

## Lesson: Boolean Operators

### Description

The purpose of this lesson is to teach students how to use the [Boolean operators](#) of "AND", "OR" and "NOT" [or "AND NOT"] in online searching to either narrow or expand the results. These Boolean operators establish a relationship between the [keywords](#)/concepts in a search and thus modify the results from that search.

- A searcher can specify that terms must appear in the items retrieved by using the AND operator.
- Using the operator AND between keywords will limit the results of a search because all the keywords have to be present in order for an item to be retrieved.
- Using the OR operator results in either or both of your search terms appearing in your results.
- Using the OR operator will result in a larger number of retrieved items and therefore expands the search.
- The NOT (or AND NOT) operator forbids the word after it from appearing in the items resulting from your search.
- NOT or AND NOT thus narrows or limits a search by excluding the keyword immediately following it.

Boolean operators are named after George Boole, an Englishman, who invented them as part of a system of logic in the mid-1800's.

[Learning Outcomes](#) | [Suggested Procedures](#) | [Assessment](#)

Materials for this **Online** lesson:

Computer with Internet access  
Venn Diagrams  
Video projection device/Screen  
Whiteboard/markers

Time allotment: 30 minutes

Grade Level: Grade 4-12

[Information Literacy Standard:](#)

1. The student who is information literate accesses Information efficiently and effectively.

### Learning Outcomes

Students will know the definition of Boolean logic and Boolean operators.  
Students will be able to use Boolean operators to connect key ideas and conduct searches.

## Set-up

- Have projection screen set up
- Have computer set up and Internet connectivity established (Note: If computer, video projector, and screen are unavailable, transparencies and/or handouts may be substituted.)

## Suggested Procedure

The teacher writes the three Boolean operators, AND, OR, and NOT on the board. The teacher explains that these terms are used to narrow or expand the results in online searching.

The teacher tells the students that they are going to help demonstrate the meaning of each Boolean Operator.

- The teacher should ask all students who are wearing jeans to stand up. Count the number of students standing.
- The teacher now asks that students who are wearing jeans AND blue shirts to remain standing. All others should sit down. Count the number of students still standing. There should be fewer students standing.
- The teacher should explain that using the AND operator has narrowed the results.
- Now the teacher asks that students wearing jeans OR blue shirts should stand. All the students wearing jeans should stand, all the students wearing blue shirts should stand, and all the students wearing jeans and blue shirts should stand. Count the number of students standing. This should be a larger number than before. The OR operator has expanded the results.

To demonstrate the NOT operator, the teacher asks all students wearing jeans but NOT sneakers to stand. The NOT operator has excluded all students wearing sneakers. It has, therefore, limited the results.

The teacher should demonstrate using these operators in an online search. The [Advanced Search of Google](#) allows the searcher to find results:

1. with all of the words (AND)
2. with the exact phrase
3. with any of the words (OR)
4. without the words (NOT)

The following keywords can be used as an example: dolphins AND whales, dolphins OR whales, dolphins NOT Miami.

## **Student Work**

Students should work in pairs or small groups to determine [keywords](#) and their relationships about a [topic they are researching](#) and search online.

The teacher provides students with blank Venn diagrams.

- Students write in their keywords and shade in the area that represents each of the 3 Boolean Operators (AND, OR, NOT).
- Have students conduct their search online.

## **Assessment**

After students have completed the topic worksheet, they should present their work to another group or the class.