

3.1.1 Ratio Models

Name: _____ Class: _____ Date: _____

KEY WORDS part-to-whole ratio

<!-- Session 2 native-skill companion -->

Objective

Practise ratio models within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Ratios, equivalent proportions and mixtures · Foundation

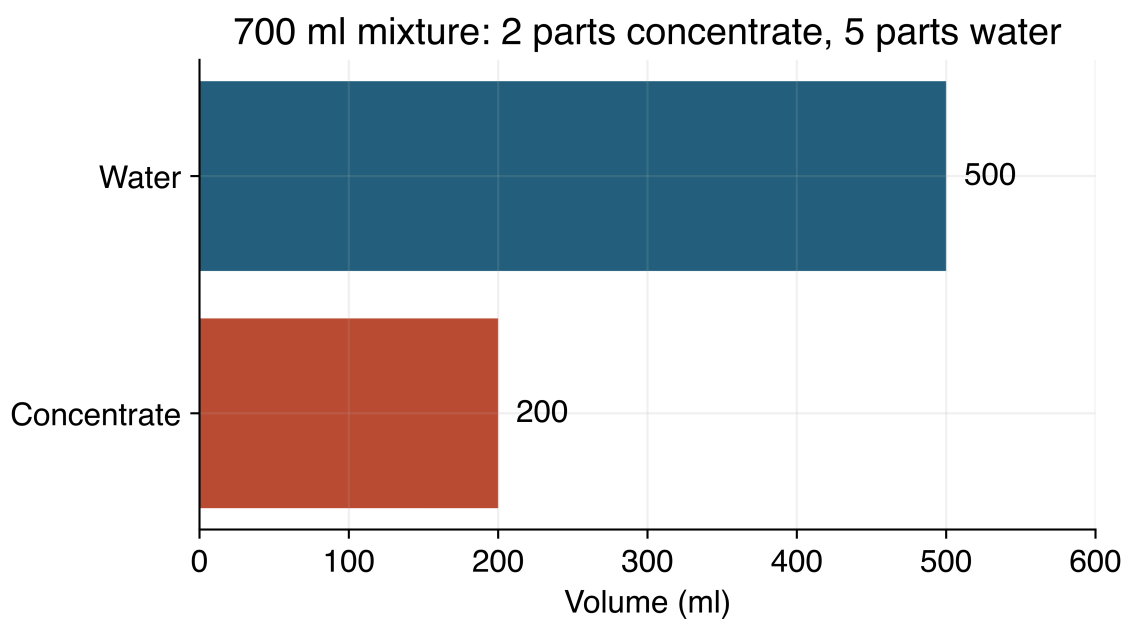
Put quantities in the same units before simplifying a ratio. Divide every part by the same nonzero factor. For a:b the whole has a+b parts; the first share is $a/(a+b)$ of the whole but a/b of the other share. Equivalent ratios have the same multiplicative relationship: $a/b=c/d$ gives $ad=bc$ when denominators are nonzero.

$$\frac{a}{b} = \frac{c}{d} \iff ad = bc, \quad C = \frac{2}{7}V, \quad W = \frac{5}{2}C$$

For 700 ml at 2:5, each part is 100 ml: concentrate 200 ml and water 500 ml. Concentrate:whole=2:7, while concentrate/water=2/5. Water/concentrate=5/2, a fraction greater than 1. Doubling both gives 400:1000=2:5. If concentrate is x and water y, the recipe requires $y=(5/2)x$, a straight line through the origin. For 300 ml concentrate, water is 750 ml and the total is 1050 ml. A batch with 200 ml concentrate and 600 ml water has ratio 1:3 and is weaker. To simplify 1.5 litres:500 ml, first write 1500:500=3:1.

Adding the same amount to both shares generally changes the ratio. Do not divide by 2+7 when the stated ratio is already part:whole 2:7; the whole is seven parts. A concentration fraction uses total volume as denominator.

AQA R3–R8 connects ratio notation, fractions, equivalent proportions and linear functions. Check that both shares sum to the stated total, and name which quantity is compared with which. Use a ratio table to scale a mixture without assuming a fixed additive difference.



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Foundation) Find concentrate in a 700 ml mixture at concentrate:water=2:5.

2.2 (Foundation) Find the numerator of water/concentrate in lowest terms.

2.3 (Foundation) For $y=(5/2)x$, find y when $x=300$.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: Adding 100 ml to both shares always preserves a mixture ratio.

Solutions

2.1 $700/(2+5) \times 2 = 200$ ml.

2.2 Water/concentrate $= 500/200 = 5/2$.

2.3 Multiply the concentrate by $5/2$: $300 \times 2.5 = 750$.

3.1 False. Shares 200 ml and 500 ml have ratio 2:5. Adding 100 ml to each gives 300:600 = 1:2, which is different.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.