

MYSTERY PICTURE

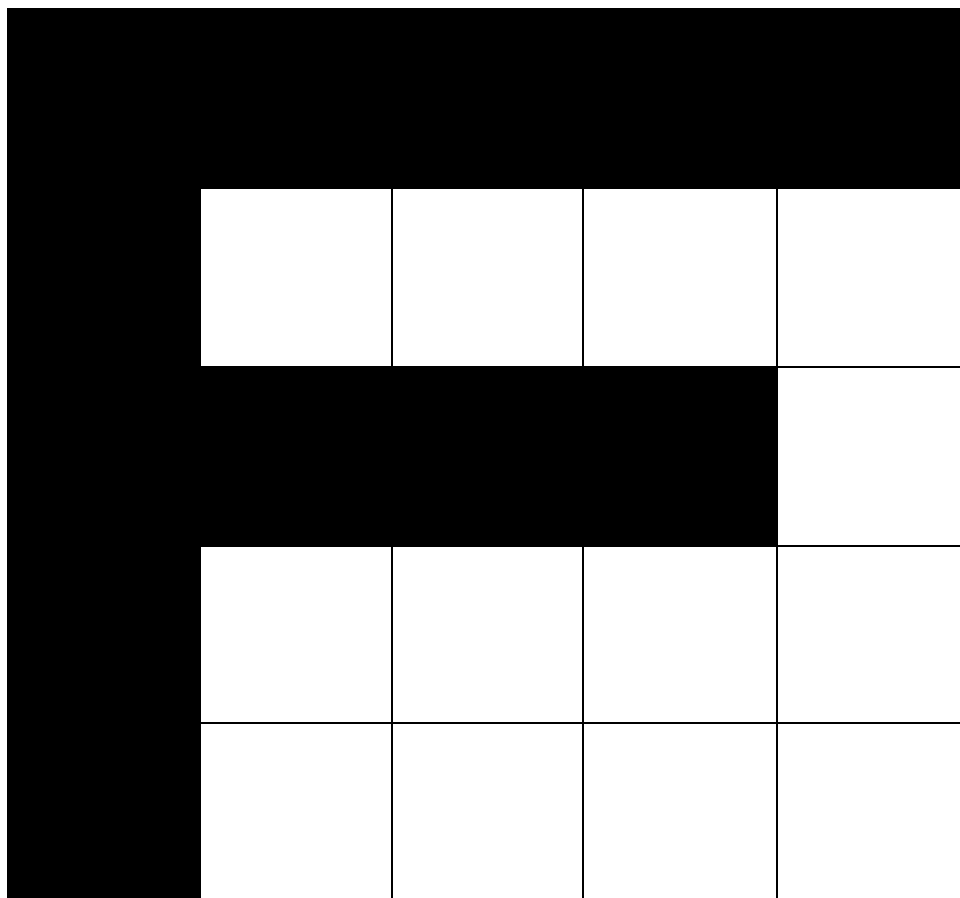


TRANSLATIONS

Translations: Is It the Image?

25 flags and 25 arrows · no numbers · wrong answers show in the picture

FREE



1. **Hand out page 3**, one per student, with a ruler or a compass each. That is the whole preparation.
2. **Say this once:** *“The arrow tells every point how far and which way. Check that A to A’ is a copy of the arrow. It must have the same length and the same slant, and point the same way. Then check that the flag came out the same way round.”*
3. **Fill the square with slanted lines if the second flag is the image. Leave it white if it is not.** A picture appears. Twelve of the 25 are filled.

Student sheet page 3, one per student. The arrow and a flag with its image are printed on it as pictures.
Answers page 4 — the finished picture and the reason for every square.

The thirteen white squares show mistakes students often make. In two squares the flag is flipped over the arrow's line, as if the arrow were a mirror line. That is the most serious mistake in this lesson. In two the arrowhead is ignored, so the flag goes backward. In two the flag goes the right way but only half as far, and in one it goes much farther. In two it goes as far as the arrow, but in a different direction. Every arrow is drawn away from its flag, on purpose. Many students believe the arrow must touch the figure, and here it never does.

In four white squares, corner A moves exactly by the arrow. But the flag is turned (two) or comes out as a mirror image (two). That is why students must also check that the flag is the same way round. A student who checks only corner A gets four squares wrong (9, 17, 20 and 25).

Recognizing a translation is the easiest skill in this topic. Drawing one is harder. This picture does not replace drawing a translation on blank paper.

Guessing does not work. Every simple guessing rule, such as filling every square where the flag looks the same way round, gets at least five squares wrong. The picture then has holes that a student can see from their own desk.



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 it the image?

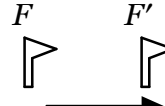
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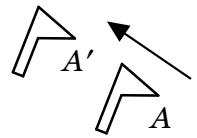
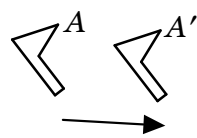
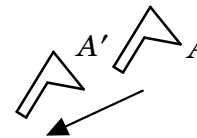
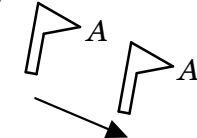
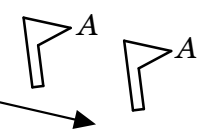
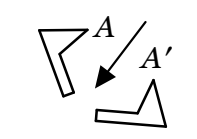
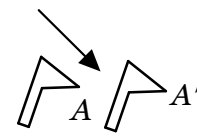
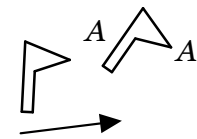
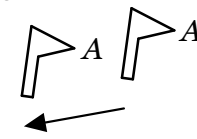
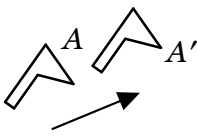
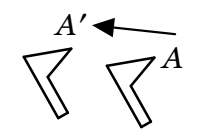
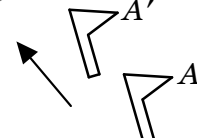
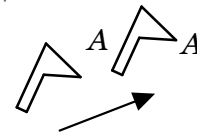
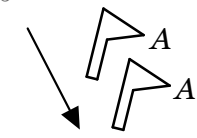
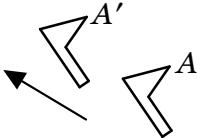
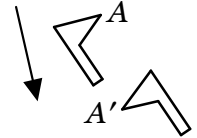
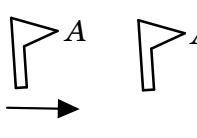
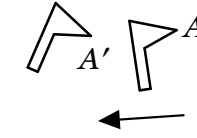
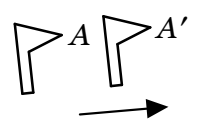
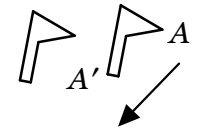
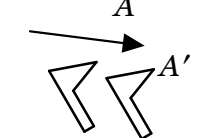
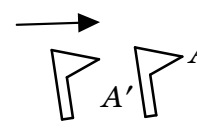
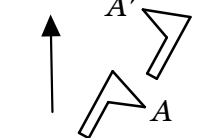
Period _____

Date _____

In each square, the flag with corner A is flag F. The other flag is somebody's drawing of its image under the translation the arrow names. A' is the corner they drew for A. Is it the image? Yes — fill the square with slanted lines. No — leave it white. Use a ruler or a compass to compare A to A' with the arrow. Nothing is measured in numbers. A picture appears. If it looks like nothing, a square is wrong.


the arrow from A to B
how far: its length · which way: its head


F' is the image of F
every point moved by the arrow. Same size, same way round

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 

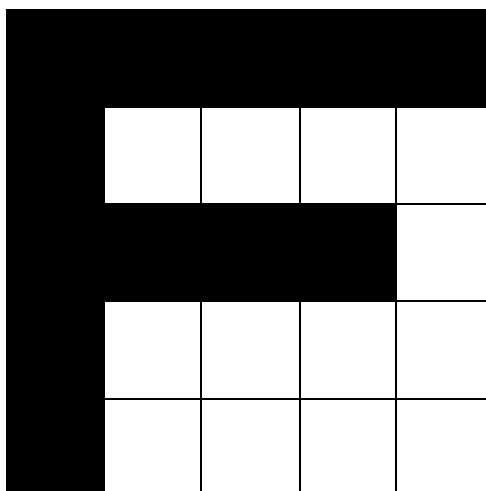


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Mystery Picture — answers

For the teacher

The finished sheet is **the letter F** — a tall upright stroke down the left side, a full arm across the top, and a shorter arm across the middle. The table reads left to right, as the sheet does.



1–5	FILL · the image	FILL · the image	FILL · the image	FILL · the image	FILL · the image
6–10	FILL · the image	white · flipped over the line	white · wrong slant	white · turned	white · backward
11–15	FILL · the image	FILL · the image	FILL · the image	FILL · the image	white · too short
16–20	FILL · the image	white · mirror image	white · flipped over the line	white · too far	white · turned
21–25	FILL · the image	white · wrong slant	white · too short	white · backward	white · mirror image

The image. Every point moved the length of the arrow, in the direction it points. **Flipped over the line.** The flag was flipped over the line the arrow lies on, as if the arrow were a mirror line. **Wrong slant.** The flag moved as far as the arrow is long, but in a different direction. **Turned.** Corner A moved exactly by the arrow, but the flag turned on the way. **Backward.** The flag moved the length of the arrow, but the wrong way. The arrowhead was ignored. **Too short.** The flag moved the right way, but only about half as far as the arrow is long. **Mirror image.** Corner A moved exactly by the arrow, but the flag came out as a mirror image. **Too far.** The flag moved the right way, but much farther than the arrow is long.

Some students do only part of the check. A student who checks that A to A' is a copy of the arrow but not the way round gets squares 9, 17, 20 and 25 wrong. A student who checks the slant and the direction but not the length or the way round gets squares 9, 15, 17, 19, 20, 23 and 25 wrong. A student who checks only the length gets squares 7, 8, 9, 10, 17, 20, 22, 24 and 25 wrong.

No square depends on sharp eyes. A wrong length is at most 0.6 times or at least 1.5 times the arrow. A wrong slant is at least 35° off, and a turn is at least 25°.