

Equivalent Ratios Complete Matched Groups

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In this lesson, 3:5 means 3 star stickers for every 5 circle stickers. In this stars:circles ratio, the first number counts stars and the second counts circles. For any ratio, keep the order of its named quantities. One complete group has 3 stars and 5 circles. Two complete groups have 6 stars and 10 circles. You may draw labeled groups instead of using counters. Changing the number of complete groups keeps the stars-to-circles relationship.

A pattern uses 3 star stickers for every 5 circle stickers. It needs 6 stars. How many circles keep the same relationship?

Matched group	Star stickers	Circle stickers
1	S S S	C C C C C
2	S S S	C C C C C

Each S is one star sticker; each C is one circle sticker. Each row is one complete matched group. Totals are 6 stars and 10 circles.

Complete groups	Star stickers	Circle stickers
1	3	5
2	6	10

Six stars is two groups of three stars. Each group needs five circles, so two groups need ten circles. I changed the number of complete groups, not the match between stars and circles.

The proposal 6 stars and 8 circles adds 3 to both original counts. It does not make two complete 3-and-5 groups. Adding another complete group of 3 stars and 5 circles is valid; adding the same amount to unequal parts is the problem here.

Worked example 1

Watch the complete-group model for 3 stars for every 5 circles. Explain why 6:10 keeps the relationship and 6:8 does not.

Equivalent Ratios Guided Whole Object Work

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Guided practice 1

A pattern has 3 stars for every 5 circles. If it has 9 stars, how many circles keep the relationship? Show groups or a table.

Guided practice 2

The same pattern has 20 circles. How many stars keep the relationship? Explain starting with the circles.

Guided practice 3

Which pairs keep 3 stars for every 5 circles: 6:10, 6:8, 9:15, 12:20? Explain one pair that works and why 6:8 does not.

Equivalent Ratios Smaller and Fractional Lengths

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Read this model before the next practice. A plan uses 6 metres of cord for every 9 metres of ribbon. A smaller plan uses 2 metres of cord. Divide both lengths by 3: 2 metres of cord needs 3 metres of ribbon. Divide those lengths by 2 again: 1 metre of cord needs 1.5 metres of ribbon. The factor from the original is $\frac{1}{6}$.

Scale from original	Cord length in metres	Ribbon length in metres
1	6	9
$\frac{1}{3}$	2	3
$\frac{1}{6}$	1	1.5

Length is continuous: 1.5 metres means one and a half metres. Whole stickers cannot be split when the task requires whole objects. A factor between 0 and 1 scales down. A factor of 1.5 scales up: 4:6 becomes 6:9 by multiplying both lengths by 1.5. Positive scale factors preserve a nonzero ratio; 0:0 does not describe this relationship.

Worked example 2

Read the smaller-length model. Explain why scaling down both lengths preserves the relationship, and why half a sticker would not be allowed in a whole-sticker pattern.

Equivalent Ratios Guided Length Work

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Guided practice 4

A length plan uses 4 centimetres of striped ribbon for every 6 centimetres of plain ribbon. Make a smaller version with 2 centimetres of striped ribbon. Find the plain length, label both lengths, and name the factor used on each.

Guided practice 5

For the same 4:6 ribbon-length plan, a version uses 1 centimetre of striped ribbon. Find the plain length. Then make a 1.5-times version of the original plan and label both lengths. Explain why decimal lengths are possible here.
