is horizontal then the object is travelling at a constant speed. On a distance/ time graph, if the graph has a negative gradient then the object is travelling downhill.</li> <li>★ Convince me that on a distance/ time graph, if the graph is horizontal then the object is stationary.</li> </ul>
7	<ul style="list-style-type: none"> <li>★ Convince me that: any A sized paper is an enlargement of any other A sized paper the ratio of the sides of any A sized paper is the square root of 2</li> <li>★ Understand and use proportionality</li> <li>★ Calculate the result of any proportional change using multiplicative methods</li> <li>★ Use compound measures in science, geography or PE</li> <li>★ Compare the speed of a sprinter (100m in 10 seconds) to the speed of a cyclist (13 miles in 1 hour)</li> <li>★ Show me an example of a suitable unit for the measurement of the speed of a boat, an aeroplane, the space shuttle, a snail, a Year 11 walking to my lesson, ...</li> <li>★ What is the same/different: 5 mph and 8km per hour, A distance-time graph with a positive gradient and a distance-time graph with a negative gradient</li> <li>★ True/Never/Sometimes: A sprinter travelling 100m in 10 seconds is faster than a cyclist travelling 13 miles in 1 hour</li> <li>★ Convince me that: You need to put time on the horizontal axis, The area under a velocity-time graph gives you the distance travelled</li> <li>★ Understand and apply Pythagoras' Theorem when solving problems in 2-D</li> </ul>
8	<ul style="list-style-type: none"> <li>★ I can use the unitary method when comparing If a 250g packet of cereal costs £1.20 and a 350g packet costs £1.70, which packet gives better value for money?</li> <li>★ Calculate the original quantity given the result of a proportional change.</li> <li>★ Understand and use trigonometrical relationships in right angled triangles and use these to solve problems, including those involving bearings</li> </ul>

