

CUT & GLUE SORT



DEDUCTIVE REASONING: DETACHMENT AND SYLLOGISM

Detachment, Syllogism, or Nothing Follows?

12 pieces · 3 rows · which law gives a conclusion

FREE

A If two angles are vertical angles, then they are congruent. If two angles are congruent, then they have equal measures.	B If a number is a multiple of 10, then it is even. Kai's number is a multiple of 10.	C If a figure is not a polygon, then it is not a triangle. If a figure is a circle, then it is not a polygon.	D If two angles are vertical angles, then they are congruent. $\angle 3$ and $\angle 4$ are not vertical angles.
E If it rains on Saturday, then the game is canceled. It rains on Saturday.	F If the bell rings, then class is over. If class is over, then Sam eats lunch.	G If two angles are vertical angles, then they are congruent. $\angle 1$ and $\angle 2$ are vertical angles.	H If a number is a multiple of 10, then it is even. Lee's number is even.

Cut & Glue Sort — how to run it

25 minutes, with the cutting

1. **Hand out pages 3 and 4, one of each per student.** Students need scissors and glue. Nothing else is needed.
2. **Say this once:** *“Find the part of the rule that the other sentence matches. The words must be the same.”*
3. **Check with page 5.** Every row gets 4 pieces.

Student sheets	pages 3 (the rows) and 4 (the pieces), one of each per student.
Answers	page 5.

Row 3 matters most. Students must learn that “Nothing follows” is a real answer, and they need to give it several times. Each piece in row 3 shows a different common mistake. In piece D, the fact says that the if part is not true. In piece H, the fact matches the then part of the rule, not the if part. In piece I, the two middle parts, “is even” and “is not even,” differ by the word not. In piece L, the two rules have the same then part, so they do not join.

The rule alone never decides the row. Two rules are printed twice: once with a fact in row 1, and once with a different fact in row 3. Pieces C and J give the two rules in the wrong order. The rules still join, so these pieces go in row 2. Many students put them in “Nothing follows” by mistake.

No simple guessing rule sorts more than 8 of the 12 pieces. A student who matches the words but never swaps the order of the two rules gets 10 right, and misses only the 2 pieces whose rules are in the wrong order.



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.
chooseyourlesson.com — 135 free geometry lessons.

Cut & Glue Sort

Which law gives a conclusion?

Name _____

Period _____

Date _____

Each piece has two given sentences. Decide which law gives a conclusion from them. If neither law fits, nothing follows. Glue the piece in the row that says it.

1. The Law of Detachment gives a conclusion.

The fact matches the if part of the rule.

2. The Law of Syllogism gives a conclusion.

The then part of one rule is the if part of the other rule.

3. Nothing follows.

Neither law fits the two sentences.

Cut & Glue Sort — the pieces

Cut along the dashed lines

Law of Detachment

If p, then q. ($p \rightarrow q$)
p is true.

So q is true.

Law of Syllogism

If p, then q. ($p \rightarrow q$)

If q, then r. ($q \rightarrow r$)

So: if p, then r.

Nothing follows

From "If p, then q" and "q is true."

From "If p, then q" and "p is not true."

The arrow goes one way only.

To join two rules, the middle part must be the same words. Similar words are not enough.

Cut out the 12 pieces. Read the two sentences on each one. Then glue the piece in a row on the other sheet.

A If two angles are vertical angles, then they are congruent. If two angles are congruent, then they have equal measures.	B If a number is a multiple of 10, then it is even. Kai's number is a multiple of 10.	C If a figure is not a polygon, then it is not a triangle. If a figure is a circle, then it is not a polygon.	D If two angles are vertical angles, then they are congruent. $\angle 3$ and $\angle 4$ are not vertical angles.
E If it rains on Saturday, then the game is canceled. It rains on Saturday.	F If the bell rings, then class is over. If class is over, then Sam eats lunch.	G If two angles are vertical angles, then they are congruent. $\angle 1$ and $\angle 2$ are vertical angles.	H If a number is a multiple of 10, then it is even. Lee's number is even.
I If a number is a multiple of 4, then it is even. If a number is not even, then it is odd.	J If a number is a multiple of 4, then it is even. If a number is a multiple of 8, then it is a multiple of 4.	K If a figure is not a polygon, then it is not a triangle. Figure K is not a polygon.	L If an animal is a dog, then it is a mammal. If an animal is a cat, then it is a mammal.



135 free geometry lessons: worksheets, worked answers and lesson plans.
chooseyourlesson.com

Cut & Glue Sort — answers

For the teacher

Row	What follows	Pieces
1	The Law of Detachment gives a conclusion. B: Kai's number is even. The fact "Kai's number is a multiple of 10" makes the if part of the rule true, so the rule's then part follows. E: The game is canceled. The fact "It rains on Saturday" makes the if part of the rule true, so the rule's then part follows. G: $\angle 1$ and $\angle 2$ are congruent. The fact "$\angle 1$ and $\angle 2$ are vertical angles" makes the if part of the rule true, so the rule's then part follows. K: Figure K is not a triangle. The fact "Figure K is not a polygon" makes the if part of the rule true, so the rule's then part follows.	B, E, G, K
2	The Law of Syllogism gives a conclusion. A: If two angles are vertical angles, then they have equal measures. The then part of the first rule is the if part of the second, so the rules join. C: If a figure is a circle, then it is not a triangle. The then part of the second rule is the if part of the first. So the rules join, even though they are given in the wrong order. F: If the bell rings, then Sam eats lunch. The then part of the first rule is the if part of the second, so the rules join. J: If a number is a multiple of 8, then it is even. The then part of the second rule is the if part of the first. So the rules join, even though they are given in the wrong order.	A, C, F, J
3	Nothing follows. D: The fact says that the if part is not true. H: The fact matches the then part of the rule, not the if part. I: The two middle parts, "is even" and "is not even," differ by the word not. L: The two rules have the same then part, so they do not join.	D, H, I, L