**Logic Gates in Minecraft**

1. **If you have Minecraft and a laptop, download the map here: http://www.rose-hulman.edu/class/csse/catapult/2016-S1/Lectures/Galluzzi/**
2. **If you aren’t sure how to open it, instructions for installing a game save are here: http://minecraft.gamepedia.com/Tutorials/Map\_downloads**
3. **LOGIC GATES**
   1. What are logic gates?
   2. In the real world they are made with transistors.
   3. We will see them implemented in redstone in Minecraft.
   4. They are implemented differently in redstone than in transistors!
4. **TRUTH TABLES**
   1. Describe the desired behavior of our device
   2. 1 is True/high current/on, 0 is False/low current/off
5. **NOT GATE** (Truth table and implementation)
6. **OR GATE** (Truth table and implementation)
7. **NOR GATE** (Truth table and implementation)
8. **AND GATE** (Truth table and implementation)
9. **CHAINING GATES** (did this with NOR—the output of one becomes input to the other)
10. **SOP Form**
11. **THE ADDER** (Truth table, gates, and implementation)
12. **MEMORY CIRCUIT** (Go over how this works—difficult to reset!)
13. **THE S-R LATCH—A SETTABLE MEMORY CIRCUIT** (Change with ORs so we can reset output)
14. **THE D LATCH—CHANGING INPUT ONLY WHEN ENABLE IS HIGH** (Invert input for other side, add clock input)
15. **THE D FLIP FLOP—HOLDING INPUT AND CHANGING ONLY ON CLOCK EDGE** (Now we only have this when clock changes—other times it is stable)