

CUT & GLUE SORT

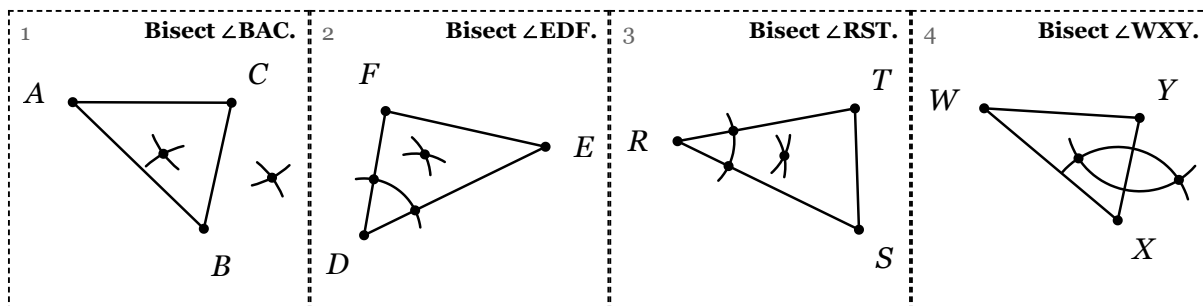


CONSTRUCTING AN ANGLE BISECTOR

Bisecting an Angle: The Named Angle, a Side, or Another Angle?

Read the arcs · read the name · the wrong vertex is the one no fold catches

FREE



1. **Hand out pages 3 and 4**, one of each per student, with scissors and glue.
2. **Say this once:** *“Find the corner the first arc is centered on. Then read the name. The vertex is the middle letter. Arcs from both ends of a side are a different mistake. Only the name tells you if the arcs are centered on the wrong corner.”*
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 two “Wrong” rows show a student bisecting the wrong thing. This mistake comes in two forms. In the first, the student builds the perpendicular bisector of a side instead of the angle bisector. In a triangle, both constructions start from the same lines, so they are easy to mix up. In the second, the student bisects an angle, but at a different vertex from the one named. Every piece shows correct marks for *something*, stopped before the line is drawn. The student reads the arcs first, then the angle's name.

The third row is the hard one. Every check a student can do on the drawing shows that the ray bisects *some* angle. None of them shows that it is the angle that was asked for. Only reading the name catches this mistake. For example, folding along a line in the middle row does not put one arm on the other, but folding along a ray in the third row does. The vertex is not always the same letter of the triangle. A student who takes the first letter of the name as the vertex gets only six of the twelve right. A student who never reads the name gets eight.

No triangle has two equal sides. So the perpendicular bisector of a side never passes through a corner. It misses every corner by at least 3 mm, and no piece fits two rows.



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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Which line will these marks give?

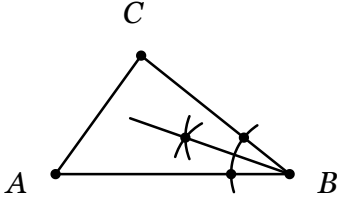
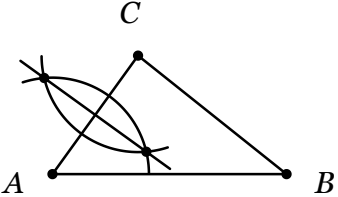
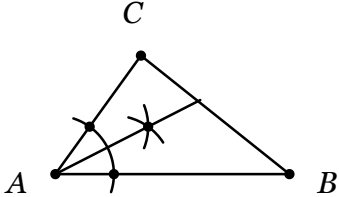
The named angle, a side, or another angle

Name _____

Period _____

Date _____

Cut out the twelve pieces on the next page. On each piece, somebody was asked to bisect the angle printed on it. They made their compass marks. Then they stopped before ruling the line. **What line are their marks built for?** Find the corner each arc is centered on. Then read the name. $\angle ABC$ is the angle at B, the middle letter. Glue each piece into its row. The pictures show the same triangle ABC. Each picture shows the line that one row's marks actually give.

 1 • CORRECT: BISECTS THE NAMED ANGLE	 2 • WRONG: BISECTS A SIDE, NOT AN ANGLE	 3 • WRONG: BISECTS A DIFFERENT ANGLE
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1 • CORRECT: BISECTS THE NAMED ANGLE — *the arcs sit at the corner the name puts in the middle*

2 • WRONG: BISECTS A SIDE, NOT AN ANGLE — *arcs from both ends of a side. It is that side's perpendicular bisector*

3 • WRONG: BISECTS A DIFFERENT ANGLE — *right arcs, wrong corner. Only the name tells you that.*

The twelve pieces

Cut along the dotted lines

This lesson has two settings, with two different rules. *First arc, from the vertex:* use any opening, as long as the arc crosses *both* arms. On a narrow angle, use a bigger opening. You may lengthen an arm if you need to. *Second and third arcs, from the two points it made:* use the *same* opening for both. Make it big enough for the two arcs to meet. On a wide angle, that means a big opening. Then rule the ray from the vertex, through the crossing, and on.

Last lesson: you built the perpendicular bisector. The two openings are equal. Each is more than half the segment.

1 Bisect $\angle BAC$.	2 Bisect $\angle EDF$.	3 Bisect $\angle RST$.	4 Bisect $\angle WXY$.
5 Bisect $\angle BDC$.	6 Bisect $\angle PQR$.	7 Bisect $\angle HJG$.	8 Bisect $\angle JKH$.
9 Bisect $\angle MNL$.	10 Bisect $\angle VUW$.	11 Bisect $\angle TUS$.	12 Bisect $\angle EGF$.



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Cut & Glue Sort — answers

For the teacher

CORRECT: BISECTS THE NAMED ANGLE	2 — $\angle EDF$: first arc centered at D	6 — $\angle PQR$: first arc centered at Q	7 — $\angle HJG$: first arc centered at J	11 — $\angle TUS$: first arc centered at U
WRONG: BISECTS A SIDE, NOT AN ANGLE	1 — $\angle BAC$: arcs centered at B and C	4 — $\angle WXY$: arcs centered at X and Y	9 — $\angle MNL$: arcs centered at L and M	12 — $\angle EGF$: arcs centered at E and F
WRONG: BISECTS A DIFFERENT ANGLE	3 — $\angle RST$: first arc centered at R	5 — $\angle BDC$: first arc centered at C	8 — $\angle JKH$: first arc centered at J	10 — $\angle VUW$: first arc centered at W

The vertex of an angle is always the middle letter of its name. Each cell gives the angle's name and the point or points the arcs are centered on.