

CUT & GLUE SORT

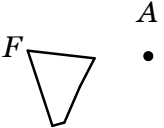
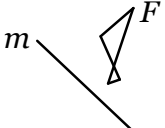
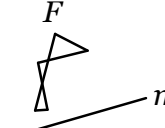


REFLECTIONS

Does It Name a Reflection?

One reflection · not a reflection · not enough

FREE

1  Reflect F in the line through point A.	2  Every point goes straight across the page to the other side of m. Each point ends up as far past m as it was before it.	3  Reflect F in line m.	4 Reflect F in line m, then slide it 3 cm along m.
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1. **Hand out pages 3 and 4**, one of each per student, and scissors and glue.
2. **Say this once:** *“A reflection needs one thing: its line. If the words say exactly where the line is, they name one reflection. If they do not, they do not name one. Every point of the line stays still. Every other point crosses the line perpendicular to it, the same distance on each side. If either fails, it is not a reflection.”*
3. **Every row gets 4.** A row with more or fewer has a piece in the wrong place. (This is on your page only, not the student's.)

Student sheets pages 3 and 4, one of each per student.
Answers page 5.

The third row is the hard one: the words describe a reflection but do not say where its line is. Pieces 1, 5, 8 and 11 go there. One names no line at all. One says “the line through point A”, but endlessly many lines pass through one point. One asks for a line perpendicular to m , which gives a direction but not a place. One names a line k parallel to m , but nothing says where k is. On tests, students lose points when they describe a reflection without saying which line it is in.

Two pieces sound vague but are not. “A line through points A and B” is only one line, because exactly one line passes through two points. “The reflection that sends P to Q” also has only one possible line: the perpendicular bisector of PQ. So the question is always whether the words allow only one line. Small words like “a” or “the” do not decide it.

The second row holds the mistakes students make most often. The most common one is on a slanted line m : the points move straight across the page, not perpendicular to m . The other three pieces are a half turn about a point of m , a move perpendicular to m that lands twice as far away, and a reflection followed by a slide along m . The slide moves the points of m , and a reflection never moves them.

Guessing does not work. A student who sorts by the look of a piece, or by a few of its words, gets at most six of the twelve pieces right.



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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One reflection, not one, or not enough?

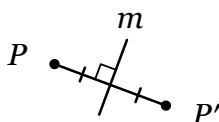
Describing a reflection

Name _____

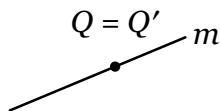
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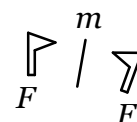
Cut out the twelve pieces on the next page. **Decide whether each is one reflection, not a reflection, or not enough to tell, and glue it into that row. A reflection is fixed by its line. Every point of the line stays still. Every other point crosses the line perpendicular to it, exactly as far again.**



P' is the image of P in m
PP' perpendicular to m, and cut in half by m



a point on m is its own image
every point of m stays where it is



F' is the image of flag F
every point reflected. F' faces the other way

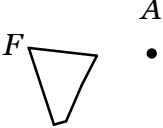
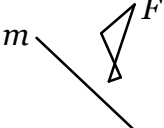
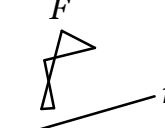
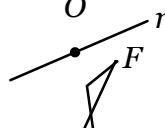
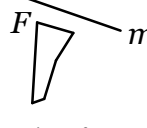
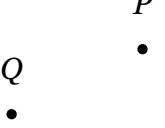
ONE REFLECTION — *the words fix its line*

NOT A REFLECTION — *some point does not go where a reflection sends it*

NOT ENOUGH — *a reflection, but the words do not fix its line*

The twelve pieces

Cut along the dotted lines

1  Reflect F in the line through point A.	2  Every point goes straight across the page to the other side of m. Each point ends up as far past m as it was before it.	3  Reflect F in line m.	4 Reflect F in line m, then slide it 3 cm along m.
5 Reflect F in a line perpendicular to m.	6 Reflect F in a line through points A and B.	7  Turn F half a turn about point O.	8 Reflect F.
9 Every point of m stays where it is. Any other point P goes to the P' that makes m the perpendicular bisector of PP'.	10 Every point P goes across m, on the line through P perpendicular to m. It lands twice as far from m as before.	11  Every point of F goes to its mirror image in line k, which is parallel to m.	12  The reflection that sends P to Q.



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Cut & Glue Sort — answers

For the teacher

ONE REFLECTION	3. Line m is named and drawn, so every point has exactly one image.	6. It says “a line”, but only one line passes through two points.	9. This is the definition of the reflection in m , with both of its parts.	12. Its line must be the perpendicular bisector of PQ , and there is only one.
NOT A REFLECTION	2. The points move straight across the page, not perpendicular to the slanted line m . This is the most common mistake.	4. The points of m move 3 cm. A reflection leaves them where they are.	7. This is a half turn. Line m cuts each segment from a point to its image in half, but not at a right angle.	10. The direction is right, but the distance is wrong. Line m does not cut PP' in half.
NOT ENOUGH	1. It says “the line”, but endlessly many lines pass through one point.	5. “Perpendicular to m ” gives a direction, but not a place.	8. No line is named at all.	11. Line k has a name and a direction, but nothing says where it is.

How the rows are decided. A piece goes in the first row when its words (and its drawing, if it has one) allow only one reflection, in one line. It goes in the third row when its words allow reflections in more than one line. It goes in the second row when what it describes is not a reflection at all. Every piece fits exactly one row.