



## Bivalence and the Excluded Middle: Lesson Plan

Topic	
Two fundamental and distinct principles of logic are the principle of bivalence and the principle of the excluded middle. The principle of bivalence states: <i>Every statement is true or false</i> . The principle of the excluded middle states: <i>For any statement P, P or not-P must be true</i> .	
Possible subjects/classes	Time needed
Social studies, Civics, Psychology, English	30-35 minutes
Video link:	
<a href="https://academy4sc.org/topic/bivalence-and-the-excluded-middle-true-false-or-neither/">https://academy4sc.org/topic/bivalence-and-the-excluded-middle-true-false-or-neither/</a>	
Objective: <i>What will students know/be able to do at the end of class?</i>	
Students will be able to... <ul style="list-style-type: none"> <li>• Define bivalence and the excluded middle.</li> <li>• Explain why it's important to be aware of these concepts in daily life.</li> <li>• Apply these concepts to a real-life scenario.</li> </ul>	
Key Concepts & Vocabulary	
Oversimplification, Generalization	
Materials Needed	
Worksheet	
Before you watch	
Ask students to answer a number of questions that don't really have yes or no answers like "are you tall?" or "Is a book small?" or "Is the desk big?". Ask students who answer yes or no to explain their answers. If students say that it depends, ask them to elaborate.	



### While you watch

Complete the *While You Watch* section of the Worksheet.

### After you watch/discussion questions

1. Think of a time you've encountered a cutoff for something (e.g., weight requirement for wrestling, height requirement to ride a roller coaster, etc.). Do you think the requirement is justified? Is there another way in which the goal of the requirement could be met while respecting the degreed nature of the measured thing (e.g., weight, height, etc.)?
2. Consider the GPA cutoff policies used by some colleges and graduate schools. Do you agree or disagree with these policies? Explain why or why not.

### Activity Ideas

- Think of a book or movie you think is good in some ways and bad in others. Create a T-chart, and list the good features in one column and the bad features in the other. Then, write a one-sentence review of the book or movie that captures the features you think are most worth noting—good and bad.
- Consider a social issue or current event that you care about. What do opposing sides say about the issue? Do they fall into the trap of oversimplifying the issue? Try to make an argument for or against the issue while avoiding the use of bivalence and the excluded middle.

### Sources/places to learn more

1. Dominic Hyde and Diana Raffman, "Sorites Paradox," *The Stanford Encyclopedia of Philosophy* (Summer 2018). See <https://plato.stanford.edu/entries/sorites-paradox/>
2. Frederick P. Miller, Agnes F. Vandome, and John McBrewster, *Law of Excluded Middle* (Alphascript Publishing, 2010).
3. Lambert M. Surhone, Miriam T. Timpledon, and Susan F. Marseken, *Principle of Bivalence* (Betascript Publishing, 2010).