Lesson_08 Simple Logic Gates A

Simple logic gates

Lesson 2.1.11 Define the Boolean operators: AND, OR, NOT, NAND, NOR and XOR

SWBAT/IB Teaching Standard for Assessment: Problems will be limited to an output dependent on no more than three inputs. The gate should be written as a circle with the name for the gate inside it. (see IB syllabus for examples)

Do Now / Coding Component (2 minutes)
Part A. Introducing the Lesson (5 minutes) **Teacher will briefly introduce the terms AND, OR, NOT, NAND, NOR, and XOR and the IB standards for assessment. Class will segue into the video lesson below.**

Part B. Student Centered Activity (20 minutes)

Video file: https://youtu.be/Uvl-AMAtrvE from Professor Brailsford / Computerphile. (10 minute video)

Part C. Whole Group Lesson Component /Harkness Protocol (15 minutes)

Part D. Optional Tasks

Resources:

https://www.elprocus.com/basic-logic-gates-with-truth-tables/

https://www.geeksforgeeks.org/logic-gates-definition-types-uses/

http://codingatschool.weebly.com/task-2-logic-gates.html

Lesson_09 Simple Logic Gates B

Lesson 2.1.12 Construct the truth tables using the Boolean operators listed above.

Lesson 2.1.13 Construct a logic diagram using AND, OR, NAND, NOR and XOR gates.

SWBAT/IB Teaching Standard for Assessment: Problems will be limited to an output dependent on no more than three inputs. The gate should be written as a circle with the name for the gate inside it. (see IB syllabus for examples)

Do Now / Coding Component (2 minutes)
Discuss and jot down what does the following code do and what are the outputs.

```
//parameters a and b can only have the values of 0 or 1
public boolean logic1(int a, int b){

     if(!(a==b)) return true;

  else return false;
}
```

Part A. Introducing the Lesson (5 minutes)

Part B. Student Centered Activity. (20 minutes)
The details will follow in this assessment statement and the next, but as an overview, and as a very useful "second spiral" just before a test/exam, students will analyze and research the following questions..
Question:
(a.) Define the AND boolean operator according to Boolean logic.
(b.) Define the AND boolean operator as it is used in compound conditions in the Java programming language.
(c.) Define the AND boolean operator by truth table.
(d.) Define the AND logic gate used in microprocessors.

Part B. Student Centered Activity. (20 minutes)

Research Tasks (includes ATL Components - Research, Communication, Time Management)
Students in small groups will be assigned to prepare 5-10 minutes discussions on the following
topics:

Group 1: Research and discuss the diagram, truth table and operations of the AND gate.

Group 2: Research and discuss the diagram, truth table and operations of the OR gate.
Group 3: Research and discuss the diagram, truth table and operations of the NOT gate.
Group 4: Research and discuss the diagram, truth table and operations of the XOR gate.

Part C. Whole Group Lesson Component /Harkness Protocol (15 minutes)

Each of the groups will present their work in 2-3 minute presentation blocks.

Part D: Assignment/HW

Assigned reading for next day discussion -
https://www.anandtech.com/show/1647/10