

MYSTERY PICTURE

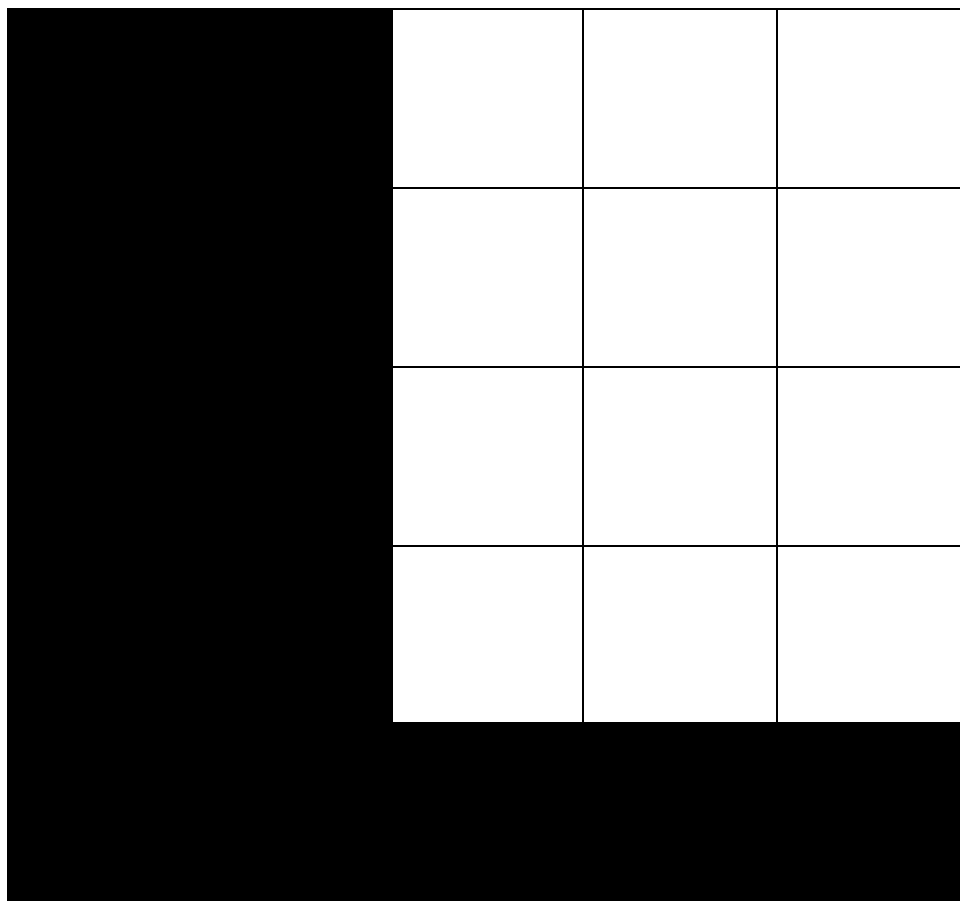


DILATING LINES, SEGMENTS AND ANGLES

Dilations: Is Line AB Its Own Image?

25 squares · a ruler · wrong answers show in the picture

FREE



1. **Hand out page 3**, one per student, with a ruler each.
2. **Say this once:** *“The question is about line AB, not the triangle. Put your ruler on A and B. If the edge goes through O, line AB is its own image.”*
3. **Students fill a square with slanted lines if line AB is its own image, and leave it white if not.** A picture appears. Thirteen of the 25 are filled.

Student sheet	page 3, one per student. Three small pictures on it show what a dilation is and the two results about lines.
Answers	page 4: the finished picture and the reason for every square.

Every square asks about the same result. A dilation takes a line through the center to itself. It takes a line that misses the center to a different, parallel line. So every square asks one question: *does the center lie on the line?* Students do not need the scale factor. The sheet says the factor is 2, but the answer would be the same for any factor except 1.

The question is about the line, not the triangle. In ten of the filled squares, O is on line AB but past A or B, outside the triangle. A student has to extend side AB with the ruler to see it. In three, O is on side AB itself.

The twelve white squares show three common mistakes. In three, O is inside the triangle but not on line AB. In four, O is on the line through side AC or BC, not on line AB. A student who checks the line through any side gets squares 5, 14, 18, 20 wrong. In five, O is a little off line AB, past A or B. There a ruler on A and B misses O by 3.5 mm or more.

Guessing does not work. Every simple guessing rule, such as filling every square where O is outside the triangle, gets at least nine squares wrong. The picture then has holes that a student can see.

What it does not test. It does not ask about lengths or angles.



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

Is line AB its own image?

Name _____

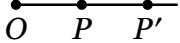
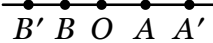
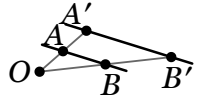
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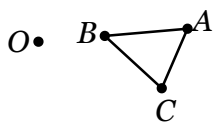
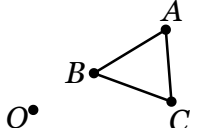
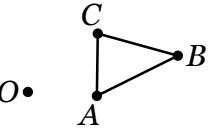
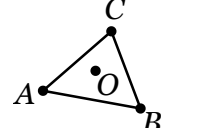
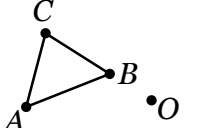
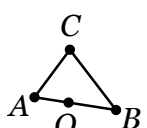
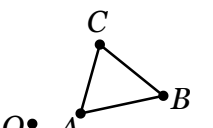
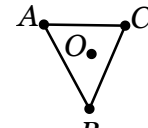
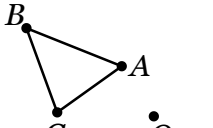
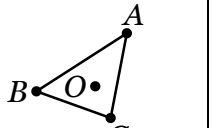
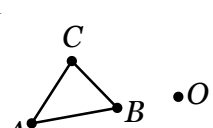
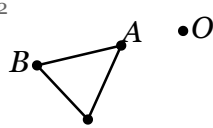
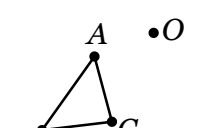
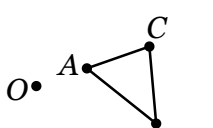
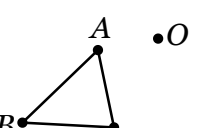
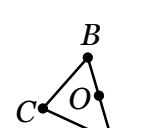
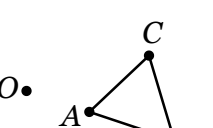
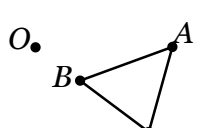
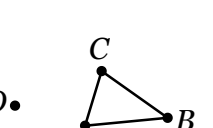
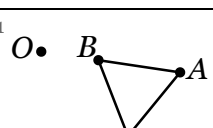
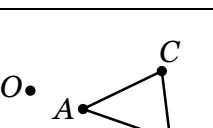
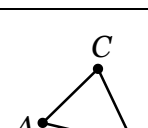
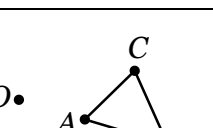
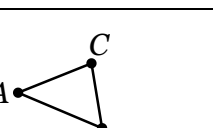
Date _____

Each square shows a triangle ABC and a center O . A dilation with center O and scale factor 2 acts on line AB . Is the image of line AB the same line?

Put your ruler on A and B . The line goes on past A and past B . If the edge of the ruler goes through O , line AB is its own image.

If yes, fill the square with slanted lines. If no, leave it white. A picture appears. If part of it is missing, or one square does not fit, check that square again.

 center O • scale factor k <i>P' is on ray OP, k times as far from O</i>	 a line through O <i>its image is the same line</i>	 a line not through O <i>its image is a new line, parallel to it</i>
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1	2	3	4	5
				
6	7	8	9	10
				
11	12	13	14	15
				
16	17	18	19	20
				
21	22	23	24	25
				

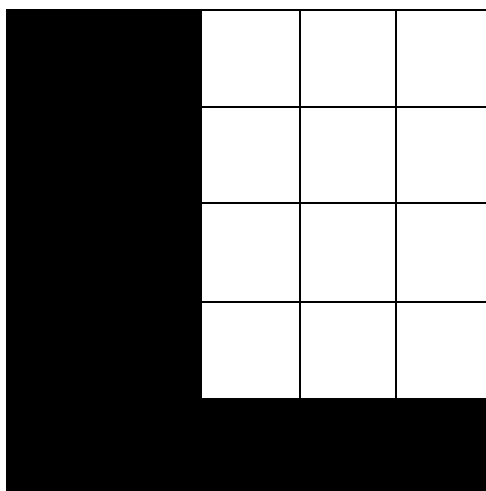


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Mystery Picture — answers

For the teacher

The finished picture is **the letter L**. The table reads left to right, as the sheet does.



1–5	FILL O is on line AB, past A or B. Line AB goes through O, so it is its own image.	FILL O is on line AB, past A or B. Line AB goes through O, so it is its own image.	white O is a little off line AB. A ruler on A and B misses O, so the image is a different, parallel line.	white O is inside the triangle but not on line AB, so the image is a different, parallel line.	white O is on the line through another side, not on line AB. So the image of line AB is a different, parallel line.
6–10	FILL O is on side AB. Line AB goes through O, so it is its own image.	FILL O is on line AB, past A or B. Line AB goes through O, so it is its own image.	white O is inside the triangle but not on line AB, so the image is a different, parallel line.	white O is a little off line AB. A ruler on A and B misses O, so the image is a different, parallel line.	white O is inside the triangle but not on line AB, so the image is a different, parallel line.
11–15	FILL O is on line AB, past A or B. Line AB goes through O, so it is its own image.	FILL O is on line AB, past A or B. Line AB goes through O, so it is its own image.	white O is a little off line AB. A ruler on A and B misses O, so the image is a different, parallel line.	white O is on the line through another side, not on line AB. So the image of line AB is a different, parallel line.	white O is a little off line AB. A ruler on A and B misses O, so the image is a different, parallel line.
16–20	FILL O is on side AB. Line AB goes through O, so it is its own image.	FILL O is on line AB, past A or B. Line AB goes through O, so it is its own image.	white O is on the line through another side, not on line AB. So the image of line AB is a different, parallel line.	white O is a little off line AB. A ruler on A and B misses O, so the image is a different, parallel line.	white O is on the line through another side, not on line AB. So the image of line AB is a different, parallel line.
21–25	FILL O is on line AB, past A or B. Line AB goes through O, so it is its own image.	FILL O is on line AB, past A or B. Line AB goes through O, so it is its own image.	FILL O is on side AB. Line AB goes through O, so it is its own image.	FILL O is on line AB, past A or B. Line AB goes through O, so it is its own image.	FILL O is on line AB, past A or B. Line AB goes through O, so it is its own image.

No square depends on sharp eyes. In every white square, O is at least 3.5 mm from line AB. In every filled square, O is exactly on line AB.