Merchant Venturers School of Engineering

Outreach Programme

My Workshop Title

Part 1 of X: My Worksheet Name

Created by

My Short Name

Organised by

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Notes to Teachers & Helpers

- This workshop is intended to last X to X$\frac{1}{2}$ hours.
- This workshop is intended for ages X$^+$ (years X$^+$).
- The content is intended to be learnt through XYZ (e.g. self-directed individual or pair game play), using this worksheet as a guide.
- The learning platform is X (e.g. Minecraft, the popular block-based building game).
- There are a number of versions of X (e.g. the Minecraft game), not all of which are compatible with this workshop:

X for Windows or Mac	This version **is compatible**. This is the normal version downloadable from the X website.
X for RaspberryPi	This version **is not compatible**. This version does not include the required X features.
X Education Edition	This version **is compatible**. You may wish to set this up with your class before we arrive to run the workshop.

- Students should already be comfortable playing(/using) X (e.g. Minecraft).
  This means they should be able to XYZ (e.g. move easily, place and destroy blocks, use items, access the inventory (in Creative mode) and be familiar with the various block types available in the game).
- This workshop teaches the following skills:
  Items marked with an asterisk are directly relatable to the National Curriculum.
  - \- E.g. XYZ
  - \- Placing, destroying and designing basic circuits using Redstone in Minecraft
  - * Basic logic equations
  - * Logic gates: NOT, OR, NOR, AND
  - * Principles of digital design: Combining logic gates

1 Introduction

Hi! In this short workshop we're going to try to introduce some of the concepts that XYZ engineers use every day to design everything from your X, to Y to Z.

Let's get started. Each section is made up of three parts:

Actions Stuff for you to do. They are highlighted in blue.

Notes Notes about important stuff you need to be aware of (and possibly remember!). They are highlighted in red.

Questions Questions you should try to answer. Sometimes you'll need to write things down; other times you'll need to build something in the game. They are highlighted in yellow.

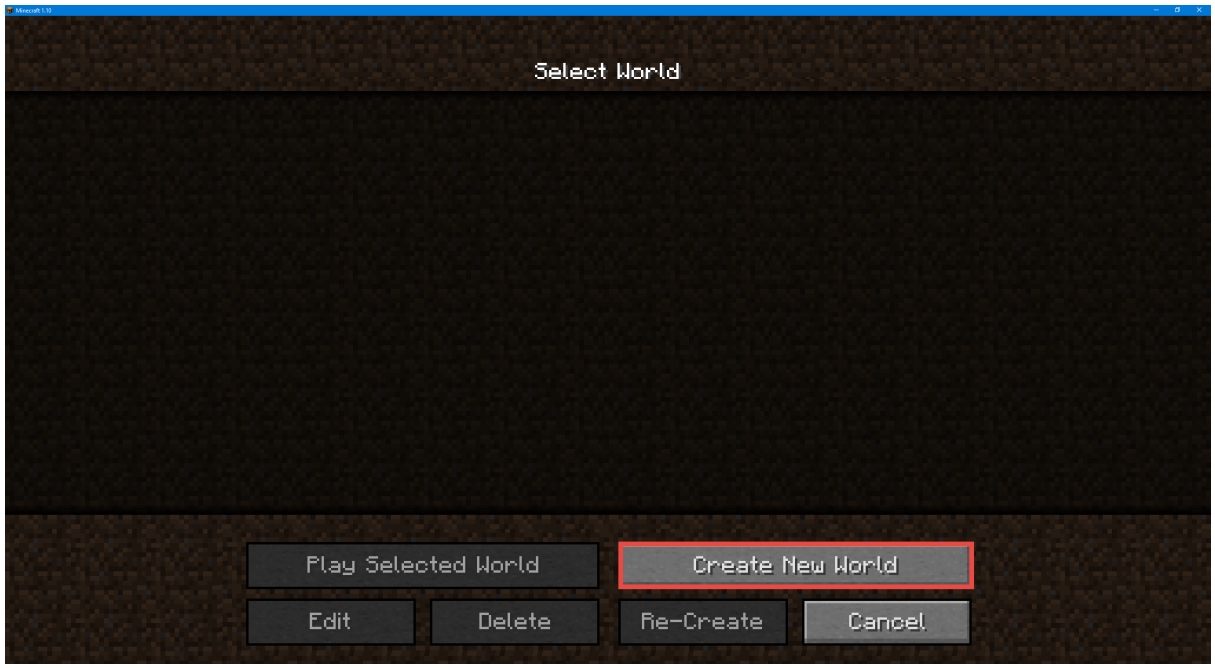
Ask a helper or the teacher to check your answers.

Goals Stuff you should have completed at the end of each section. They are highlighted in green.

We'll also write some information between parts and include plenty of screenshots to help you out.

Actions

1. Open Minecraft
2. Log in
3. Go to Single Player



The Minecraft Single Player World List

Notes

Click "Create New World"

Actions

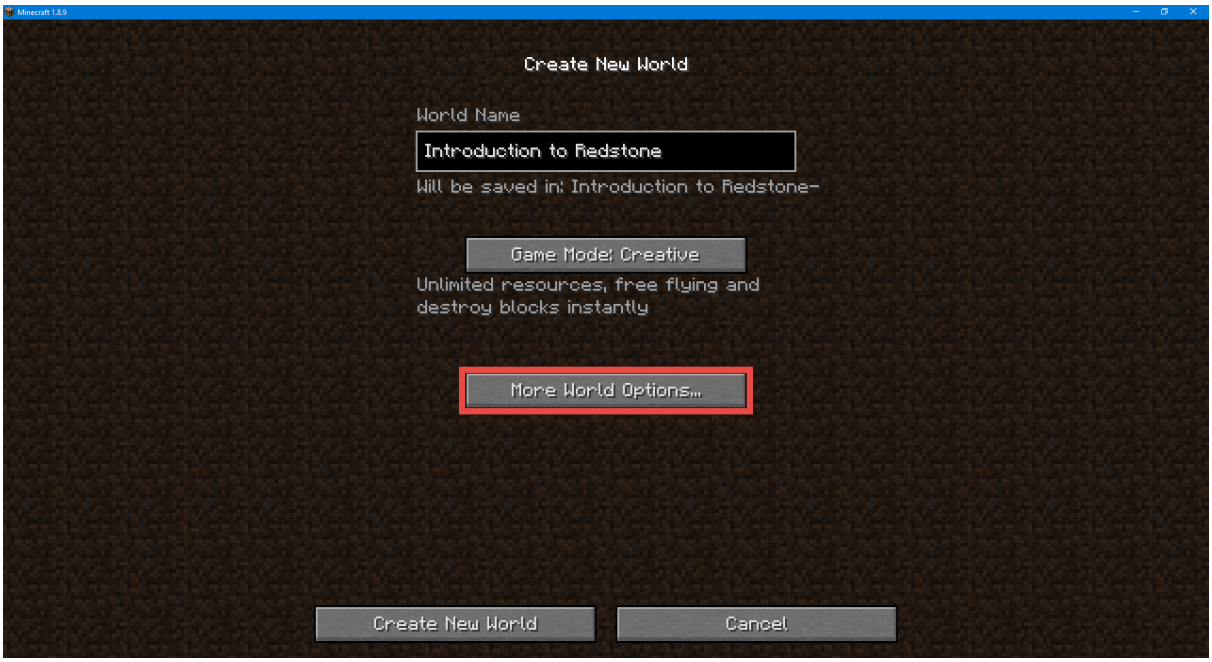
4. Create a new Creative world with the following setup:

Game Mode	Creative
World Type	Superflat
Preset	Redstone Ready
Generate Structures	ON
Allow Cheats	ON

Goals

You should now know how to:

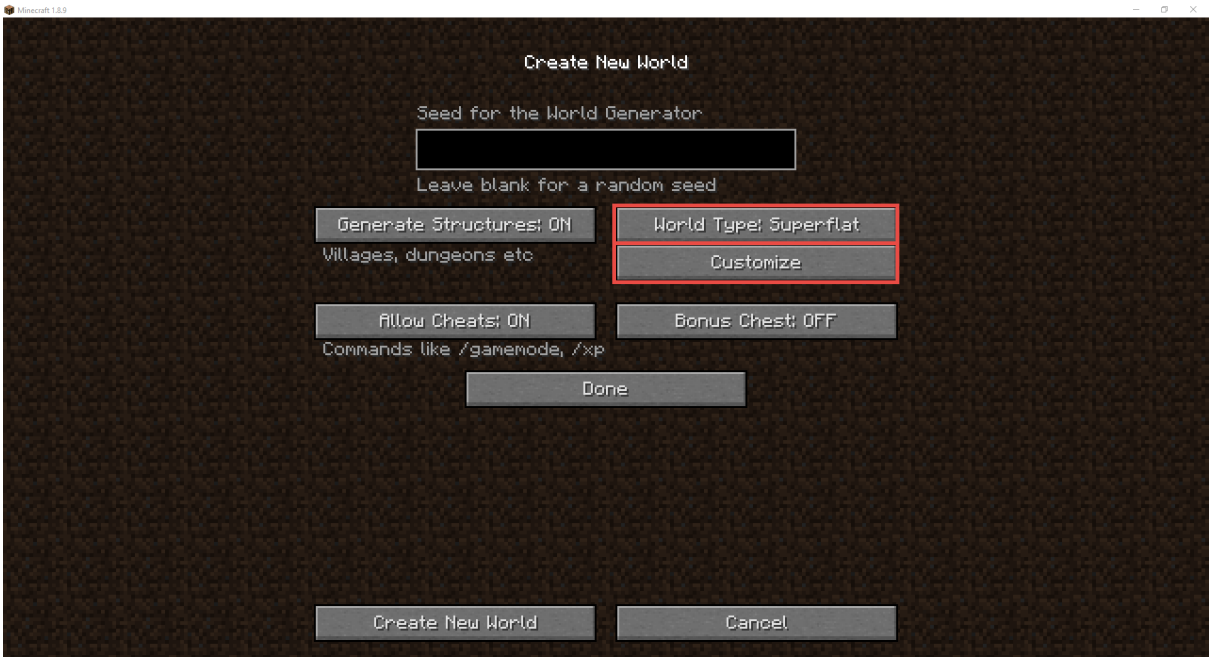
- Get Redstone from the inventory
- Place Redstone dust to form a wire
- Power and unpower Redstone wires using Redstone torches
- Boost Redstone power using a repeater



Create New World (Stage 1)

Notes

Click "More World Options..."

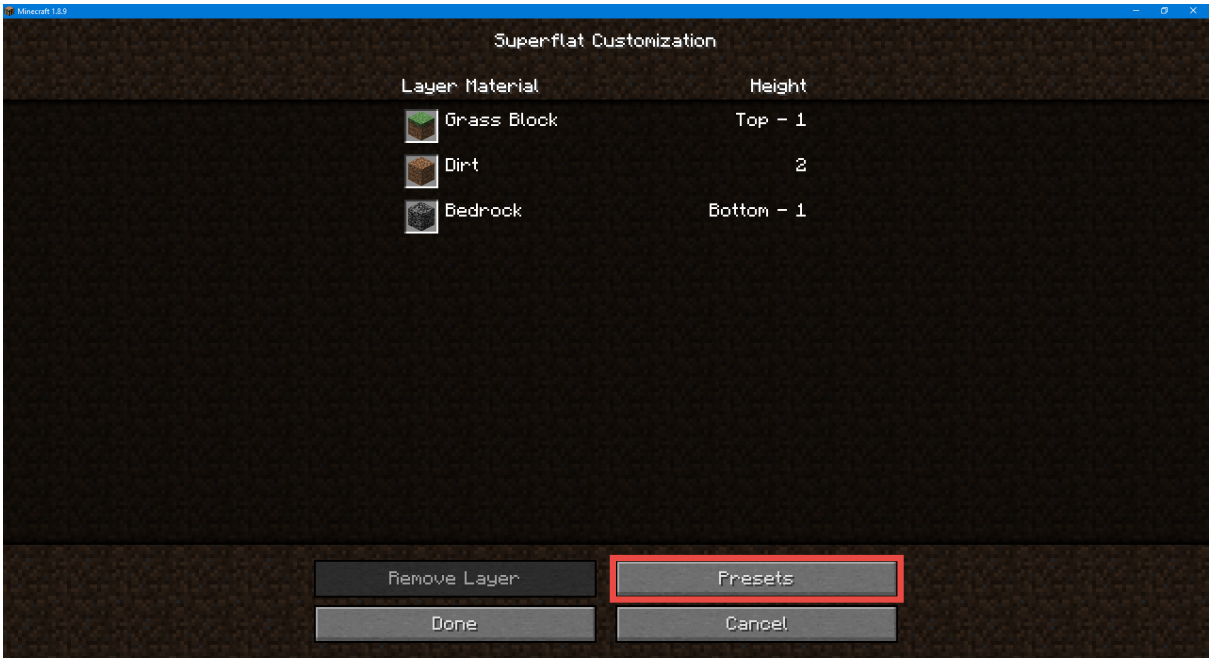


Create New World (Stage 2)

Notes

Set "World Type" to "Superflat" by repeat clicking it.

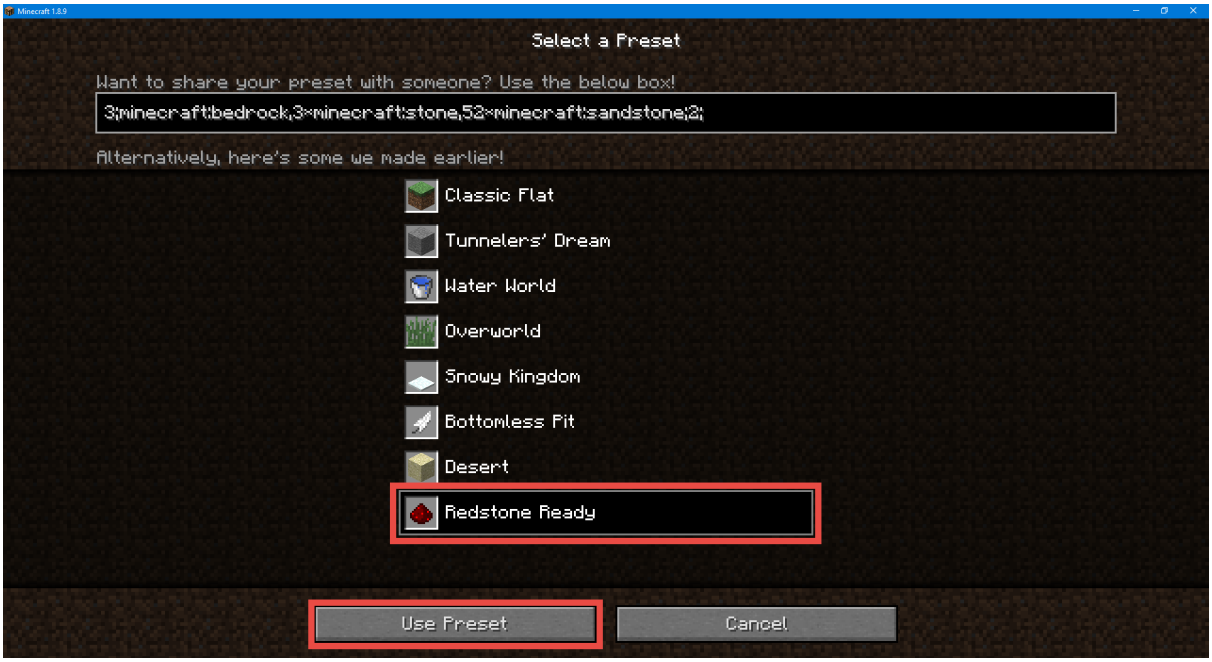
Then click "Customize"



Superflat Customisation

Notes

Click "Presets"



Select Redstone Ready preset (bottom of list)

Notes

Scroll to the bottom and click "Redstone Ready"

Finally, click "Use Preset" then "Done" then "Create New World".

Wait for the world to load.

Goals

That's it for the introduction - you should now have created your new world ready for Redstone building.

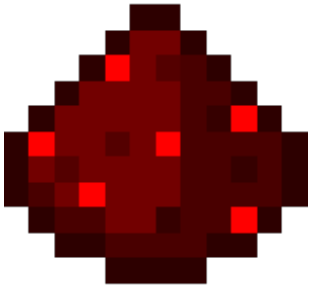
You can build Redstone in any type of world, but Redstone Ready worlds make it much easier.

Questions

1. What kind of block is the Redstone ready world made from?
2. How many blocks vertically downwards are there till you reach the bedrock?

2 Placing and Powering Redstone

Let's get started with Redstone. It looks like this:



Redstone Dust

You can get it from the Redstone tab of the Inventory:

Redstone tab of the Inventory

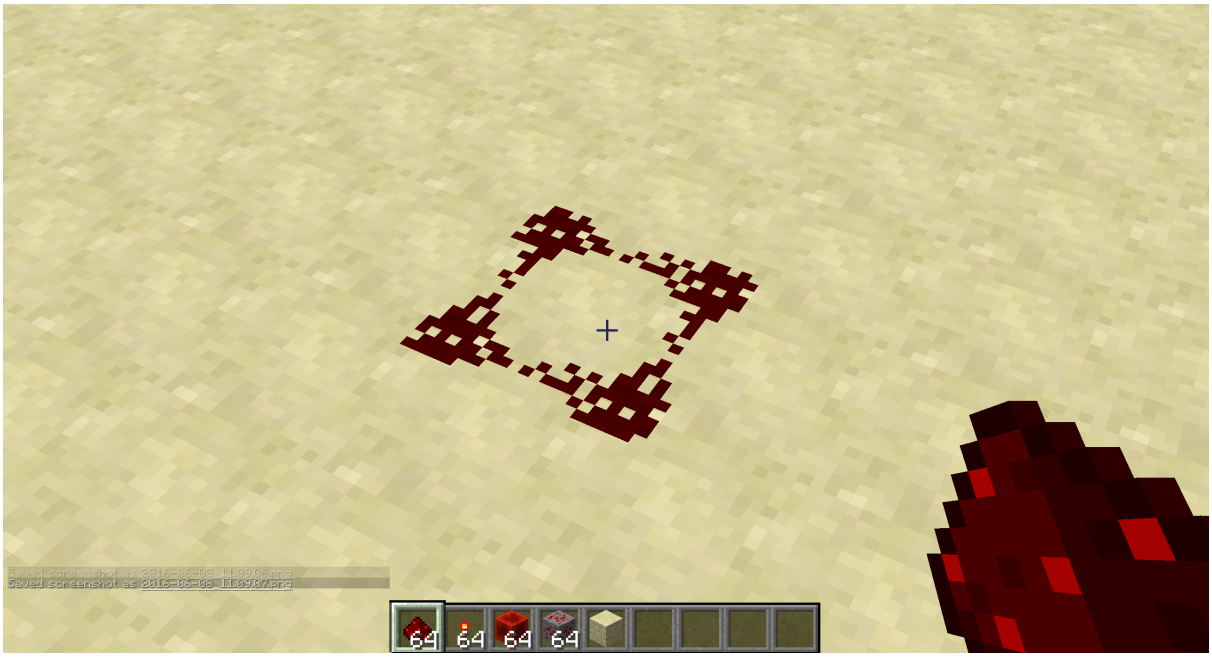
Actions

1. Open the inventory
2. Take some Redstone dust
3. Take a Redstone torch
4. Take a Redstone lamp
5. Take a Redstone repeater

Redstone Repeater

2.1 Powering a lamp

We can place Redstone dust on the ground to form wires. Wires move Redstone power around.



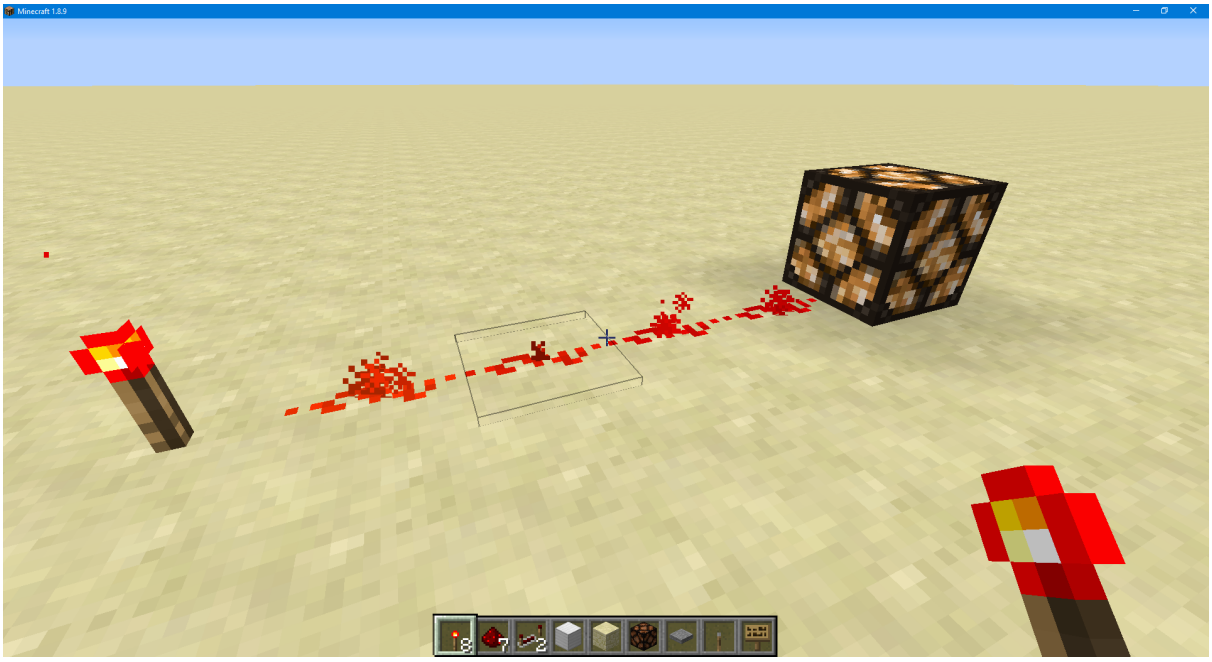
Four bits of Redstone dust placed on the ground

Actions

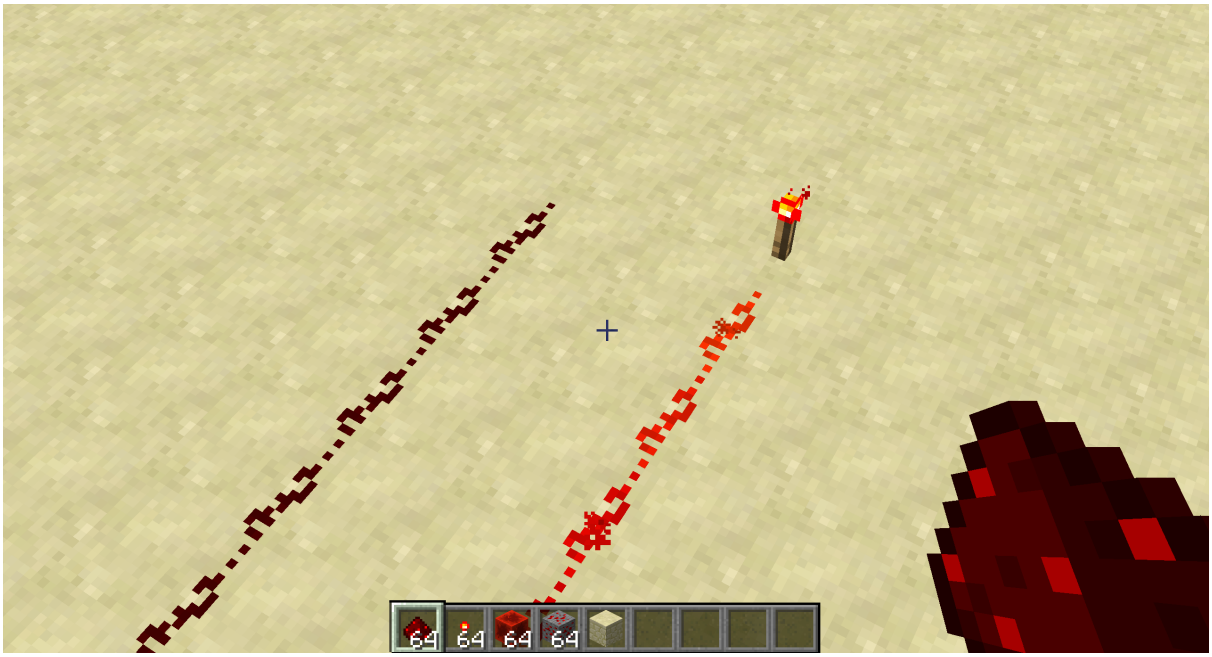
1. Place some Redstone dust on the ground
2. Place more Redstone dust to form a line
3. Place a Lamp at one end of the line (on the end, not next to it)
4. Place a Redstone torch at the other end of the line

Notes

Redstone torches look similar to normal torches - don't use the wrong one!



Powered wire going into lamp



Unpowered (left) and powered (right) Redstone wires

Goals

The torch should be supplying power to the wire. The power should be traveling down the wire into the lamp, so the lamp should light up.

Let's call the four levers of our lock inputs A, B, C and D. We want our door to open if A *and* B *and* C *and not* D are switched on. It sounds like we're going to need an AND gate!

2.2 AND gates

An AND gate is easy to make. We have two inputs. We NOT each of them separately, and then NOR the outputs of the NOT gates together. It looks like this:

Screenshot of AND gate

3 Wrap-up

We hope you enjoyed this workshop! This workshop also has a second part where we teach you how to build more complex circuits like a Minecart Wave Machine and a Locked Corridor. Ask your teacher about it!

Goals

Hmmm...

- TODO

4 Extra Resources

Here's a few extra resources to help you along with this worksheet and some stuff to try at home.

- Minecraft website : http://www.minecraft.net