



Welcome to the Boole2School Worksheet- 1st and 2nd Years

Section 1 - George Boole

1. Who is George Boole?

2. Where did he teach in Ireland?

3. Why are we celebrating him this year?

Section 2 - Logic

4. Give an example of a logic argument using assumptions and conclusions:

5. Decide which of the following is a proposition and which is not:

- (1) What time is it?
- (2) It's time to have some fun.
- (3) This statement you're reading just now is false.

Section 3 - How do we use Boolean Logic?

6. Give an example of the way Boolean logic is used in your everyday life:

Section 4 - Truth Tables

7. Class exercise:

For every statement P , one can find an opposite $\text{NOT}(P)$ by the following rules: whenever P is TRUE, then $\text{NOT}(P)$ is FALSE. Whenever P is FALSE, then $\text{NOT}(P)$ is TRUE.

Let P be the statement: "Anna **AND** Brian are happy."

Then $\text{NOT}(P)$ is: _____

Fill out the table with true or false depending on what you see you classmates do

Stages	Statements	
	Anna AND Brian are happy.	Anna OR Brian is NOT happy.
1) Anna 😊, Brian 😞.		
2) Anna 😊, Brian 😊.		
3) Anna 😞, Brian 😊.		
3) Anna 😞, Brian 😞.		

8. One day the famous scientist Dr. Doom makes a public announcement:
 "IF there will be an earthquake tomorrow, THEN this entire building will fall down."
 The next day, everybody talks about how Dr. Doom was so wrong.
 What happened in the meanwhile?

Let's call the proposition "there will be an earthquake tomorrow" by the letter P and "this entire building will fall down" by the letter Q .

In Boolean Algebra, $\text{NOT}(\text{IF } P, \text{ THEN } Q)$ can be written as:

Section 5 – Puzzles

8. ON, OFF and IN-BETWEEN...

You are standing outside of a room. The room has no windows and the door is closed. Inside the room is a light bulb. Outside of the room there are three light switches. One of these switches belongs to that light bulb. The light bulb is not lit and the switches are in off state. You can turn them on and off as many times as you like but only enter the room once. How can it be determined which of these switches is connected to the light bulb?



9. The First Sudoku Toilet Paper

Inspector Simon Mart of Scotland Yard was looking at the interrogation statements of 3 well known criminals. It had already been established that one of them had stolen the Very First Roll of Sudoku Toilet Paper, which of course is an object of immense historical value. It also had already been established that of the four suspects, exactly one spoke the truth.

Inspector Simon Mart looked at their statements:

Albert: I am innocent.

Bill: Charles stole it.

Charles: I am innocent.

Who stole the toilet paper?



Hint: Consider assuming the guilt of a suspect and then evaluating the truth of all statements based on this assumption. Try filling out this table with TRUE or FALSE.

	Charles is Guilty	Bill is Guilty	Albert is Guilty
Albert: I am innocent.			
Bill: Charles stole it.			
Charles: I am innocent.			

10. Einstein puzzle with houses

There are four bungalows in our cul-de-sac, numbered 1 through 4 from left to right. They are made from these materials: straw, wood, brick and glass.

Mrs Scott's bungalow is somewhere to the left of the wooden one and the third one along is brick. Mrs Umbrella owns a straw bungalow and Mr Tinsley does not live at either end, but lives somewhere to the right of the glass bungalow. Mr Wilshaw lives in the fourth bungalow, and the first bungalow is not made from straw.

Each person lives in a different house made of a different material from all the others. Who lives where, and what is each person's bungalow made from?

Please use the table provided for your answer

House	#1	#2	#3	#4
Owner:				
Built of:				

Section 6 – Follow-up

If you found this lesson particularly enjoyable, you might wish to try out

- Some of the puzzles on this website:

<https://justpuzzles.wordpress.com/category/logic/>

- some of the lesson plans linked here:

<http://euclid.ucc.ie/pages/MATHENR/ScheduleJuniors2015-2016.pdf>

