

MAZE



DEDUCTIVE REASONING: DETACHMENT AND SYLLOGISM

What Follows? Detachment and Syllogism

8 boxes · two given sentences in each · no dead ends

FREE

4

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. What follows?

- Nothing follows. **Go to box 3.**
- If a number is a multiple of 8, then it is even. **Go to box 7.**

Hint: Look for a part that is the then part of one rule and the if part of the other rule.

7

If an animal is a dog, then it is a mammal. Tom is a mammal. What follows?

- Nothing follows. **Go to box 2.**
- Tom is a dog. **Go to box 3.**

Hint: Find the part of the rule that the fact matches: the if part or the then part.

2

If a figure is not a polygon, then it is not a triangle. Figure M is not a polygon. What follows?

- Figure M is not a square. **Go to box 8.**
- Figure M is not a triangle. **Go to box 6.**

Hint: Find the part of the rule that the fact matches: the if part or the then part.

6

If a number is a multiple of 20, then it ends in 0. If a number is a multiple of 10, then it is even. What follows?

- Nothing follows. **Go to box 1.**
- If a number is a multiple of 20, then it is even. **Go to box 8.**

Hint: Compare the words of the two middle parts, one word at a time.

1. **Hand out page 3.** Students start at box 4. Nothing else is needed.
2. **Say this once:** *“Sometimes the right answer is: nothing follows. Check the words of each part.”*
3. **Check the row of box numbers at the bottom of the page.** A clean run is 4, 7, 2, 6, 1, 5, then Finish.

Student sheet page 3, one per student.

Answers page 4: the route, and the right answer in every box.

Every box tests one common mistake. Each box gives two sentences and two answers. One answer is what really follows, or “Nothing follows.” The other is the answer a student gets by making the mistake. A wrong answer sends the student to a box off the route (3 and 8) or back one step. Every box has a question, so no student is ever stuck.

“Nothing follows.” is right in 5 boxes and wrong in 1. In box 4, the two rules are given in the wrong order, but they still join. Many students answer “Nothing follows” there. So a student who always chooses “Nothing follows,” or never chooses it, goes wrong.

In box 2, the wrong answer is true. “Figure M is not a square” is true in real life. It does not follow from the two sentences, because the rule says triangle, not square. In box 6, the middle parts “ends in o” and “is a multiple of 10” mean nearly the same thing. But the words are different, so the rules do not join.

Guessing does not reach Finish. Every simple guessing rule, such as always taking the first answer, goes wrong within the first three boxes of the route. The hints say what to look at, never the answer.



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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Name _____

Period _____

Date _____

Start at box 4. Read the two sentences. Choose what follows from them. Then go to the box it names.

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.

1

If the bell rings, then class is over. If class is over, then Sam eats lunch. What follows?

- If Sam eats lunch, then the bell rings. **Go to box 6.**
- If the bell rings, then Sam eats lunch. **Go to box 5.**

Hint: Look for a part that is the then part of one rule and the if part of the other rule.

2

If a figure is not a polygon, then it is not a triangle. Figure M is not a polygon. What follows?

- Figure M is not a square. **Go to box 8.**
- Figure M is not a triangle. **Go to box 6.**

Hint: Find the part of the rule that the fact matches: the if part or the then part.

3

If two angles are vertical angles, then they are congruent. $\angle 3$ and $\angle 4$ are not vertical angles. What follows?

- Nothing follows. **Go to box 7.**
- $\angle 3$ and $\angle 4$ are not congruent. **Go to box 4.**

Hint: Find the part of the rule that the fact matches: the if part or the then part.

4

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. What follows?

- Nothing follows. **Go to box 3.**
- If a number is a multiple of 8, then it is even. **Go to box 7.**

Hint: Look for a part that is the then part of one rule and the if part of the other rule.

5

If two angles are vertical angles, then they are congruent. If two angles are not congruent, then they do not have equal measures. What follows?

- Nothing follows. **Go to Finish.**
- If two angles are vertical angles, then they do not have equal measures. **Go to box 1.**

Hint: Check each not in the two sentences.

6

If a number is a multiple of 20, then it ends in 0. If a number is a multiple of 10, then it is even. What follows?

- Nothing follows. **Go to box 1.**
- If a number is a multiple of 20, then it is even. **Go to box 8.**

Hint: Compare the words of the two middle parts, one word at a time.

7

If an animal is a dog, then it is a mammal. Tom is a mammal. What follows?

- Nothing follows. **Go to box 2.**
- Tom is a dog. **Go to box 3.**

Hint: Find the part of the rule that the fact matches: the if part or the then part.

8

If a figure is a square, then it is a rectangle. If a figure is a square, then it is a rhombus. What follows?

- If a figure is a rectangle, then it is a rhombus. **Go to box 2.**
- Nothing follows. **Go to box 6.**

Hint: Look for a part that is the then part of one rule and the if part of the other rule.

Write each box number here, in order, as you go. Start with 4.

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Maze — answers

For the teacher

The route: $4 \rightarrow 7 \rightarrow 2 \rightarrow 6 \rightarrow 1 \rightarrow 5 \rightarrow \text{Finish}$. Boxes 3 and 8 are off the route. A student reaches them only after a wrong answer.

Box	Place on the route	Right answer, and why	Next box
1	step 5	If the bell rings, then Sam eats lunch. The two rules join in the order given. The other answer turns the chain around.	box 5
2	step 3	Figure M is not a triangle. This is the Law of Detachment. The other answer is true in real life, but it does not follow.	box 6
3	off the route	Nothing follows. The fact says that the if part is not true, so nothing follows. The other answer uses the inverse.	box 7
4	step 1	If a number is a multiple of 8, then it is even. The two rules are given in the wrong order, but they still join.	box 7
5	step 6	Nothing follows. The two middle parts differ by the word not, so the rules do not join.	Finish
6	step 4	Nothing follows. The two middle parts, “ends in 0” and “is a multiple of 10,” mean nearly the same thing. But the words are different, so the rules do not join.	box 1
7	step 2	Nothing follows. The fact matches the then part, not the if part, so nothing follows. The other answer uses the converse.	box 2
8	off the route	Nothing follows. The two rules have the same if part, so they do not join.	box 6