PAINT WITH NUMBERS
Lesson 3: Mixing Ratios

Australian Curriculum: Mathematics (Year 7)

ACMNA173: Recognise and solve problems involving simple ratios.

Lesson abstract

This task presents the context of combining two equal sized tins containing different shades of green paint. One tin contains a mixture of green and white paint in the ratio of 1:3, the second tin a mixture in the ratio of 1:7. Students determine the resulting ratio of green to white paint when the two tins are combined.

Mathematical purpose (for students)

What is the resulting ratio when different mixtures of paint are combined?

Mathematical purpose (for teachers)

Students deepen their understanding that a ratio is a multiplicative comparison between two quantities. They determine the result of mixing paint mixed in two different ratios. They recognise that the resulting ratio is not determined by adding parts.

Suggested presentation: One lesson of one hour.

Vocabulary encountered
- additive
- multiplicative
- ratio

Lesson materials
- Unifix cubes

We value your feedback after this lesson via our website.

Mathematics by Inquiry is an initiative of, and funded by, the Australian Government Department of Education

Australian Academy of Science

Introduction

Archie has several tins of paint in different shades of green. All of the tins are exactly the same size. The first shade of green is made of a mix of green and white paint in the ratio 1:3. The second shade of green is a mix of green and white paint in the ratio 1:7.

Archie realises that 1:5 is halfway between 1:3 and 1:7. He wonders if mixing a 1:3 tin with a 1:7 tin will create two tins of paint with a ratio of 1:5.

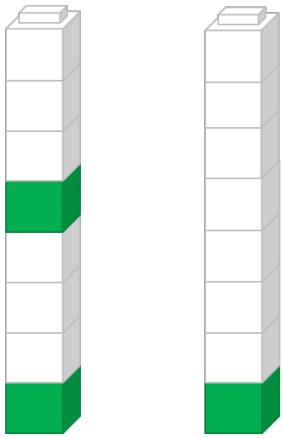
Pose the question: *Is Archie correct? What is the ratio of green to white paint if we combine one tin of paint containing green and white in the ratio of 1:3 with one tin of paint containing green and white in the ratio 1:7?*

Exploration

Allow students time to explore the problem.

Enabling Prompt

- A bar model represented with Unifix cubes can be used. *If each tin of paint contains 800 mL, how much green paint and white paint is in each tin? What is the result if they are added?*



Green to white in the ratio 1:3 | Green to white in the ratio 1:7

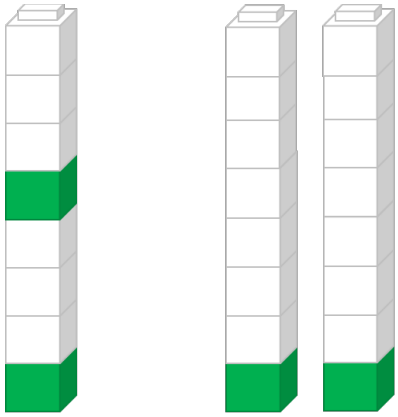
The amount of green and white paint in a 800mL tin

Green to white in the ratio 1:3	200mL	200mL	200mL	200mL

Green to white in the ratio 1:7	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL

Mixing these two tins of paint means mixing 300mL of green paint with 1300mL or 1.3L of white paint. This creates a ratio of 3:13.

To create a ratio of 1:5:



2 tins of green to white in the ratio 1:7

The amount of green and white paint in a 800mL tin

Green to white in the ratio 1:3	200mL	200mL	200mL	200mL

Green to white in the ratio 1:7	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL

Green to white in the ratio 1:7	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL	100 mL

Mixing these two tins means mixing 400mL of green paint with 2000mL or 2L of white paint. This creates a ratio of 4:20 or 1:5.

Questions to prompt deeper thinking

- *When making new paint by mixing paint with ratios of 1:3 and 1:7, does the new paint always have a green to white ratio between 1:3 and 1:7? For example, could you make paint with a ratio of one part green to nine parts white?*
    - The ratio will always be between 1:3 and 1:7.

Extending Prompt

- *What is the fewest number of tins of paint that I would need of each shade to make paint containing green and white in the ratio:*
    - *1:4?*
    - *1:6?*

Class discussion

Select different strategies used to discuss as a class.

Further activities

Complete the Nrich task Mixing More Paints.