

MYSTERY PICTURE

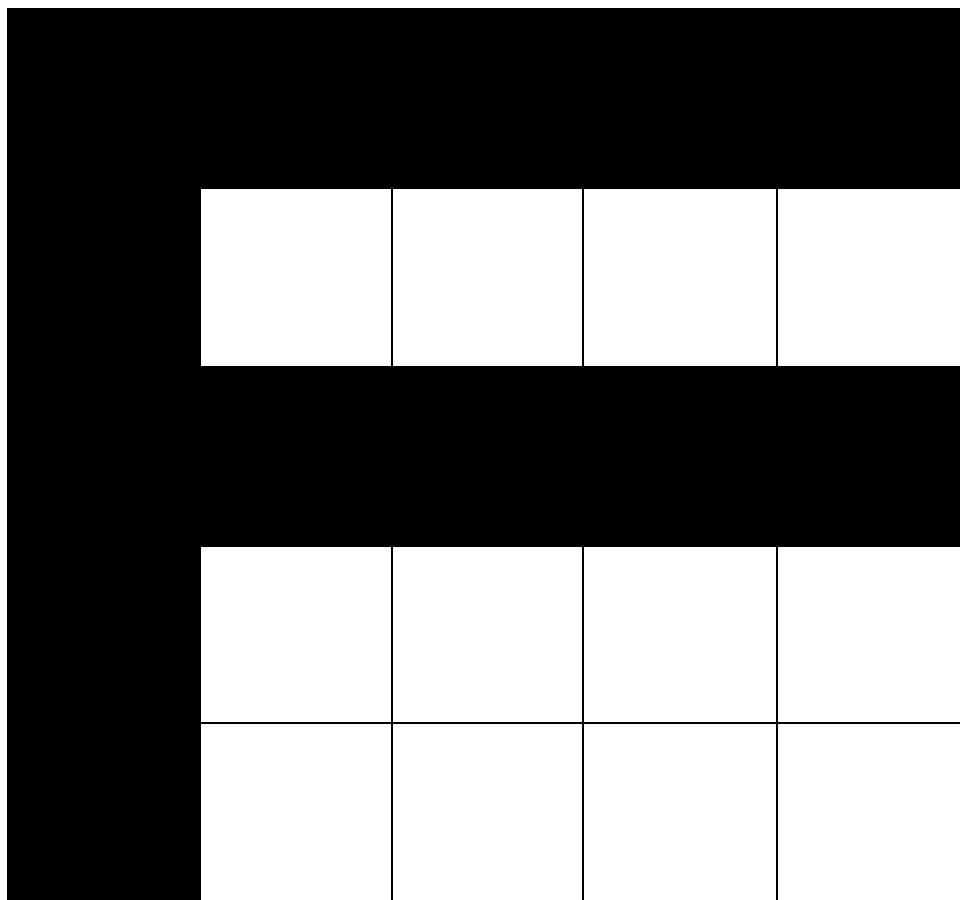


SCALE DRAWINGS AND SCALE FACTOR

Bigger or Smaller, and From Which One?

25 pairs of figures · is the scale factor sentence true?

FREE



1. **Hand out page 3**, one per student. Pencils. Nothing else is needed.
2. **Say this once:** *“Read which figure the sentence starts from. A scale factor more than 1 makes the second figure bigger. A factor less than 1 makes it smaller. Fill the square only if the sentence is true.”*
3. **When a student finishes, look at the picture.** If it is not the letter F, a square is wrong. The student finds it and checks it again.

Student sheet	page 3, one per student. Every square shows a figure marked “original” beside a scale drawing of it marked “drawing”.
Answers	page 4: the finished picture and the reason for every square.

Every square shows a figure marked “original” and a scale drawing of it marked “drawing”. They are drawn to one scale, so the bigger one really is that many times bigger. The sentence under them gives the scale factor from one figure to the other. A true sentence is filled. Every false sentence gives the factor the wrong way round: from the drawing to the original when it says from the original to the drawing, or the other way.

The direction is the whole point. In twelve squares the original is the bigger figure, and in twelve the sentence goes from the drawing to the original. Many students think a factor must be more than 1, or read every sentence as “from the small one to the big one”. A student who ignores which way the sentence goes gets twelve squares wrong. The numbers are written as whole numbers, fractions, decimals and percents. $\frac{3}{2}$, 1.5 and 150% are the same number.

No square needs a ruler or a calculation. A factor more than 1 (or more than 100%) makes the second figure bigger. Guessing does not work: every simple guessing rule gets at least twelve squares wrong.



This is the free lesson this activity came from. The worksheet, the full answers and the lesson plan are on it, at three levels of difficulty.
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Mystery Picture

Which way does the factor go?

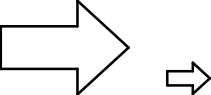
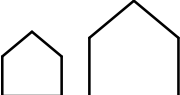
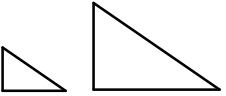
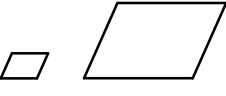
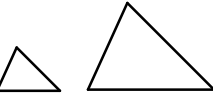
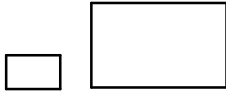
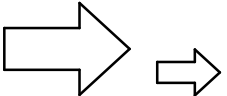
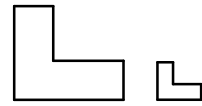
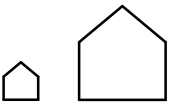
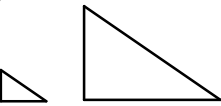
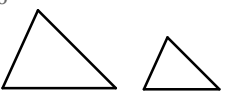
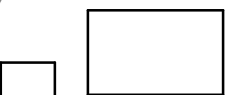
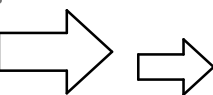
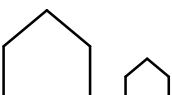
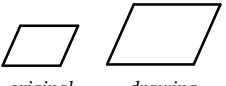
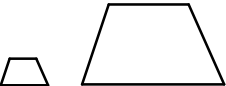
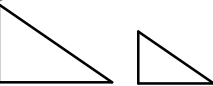
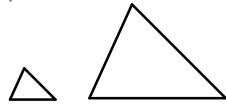
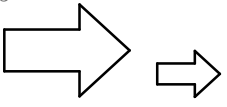
Name _____

Period _____

Date _____

Each square shows an original and a scale drawing of it, drawn to one scale. Is the sentence under them true? If yes, fill the square with slanted lines. If no, leave it white.

Read which figure the sentence starts from. A scale factor more than 1 (more than 100%) makes the second figure bigger. A factor less than 1 makes it smaller. $\frac{3}{2}$, 1.5 and 150% are the same number. When you finish, look at the picture. If part of it is missing, or one square does not fit, check that square again.

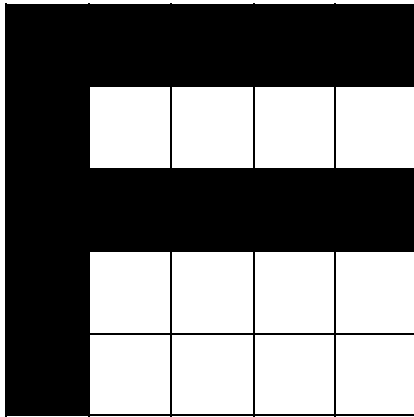
1  drawing original From the original to the drawing, the scale factor is 0.4.	2  original drawing From the drawing to the original, the scale factor is 3.	3  original drawing From the original to the drawing, the scale factor is 1.5.	4  original drawing From the drawing to the original, the scale factor is $\frac{1}{2}$.	5  original drawing From the original to the drawing, the scale factor is $\frac{2}{3}$.
6  original drawing From the drawing to the original, the scale factor is 50%.	7  drawing original From the drawing to the original, the scale factor is $\frac{1}{3}$.	8  original drawing From the original to the drawing, the scale factor is 0.5.	9  original drawing From the drawing to the original, the scale factor is 2.5.	10  original drawing From the original to the drawing, the scale factor is 200%.
11  drawing original From the original to the drawing, the scale factor is 250%.	12  drawing original From the drawing to the original, the scale factor is $\frac{5}{2}$.	13  drawing original From the original to the drawing, the scale factor is $\frac{1}{3}$.	14  drawing original From the drawing to the original, the scale factor is 40%.	15  original drawing From the original to the drawing, the scale factor is 2.
16  original drawing From the drawing to the original, the scale factor is 150%.	17  drawing original From the drawing to the original, the scale factor is $\frac{2}{5}$.	18  drawing original From the original to the drawing, the scale factor is $\frac{2}{3}$.	19  drawing original From the drawing to the original, the scale factor is 40%.	20  drawing original From the original to the drawing, the scale factor is $\frac{1}{2}$.
21  original drawing From the original to the drawing, the scale factor is $\frac{3}{2}$.	22  original drawing From the drawing to the original, the scale factor is 3.	23  original drawing From the original to the drawing, the scale factor is $\frac{3}{2}$.	24  original drawing From the drawing to the original, the scale factor is 300%.	25  original drawing From the original to the drawing, the scale factor is 2.



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Mystery Picture — answers

For the teacher



The finished picture is **the letter F**: a line down the left side, with a bar along the top and a bar just as long across the middle.

A square is filled when its sentence is true. To check a square with a student, ask: “Which figure does the sentence start from? Is the other figure bigger or smaller than that one?”

Squares, and the numbers printed	Answer	Why
3, 11, 15, 21 1.5, 250%, 2, 3/2	FILL	The sentence goes from the original to the drawing, and the drawing is the bigger figure. So the factor must be more than 1 (more than 100%). Each number here is more than 1, so the sentence is true.
8, 18, 20 0.5, 2/3, 1/2	white	The sentence goes from the original to the drawing, and the drawing is the bigger figure. So the factor must be more than 1 (more than 100%). Each number here is less than 1: it is the factor the other way round.
1, 5, 13 0.4, 2/3, 1/3	FILL	The sentence goes from the original to the drawing, and the drawing is the smaller figure. So the factor must be less than 1 (less than 100%). Each number here is less than 1, so the sentence is true.
10, 23, 25 200%, 3/2, 2	white	The sentence goes from the original to the drawing, and the drawing is the smaller figure. So the factor must be less than 1 (less than 100%). Each number here is more than 1: it is the factor the other way round.
4, 6, 14 1/2, 50%, 40%	FILL	The sentence goes from the drawing to the original, and the original is the smaller figure. So the factor must be less than 1 (less than 100%). Each number here is less than 1, so the sentence is true.
9, 22, 24 2.5, 3, 300%	white	The sentence goes from the drawing to the original, and the original is the smaller figure. So the factor must be less than 1 (less than 100%). Each number here is more than 1: it is the factor the other way round.
2, 12, 16 3, 5/2, 150%	FILL	The sentence goes from the drawing to the original, and the original is the bigger figure. So the factor must be more than 1 (more than 100%). Each number here is more than 1, so the sentence is true.
7, 17, 19 1/3, 2/5, 40%	white	The sentence goes from the drawing to the original, and the original is the bigger figure. So the factor must be more than 1 (more than 100%). Each number here is less than 1: it is the factor the other way round.