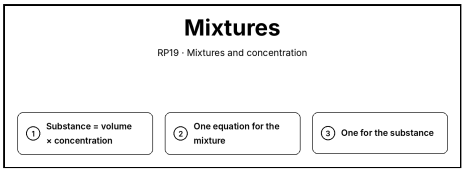
Mixtures: teacher script

RP19-V1 · RP19 Mixtures and concentration · teachers only. Without a screen, read each Say line and draw each Draw step on the board. About 107 seconds as a video.

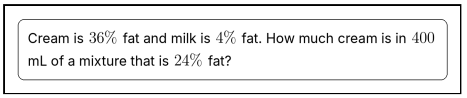
01



Say. Mixtures. The amount of a substance is volume times concentration. Write one equation for the mixture, and one for the substance.

Draw. Write the title “Mixtures” and the steps: 1. Substance = volume × concentration; 2. One equation for the mixture; 3. One for the substance.

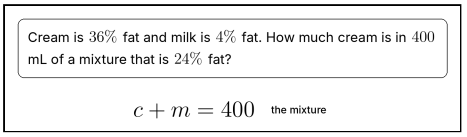
02



Say. Cream is 36 percent fat and milk is 4 percent fat. How much cream is in 400 millilitres of a mixture that is 24 percent fat?

Draw. Clear the board. Write “Cream is 36\% fat and milk is 4\% fat. How much cream is in 400 mL of a mixture that is 24\% fat?” in a box at the top.

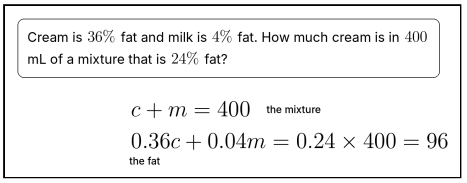
03



Say. Let c and m be the millilitres of cream and milk. For the mixture: c plus m is 400.

Draw. Write c + m = 400 on the next line. Beside it, write “the mixture”.

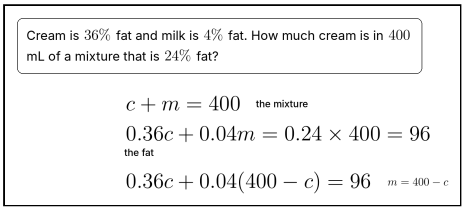
04



Say. For the fat: 0.36 c plus 0.04 m equals 0.24 times 400, that is 96.

Draw. Write 0.36c + 0.04m = 0.24 × 400 = 96 on the next line. Beside it, write “the fat”.

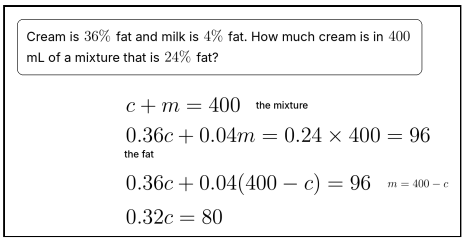
05



Say. Put in m equals 400 minus c.

Draw. Write 0.36c + 0.04(400 − c) = 96 on the next line. Beside it, write “m = 400 − c”.

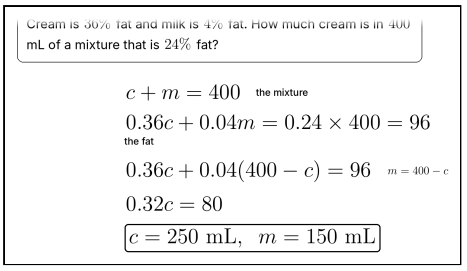
06



Say. Then 0.32 c equals 80.

Draw. Write 0.32c = 80 on the next line.

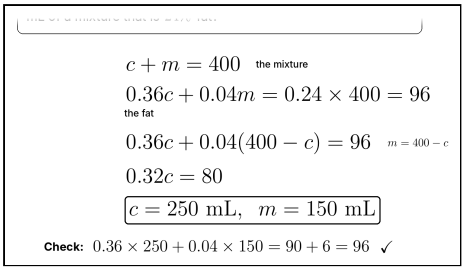
07



Say. So there are 250 millilitres of cream and 150 of milk.

Draw. Write c = 250 mL, m = 150 mL and box it on the next line.

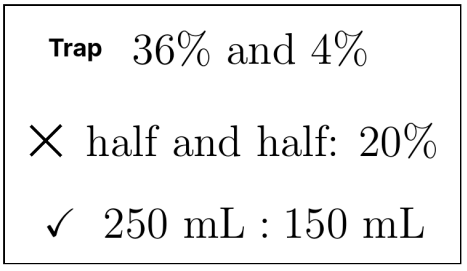
08



Say. Check the fat: 90 plus 6 is 96.

Draw. Below, write “Check: 0.36 × 250 + 0.04 × 150 = 90 + 6 = 96” and tick it ✓.

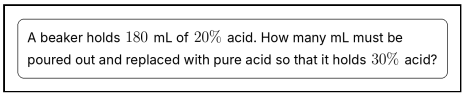
09



Say. Watch for the trap: averaging the concentrations. Half and half would give 20 percent, and that only works with equal amounts.

Draw. Clear the board. Write “Trap” and 36\% and 4\%. Below, write half and half: 20\% and cross it out ×. Then write 250 mL : 150 mL with a tick ✓.

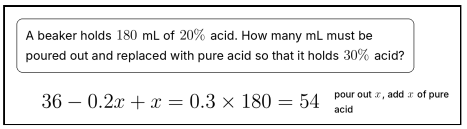
10



Say. A beaker holds 180 millilitres of 20 percent acid. How much must be poured out and replaced with pure acid so that it holds 30 percent acid?

Draw. Clear the board. Write “A beaker holds 180 mL of 20\% acid. How many mL must be poured out and replaced with pure acid so that it holds 30\% acid?” in a box at the top.

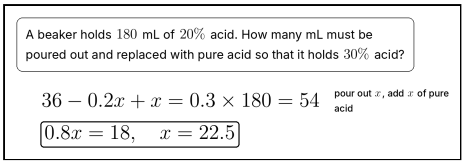
11



Say. There are 36 millilitres of acid. What you pour out takes its share of acid with it, 0.2 x, and then you add x of pure acid. The acid must be 54.

Draw. Write 36 − 0.2x + x = 0.3 × 180 = 54 on the next line. Beside it, write “pour out x, add x of pure acid”.

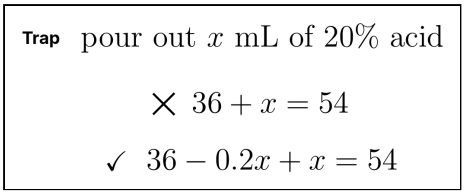
12



Say. So 0.8 x is 18, and x is 22.5 millilitres.

Draw. Write 0.8x = 18, x = 22.5 and box it on the next line.

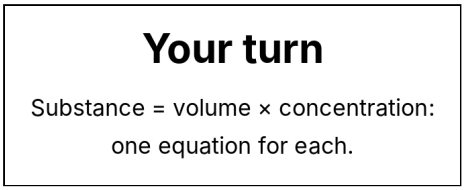
13



Say. Watch for the trap: pouring mixture out without taking out its share of the acid. The x millilitres you pour out hold 0.2 x of acid.

Draw. Clear the board. Write “Trap” and pour out x mL of 20\% acid. Below, write 36 + x = 54 and cross it out ×. Then write 36 − 0.2x + x = 54 with a tick ✓.

14



Say. Now it is your turn. Write one equation for the mixture, and one for the substance.

Draw. Point to today’s activity: Substance = volume × concentration: one equation for each.