Create & Learn

STEM Learning at the Pace of Innovations

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How to Use this Deck

This slide deck is set up as a visual aid for teaching a group of students how binary works using Minecraft Redstone features.

Each slide has teacher notes that help explain the visual steps and addresses any possible issues students may have with their building projects.

The full Lesson Plan for this activity can be found here:

Learn How Binary Works with Computers using Minecraft - Lesson Plan

PDF Version of this deck can be downloaded at

Learn How Binary Works with Computers using Minecraft Create & Learn.pdf

Our website - www.create-learn.us.

Contact us at hour-of-code@createandlearn.us if you have any questions

Notes about access to this deck & more free programs

This deck has been shared with public. If your colleague has trouble accessing it, she/he might need to login to a Google account to access or see if their domain is blocking access.

We have another awesome free program where any school teachers can request us to teach live online classes just for your students. You can choose from 10 different topics. We run it all year round. https://www.create-learn.us/hour-of-code

To learn more about us, visit www.create-learn.us

Email hour-of-code@createandlearn.us for more information.

Kids can join free live online 1-hour Minecraft classes

Minecraft Coding Intro - TimeTravel! (free event)

Share

Grades 3-6

Does your child love Minecraft? This awesome 1-hour free event will introduce your child to another dimension of Minecraft - Learn Coding!. We will setup Minecraft Education first and then get everyone started on a self-guided tutorial that teaches basics of block coding on Minecraft. Your child will be introduced to Minecraft coding by completing a series of challenges with code to save the future by solving mysterious mishaps in time.

Learn more here

Creative Minecraft Building (free event)

Share

Grades 2-5

Join this free, live virtual event to start creating with one of the most powerful elements in Minecraft - Redstone. Through a series of fun activities and puzzle-solving, students will be introduced to how different power sources such as Redstone blocks, torches, and switches can be used to power blocks around them in different ways. These skills will form the foundation of creating more advanced structures that can be powered up or automated. The same event is run once every month.

Learn more here

Minecraft Engineering

Learn How Binary Works with Computers using Minecraft

Let’s Experience: Redstone Computer

Redstone computer

Takes input from players

Can do math calculations!

But how does it work??

Let’s Explore: Binary

Everything in Computers is represented as combinations of 0s & 1s, also called **Binary**

Let’s Explore: Binary

How do we count in decimal?

07
08
09
10
11
12
13
…

How do we count in binary?

1
10
11
100
101
110
111
…

Binary	Decimal
0	0
1	1
10	2
11	3
100	4
101	5
?	6
?	7
?	8

Let’s Build: Manual Binary Switches

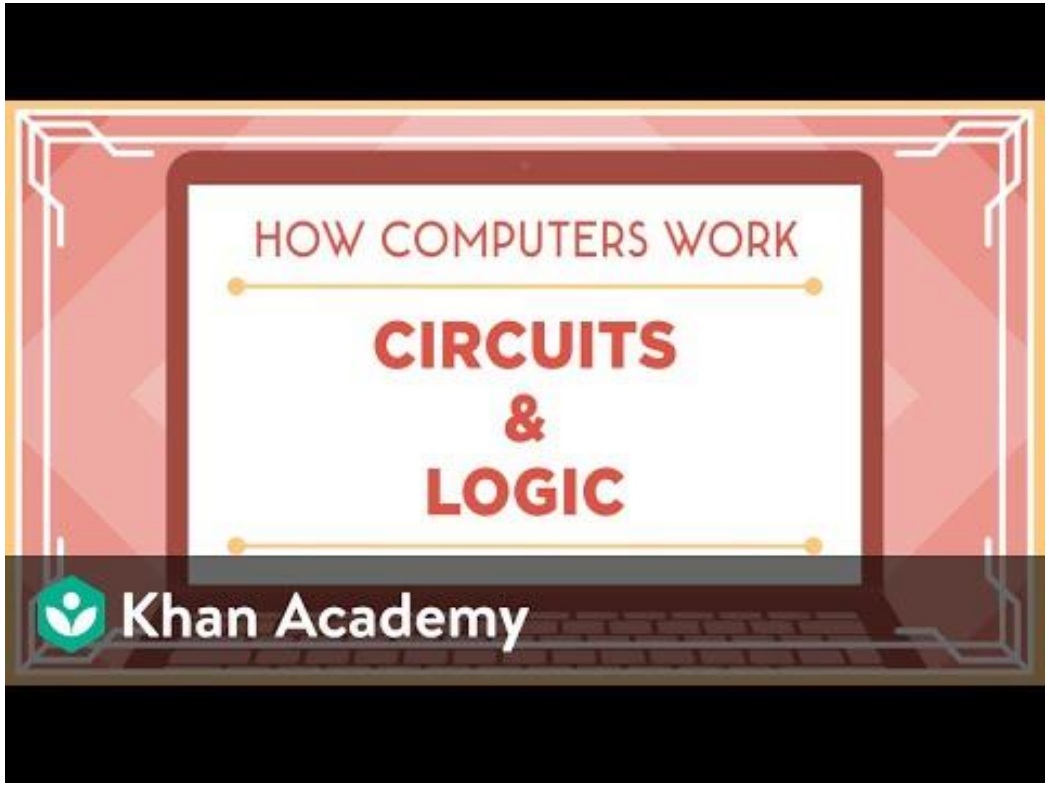
Build a simple row of lamps with levers to indicate binary: 0 is light off, 1 light on

Let’s represent the following numbers in binary:

Decimal:	Binary:
2	10
5	101
9	1001

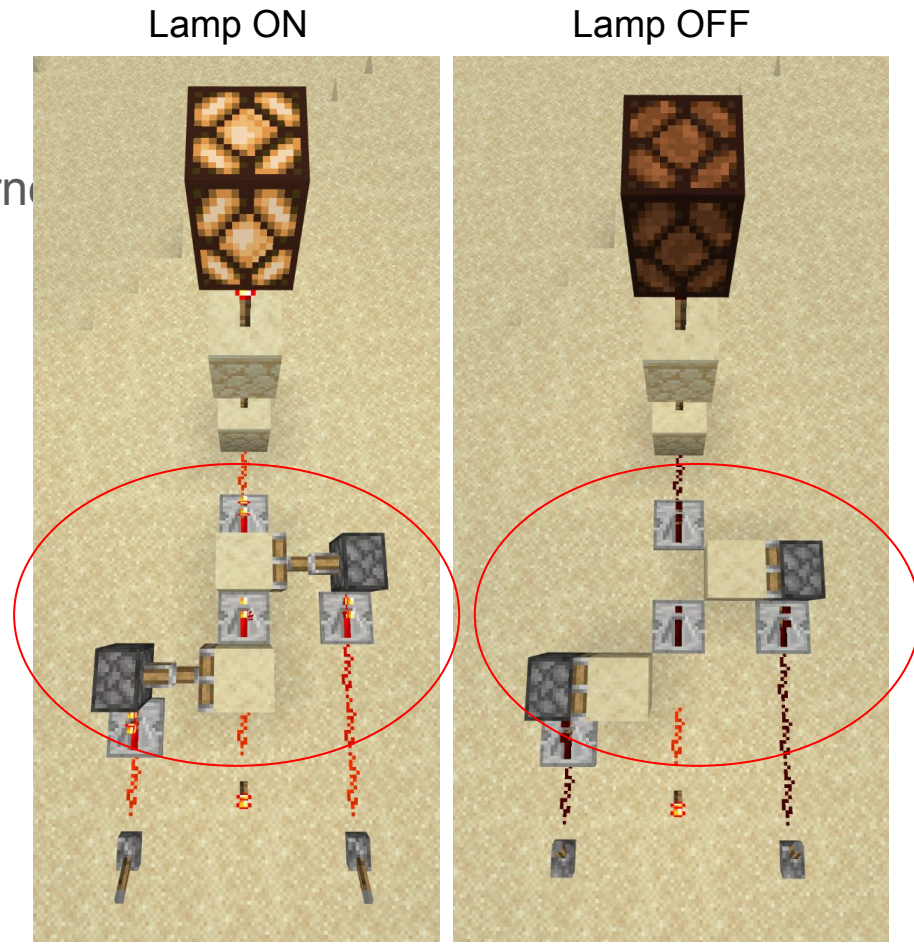
Let’s Explore: AND Gate

AND logic gates need TWO powered inputs to create ONE powered output



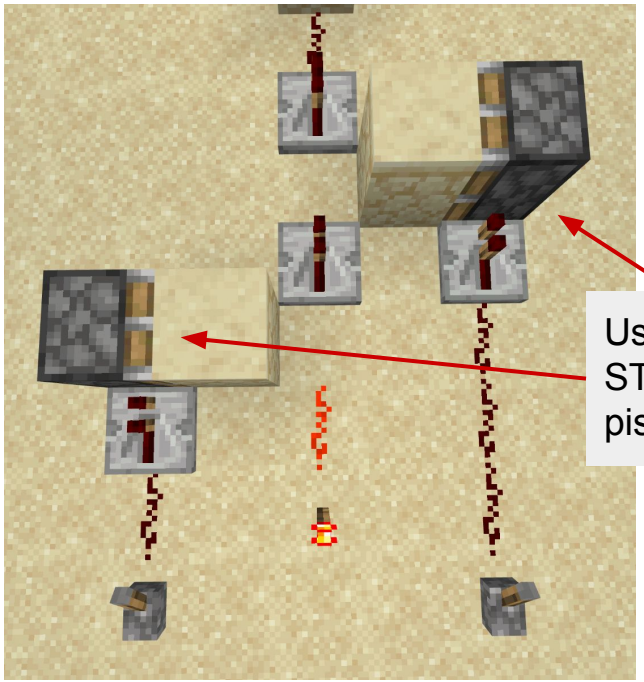
Let’s Build: AND Gate

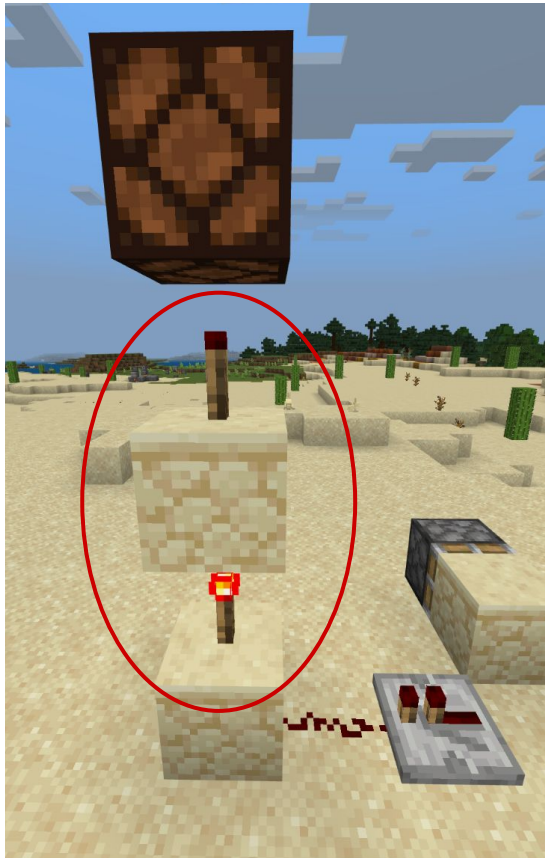
AND means **both** switches must be turn
on to light up lamp



Let’s Build: AND machine

Step 1: create both circuits that meet in the middle





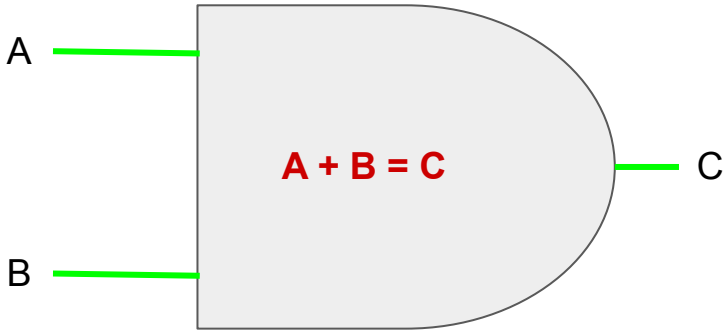
Step 2: Create the lamp tower - note TWO redstone torches are needed.

Flip on your levers…

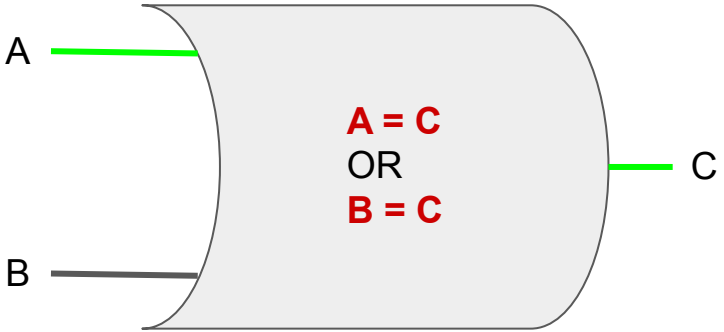
Share your machines!

AND Gate, OR Gate Compared

How can we make it an OR gate?



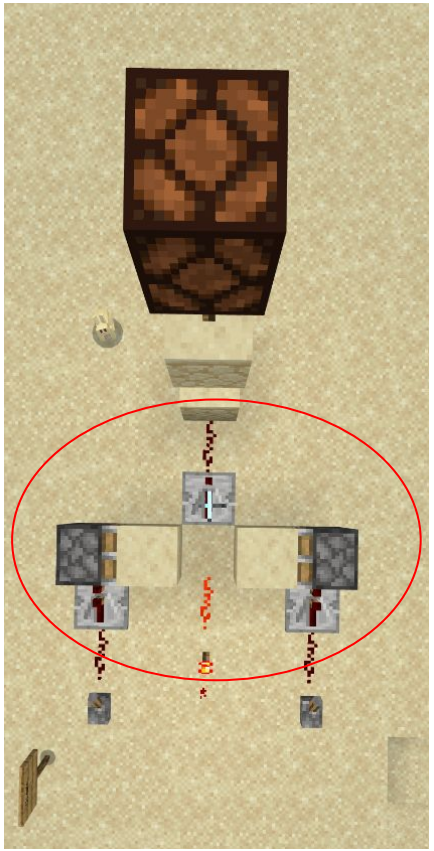
AND gate needs **both** A and B lines powered to make C powered.

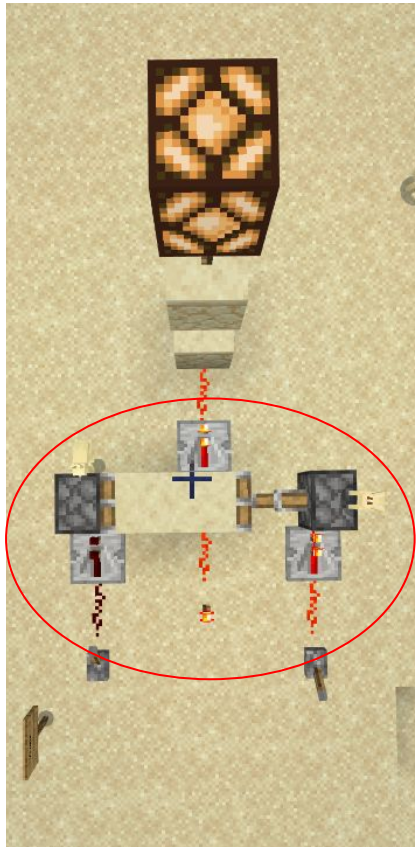


OR gate needs **either** A and B lines powered to make C powered.

Let’s Build: OR machine

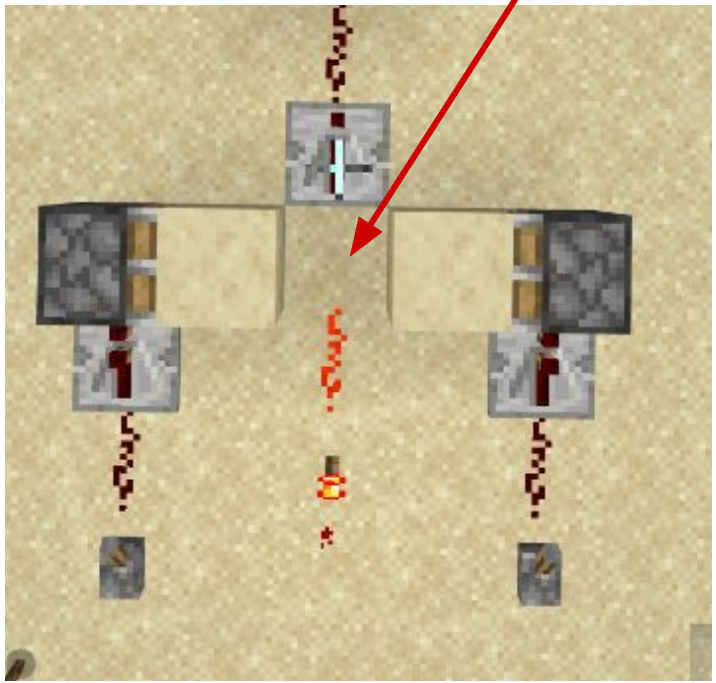
OR means **either** switch must be turned on to light up lamp





Let’s Build: OR machine

Step 1: create circuits so the sticky piston ends up “on” in the same place for either one



Step 2: Same setup as the AND gate

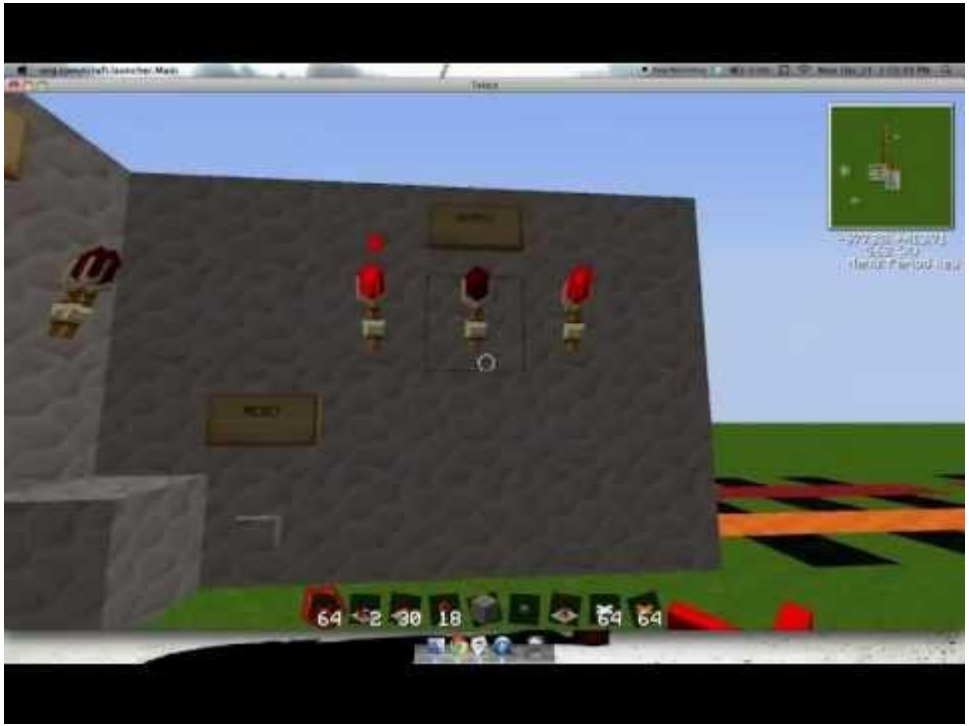
Share your machine!

Let’s Experience: Redstone Binary Adding Machine

Uses redstone circuits to provide or remove power

Comparators turn circuits on/off depending on what values are added

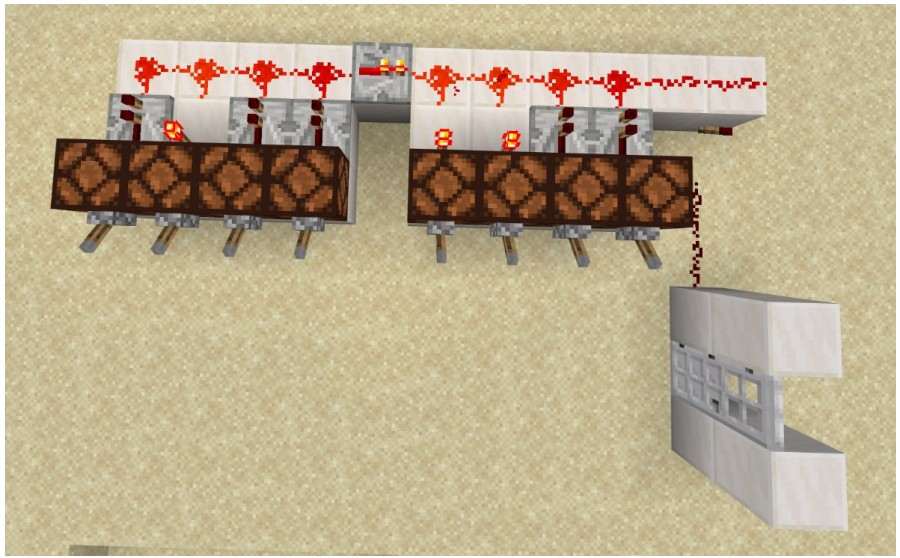
This system is using AND and OR gates!



Let’s Build: 8-Digit Binary Combination Lock

This sets only certain levers to open the door when combined

Share your lock builds!



What binary number is this combination?

01001100

Recap

Binary: Only uses 0 and 1, represents all data inside a computer

AND gate: Both levers must be ON to turn on the circuit

OR gate: Either lever must be ON to turn on the circuit

Binary Lock: Creates a “key code” to open a door or move a piston.