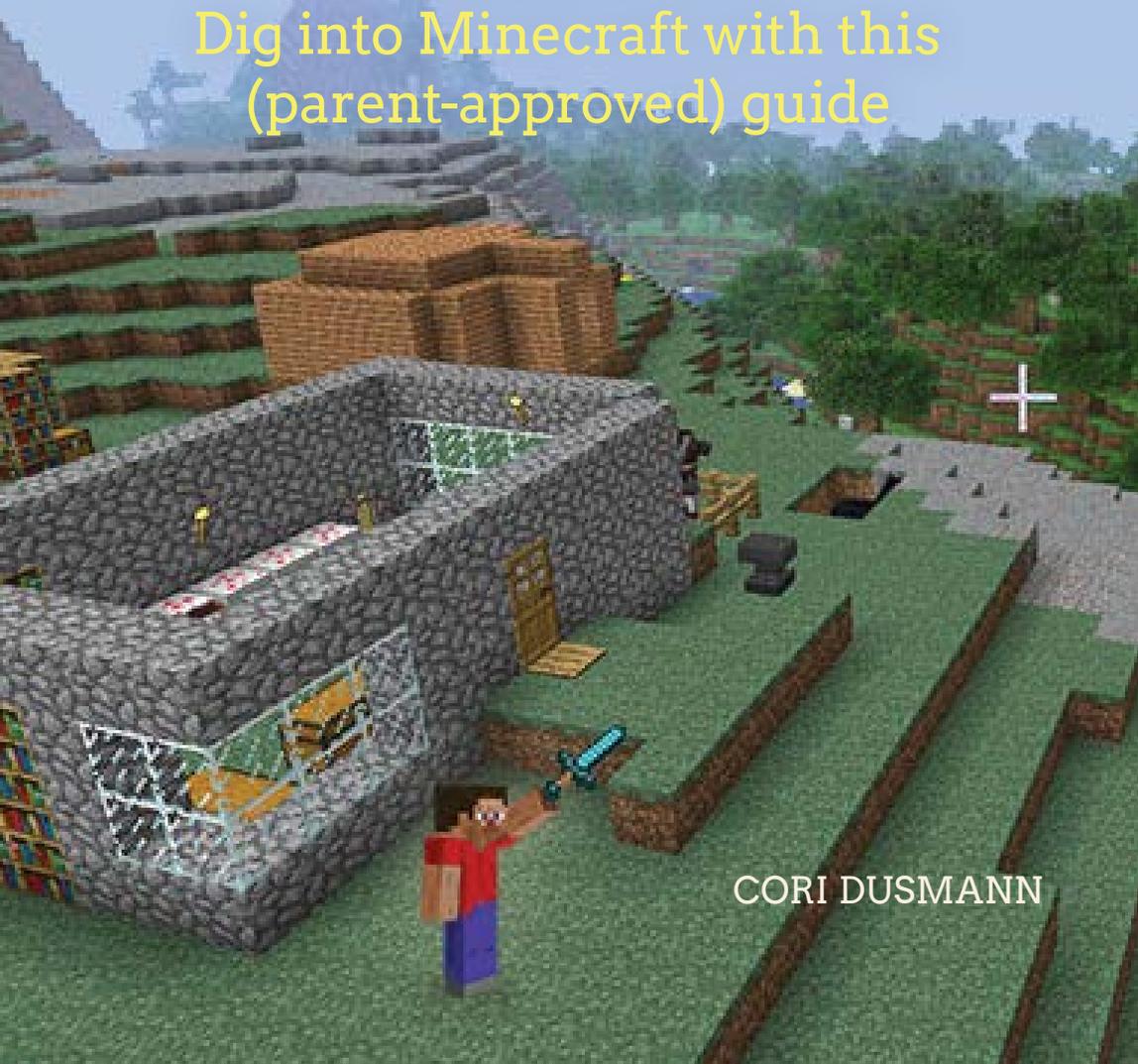


MINECRAFT

REDSTONE ESSENTIALS AND MUST-DO PROJECTS

Dig into Minecraft with this
(parent-approved) guide



CORI DUSMANN

Minecraft Redstone Essentials and Must-Do Projects

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Peachpit Press

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Redstone Projects

There are as many redstone creations and devices as there are people to imagine them. From automated farms and brewing stations to complex defense systems, from various ways to lock your door to music systems and fireworks launchers, redstone projects can suit the tastes and needs of any player.

Wrednax (my 15-year-old) and I have put together these projects for you to try. Ranging from the very simple to the moderately complex, these projects will give you a taste of what you can make with redstone and allow you to gain the skills you'll need to experiment and create with redstone yourself.

Redstone Lamp

The most basic of redstone creations, the redstone lamp (**Figure 2.1**) is a simple light made from glowstone and redstone. Like glowstone, it gives off light that is one level higher than torches, but unlike glowstone, it can be turned on and off if attached to a switch.

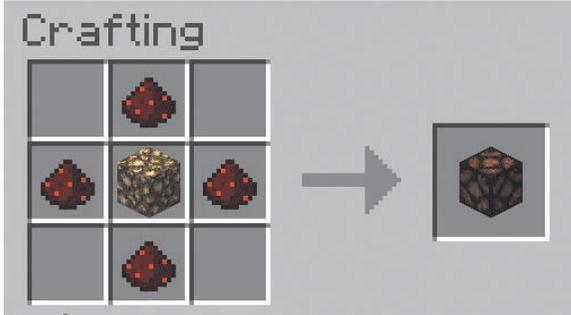


FIGURE 2.1 Recipe for a redstone lamp, using redstone and glowstone.

Redstone lamps are easily powered to stay continuously lit by placing a redstone torch or redstone block adjacent to the lamp (**Figure 2.2**).

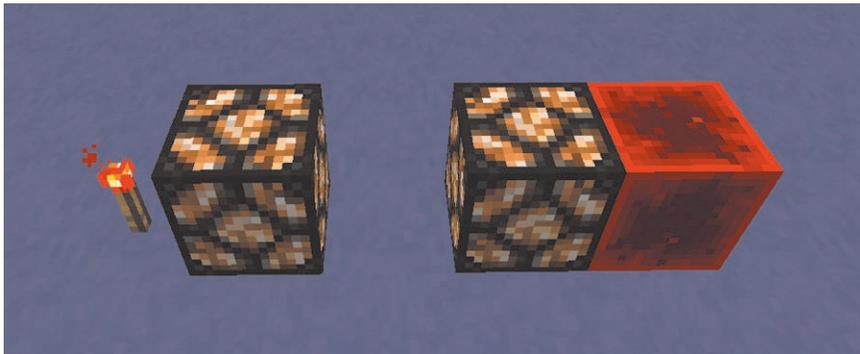


FIGURE 2.2 Redstone lamps powered by a redstone torch and a redstone block.

Redstone Lighting with a Lever

You can also power a redstone lamp with a lever, allowing you to turn the light on and off. Placing the lever in the block beside, above, or below the lamp will

light up that one lamp. If you place the lever on the redstone lamp itself, all lamp blocks that are directly touching the lamp with the lever will also turn on (**Figure 2.3**).

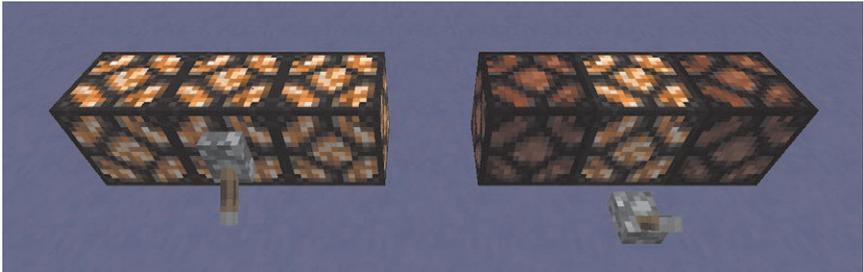


FIGURE 2.3 A lever placed directly on a redstone lamp (left) will also power the blocks touching it, but if you place the lever in a block adjacent to the lamp (right), it will power only that block.

Redstone Lighting with a Switch

You can add switches to your redstone lamps that are a little more complex than placing a lever directly on the lamp.

1. Place your redstone lamps.

Here, we placed them in the ceiling (**Figure 2.4**).

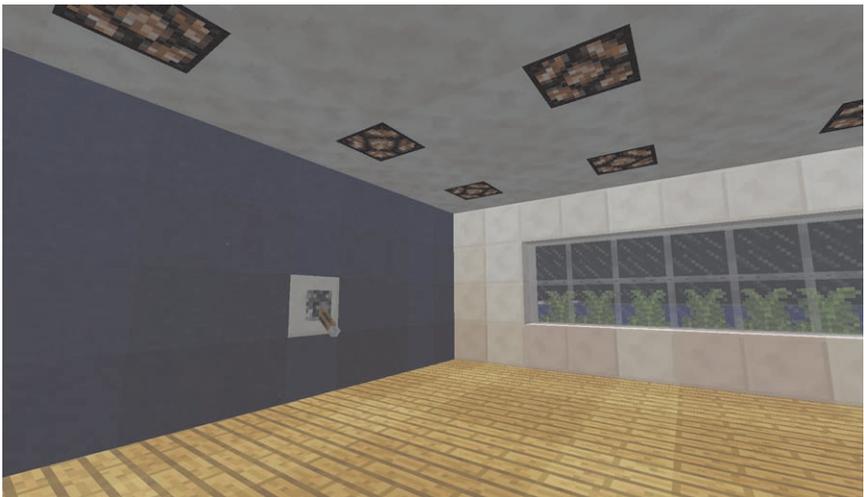


FIGURE 2.4 Redstone ceiling lamps activated with a wall switch.

2. Connect all your redstone lamps with redstone wiring (**Figure 2.5**).

If they are more than 15 blocks from your switch location, you'll need to use repeaters to extend the current.



FIGURE 2.5 Connect all the lamps with redstone.

3. Place a wall switch (a lever), as in Figure 2.4.

Since your switch is inside the room, and we want to keep the redstone wiring hidden away, we're going to run the redstone along the outside of the wall until it reaches the opposite side of the block that the lever is on (**Figure 2.6**).

4. Lay blocks in a stair formation (remember that redstone can't be placed on crafted steps).
5. Run your redstone down the outside of the wall.

Here, we ran two lines of redstone wiring in order to reach all the lamps without needing a repeater. You'll likely want to have this area of your building blocked off when you're done, so that the redstone is hidden away.

Now that your lighting is wired up, you can turn your lights on with the flip of a switch.

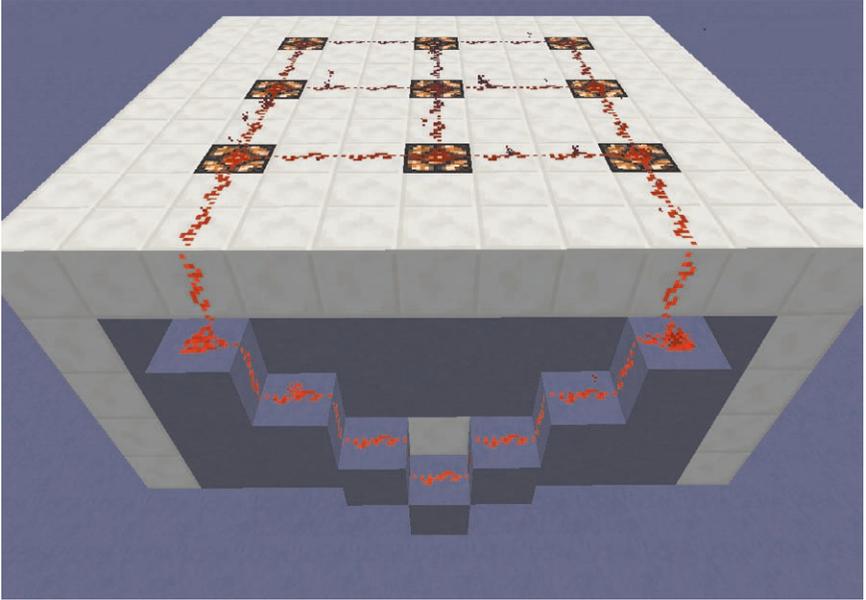


FIGURE 2.6 Use blocks in a stair foundation to lay redstone wiring that connects the lamps with the reverse side of the block that you have your switch on.

Redstone Lighting with Light Sensor

You can use a daylight sensor to turn your lights on automatically at night. This is a great option for lights set in the ground in walkways (**Figure 2.7**).

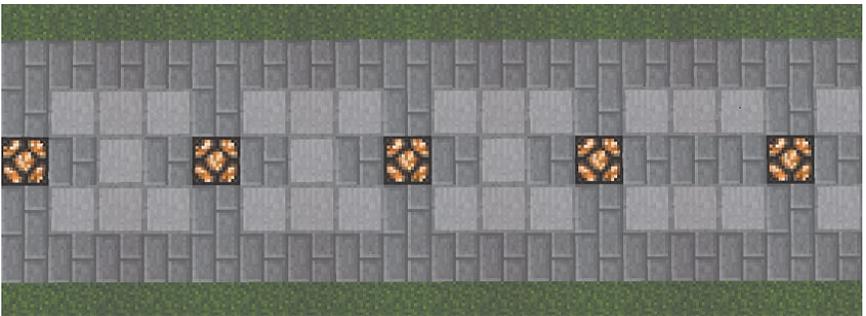


FIGURE 2.7 Using a daylight sensor and underground wiring, lights turn on at night to illuminate the road.

Daylight sensors are powered by the sun, and we want the lights to turn on at night. This is a perfect situation for a NOT gate to switch the current so that it is on at night and off during the day (**Figure 2.8**).

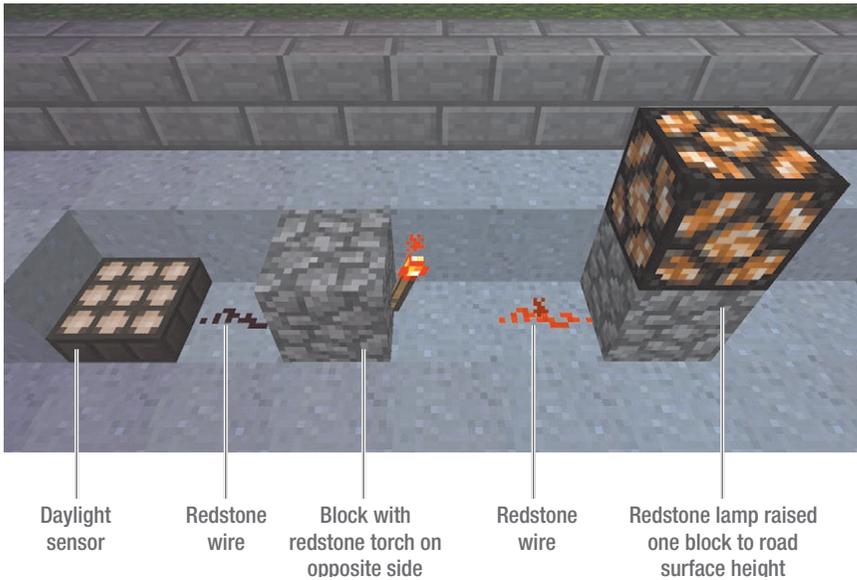


FIGURE 2.8 Using a daylight sensor and a NOT gate to switch redstone lights on at night.

1. Dig down two blocks deep. This will allow you to cover the redstone wiring with blocks at your road height.
2. Place a light sensor two blocks deep into the ground.
3. Place a piece of redstone beside the sensor, leading to a solid block. Place a redstone torch on the other side of that block, creating a NOT gate.
4. Lay redstone from the torch to your lamp location (remembering that redstone signals go only 15 blocks). To raise your lamp to ground level, place a block under your redstone lamp. Fill in the road around the lamp, covering the wiring.

Automated Furnace

An automated furnace doesn't use redstone. Rather, it uses hoppers, chests, and furnaces to smelt ore dropped into the top chest (**Figure 2.9**).

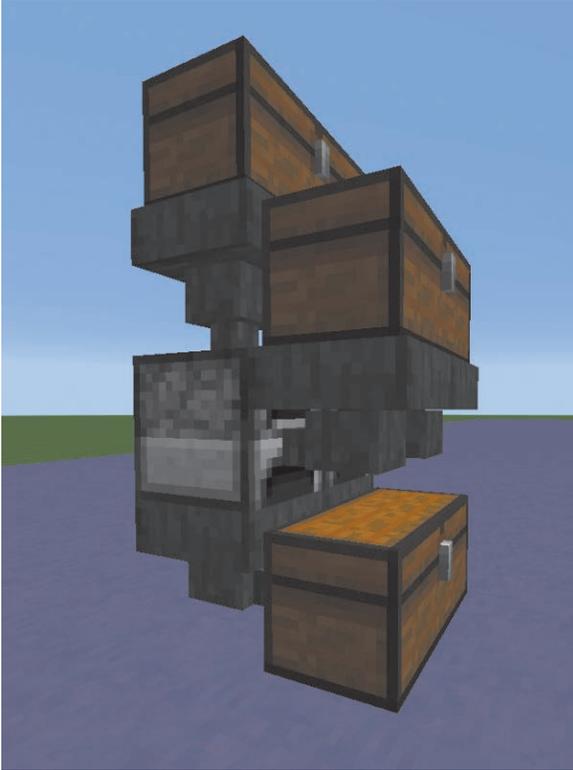


FIGURE 2.9 Using hoppers, chests, and furnaces, an automated furnace smelts ore.

Hoppers can be tricky to place. You need to Shift-click in order to connect them correctly.

- 1.** Place your furnaces one block above the ground. Place chests on the ground in front of the furnaces.
- 2.** Place two hoppers under the furnace, Shift-clicking the back of the chest to correctly attach them.
- 3.** Place two more hoppers in front of the furnace, Shift-clicking the front of the furnaces.
- 4.** Place the final two hoppers on top of the furnaces, Shift-clicking the top of the furnace to place them.
- 5.** Place chests on top of the hoppers that are in front of and above the furnace.

6. Place coal or other fuel (for instance, buckets of lava) in the middle chests.
7. To use your automated furnace, simply drop your raw ores into the top chest, and remove the smelted product from the bottom chest.

Doors

Doors are straightforward in Minecraft. You make the doorway and you place the door. Iron doors require a button, pressure plate, or lever to work, because they are powered, but you can simply place a button or lever. However, if you want to make more complicated doors, such as automated, hidden, or locking doors, you can use redstone.

Wiring a Door

Iron doors can't be opened without a power source. The easiest solutions are to use a button or lever beside the door, or a pressure plate at the base. Sometimes, though, you might want to hide a redstone wire in the floor, for times when you want to make a lock or open the door from another area.

You can open the door by powering the block underneath it (**Figure 2.10**). As long as the signal is less than 15 blocks away or you use a repeater to boost it, you can place the switch wherever you'd like, much like we did with the light switch.

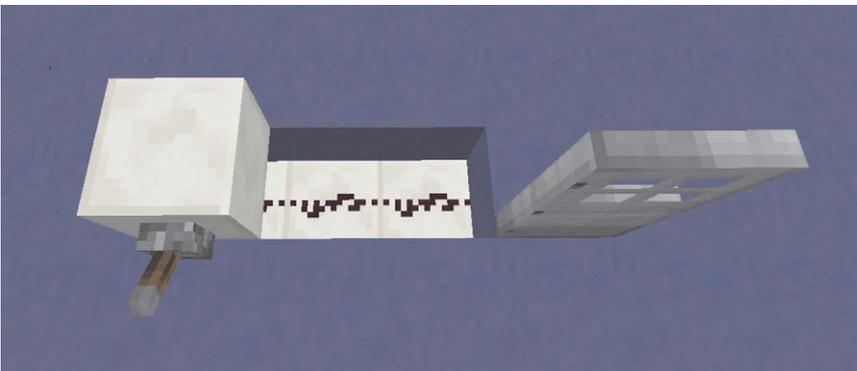


FIGURE 2.10 Run redstone wire underground to the block the door it's placed on.

Redstone Lamp Sticky Piston Door

This door uses sticky pistons to draw the door into the wall when a switch, such as a pressure plate, activates the redstone. While it can be crafted from most blocks, using redstone lamps as the doors (with redstone blocks forming the top and bottom of the doorframe) creates a flashy effect with minimal effort.

When the doors are closed, the redstone blocks power the lamps, making the door light up; as it slides open, the redstone lamps turn off because they are no longer in contact with the blocks. In **Figure 2.11**, the redstone lamp doors are open, having slid into the walls.



FIGURE 2.11 A piston door made with redstone lamps and blocks (built by KingKazma91).

This door could also be made in reverse by placing the redstone blocks above and below the blocks that the pistons retract into. And of course you can use almost any other blocks as well, to make a door that is camouflaged or decorative.

To make your door, you will need enough space for the doorway, the sticky pistons that will open the doors, and the wiring running underneath.

1. Working two blocks below where you will be placing your doors, lay the wiring for your door (**Figure 2.12**). You'll need to split the redstone wiring to reach the pressure plates you'll be placing on each side of the door.
2. Add a redstone torch on each side to power the lower sticky pistons.

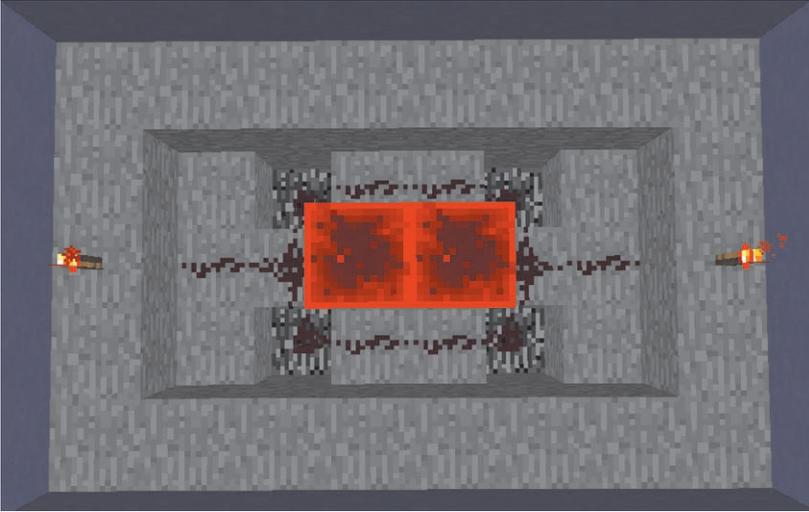


FIGURE 2.12 The wiring for your door. The two redstone blocks in the center are at floor height.

3. Place your door frame, doors, and sticky pistons. Sticky pistons can be placed facing different directions, so you will need to place them on their sides facing the door blocks. **Figure 2.13** shows the placement of the doors, the pistons, and the frame above and below the doors.

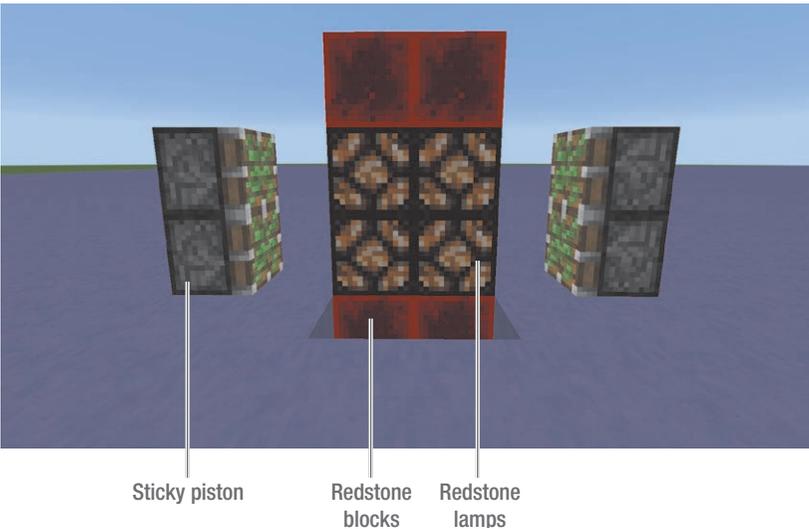


FIGURE 2.13 Redstone lamp doors, redstone blocks on the floor and ceiling, and sticky pistons. The pistons will extend and grab the redstone lamps when activated.

To power both the sticky pistons, we're going to need to power the block behind the lower piston.

4. Place a block above each redstone torch and a piece of redstone dust on top of those two blocks. This will power the upper pistons (**Figure 2.14**).

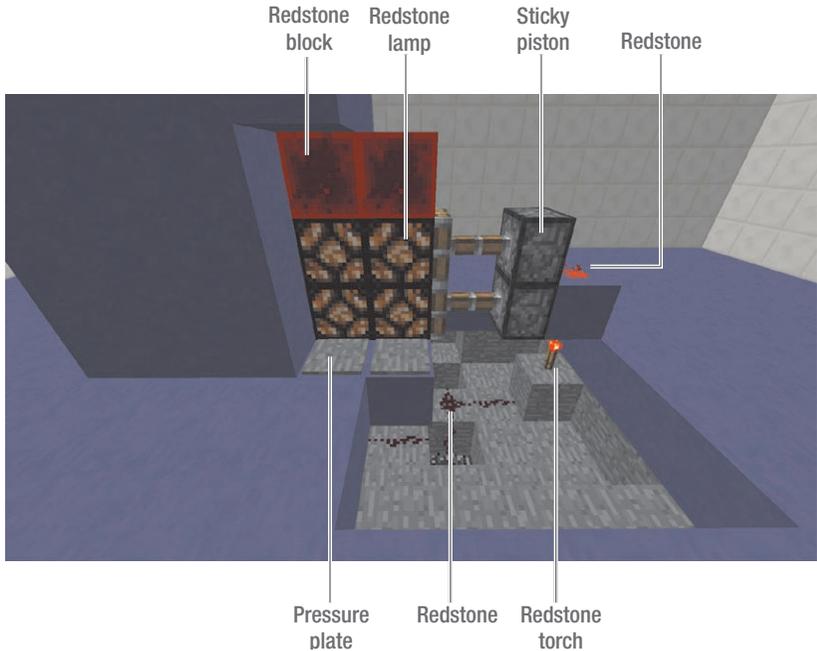


FIGURE 2.14 The sticky piston door—on the left the inner workings are hidden away, while on the right, we can see all the workings.

You can fill in the floor on either side of the door. Add pressure plates on both sides of the door and test it to make sure it works. Once you have confirmed that your redstone is functioning properly, you can hide the pistons and wiring in the walls and floor, as you can see on the left side of Figure 2.14.

Record Lock

There are various ways to lock your door. One cool method is to use a record lock, which uses a jukebox for the lock and a music disc for the key (**Figure 2.15**).



FIGURE 2.15 A record lock, here showing the music disc needed to open the door.

Every music disc generates a signal of a different length (**Table 2.1**); for instance, cat sends a two-redstone signal, while ward sends one that is 10 blocks long. You can experiment to discover the signal of each disc, or you can find them on the wiki.

TABLE 2.1 Music Disc Signal Strengths

DISC	SIGNAL STRENGTH
13	1
cat	2
blocks	3
chirp	4
far	5
mall	6
melohi	7
stal	8
strad	9
ward	10
11	11
wait	12

By using this information, we can connect a jukebox to a door, making the redstone wire the length of the signal associated with a particular music disc. To open the door, the player needs to have the correct music disc.

We'll be using repeaters to extend the correct signal to the door, and to block the signals that are too long or too short (**Figure 2.16**).

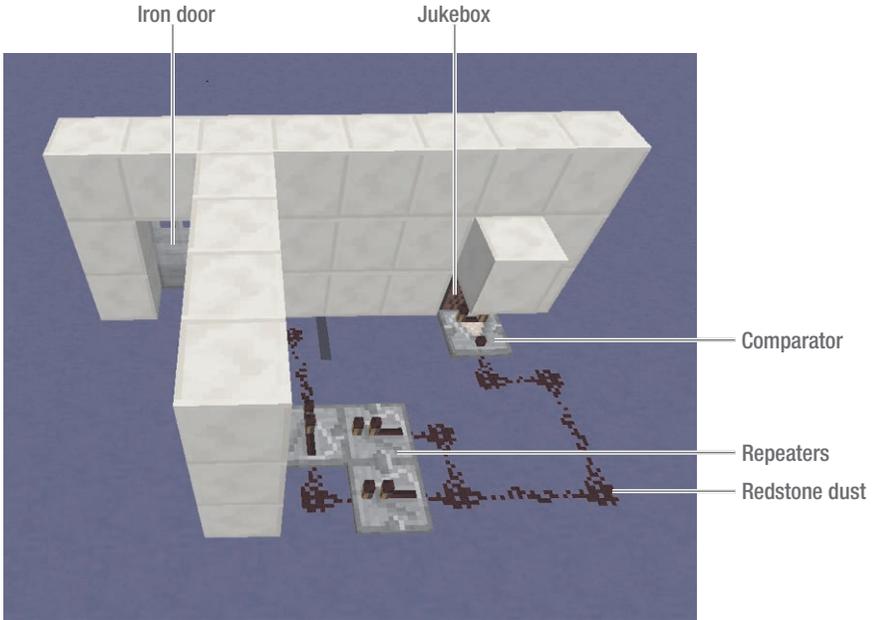


FIGURE 2.16 Using repeaters to activate the door only when the correct disc is inserted in the jukebox.

In this example, we use the mall disc, which sends a signal for six blocks.

1. Decide where you are going to place your door and jukebox, and which disc you will be using. You will need enough space to lay a circuit the length of the disc signal between the comparator attached to the jukebox and the repeaters.
2. Place a comparator behind the jukebox. This will determine the strength of the signal, depending on which disc is placed in the jukebox.
3. Lay your redstone wire the correct number of blocks (here, it is six blocks, to match the signal from the mall disc) (**Figure 2.17**).

4. Place a repeater at the end of your redstone wire, and then place a second one directly beside it, connecting the two with a piece of redstone wire. Now place a third repeater connected to the second, facing toward the doorway (Figure 2.18).

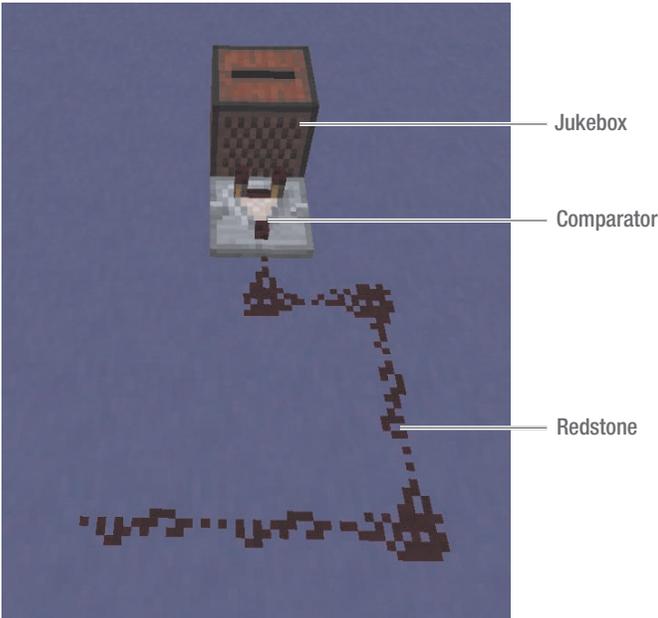


FIGURE 2.17 The jukebox, a comparator, and the six pieces of redstone wire needed to activate the door with the mall disc.

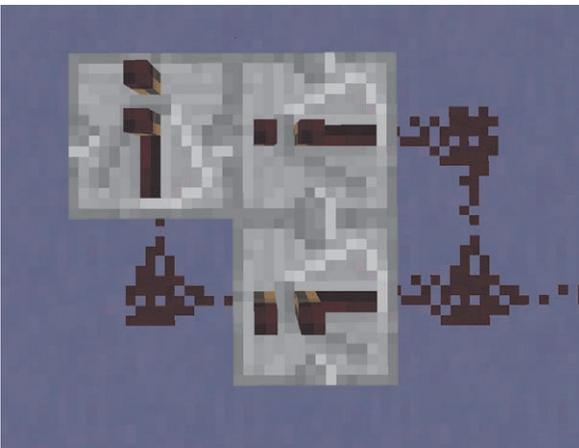


FIGURE 2.18 Place three repeaters at the end of the wire, to control the signals from the jukebox.

If the signal is the right length, it will end at the first repeater. If it is too short, it won't get there at all, and if it is too long, it will continue past the first repeater, to the second, where the signal will block the third.

5. Lay another piece of redstone on the other side of the first repeater, connecting it to the third. From there, lay redstone forward toward the door (see "Wiring a Door," earlier in this chapter).

Automated Pumpkin and Melon Farm

There are many ways to automate farms. We're going to look at a very simple system that uses redstone-wired pistons to harvest the pumpkins or melons, and water to direct them to hoppers (Figure 2.19).

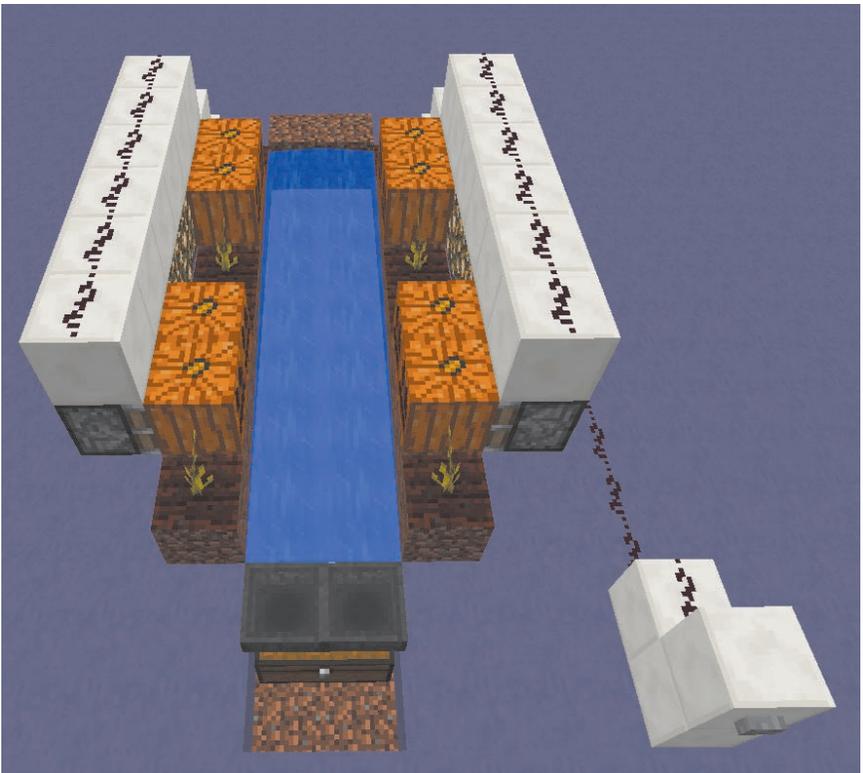


FIGURE 2.19 A basic pumpkin or melon farm is easy to craft.

Melons and pumpkins grow and are harvested in the same manner—for this tutorial we'll be using pumpkins.

1. Create your farm by placing two single-block-wide rows of dirt on either side of a water channel. Here, we're using packed ice (found in the Icy Plains Spike biome) to make the items move faster on its slippery surface. Pumpkins require two blocks of farm space for each plant—one for the stalk of the plant and an empty one for the pumpkin to grow on.
2. Hoe and plant your seeds in a pattern that will leave space for your pumpkins.
3. Place pistons behind and facing the spots you've left open.
When the pumpkins are ripe, you'll push a button that extends the pistons, pushing them into the water (**Figure 2.20**).

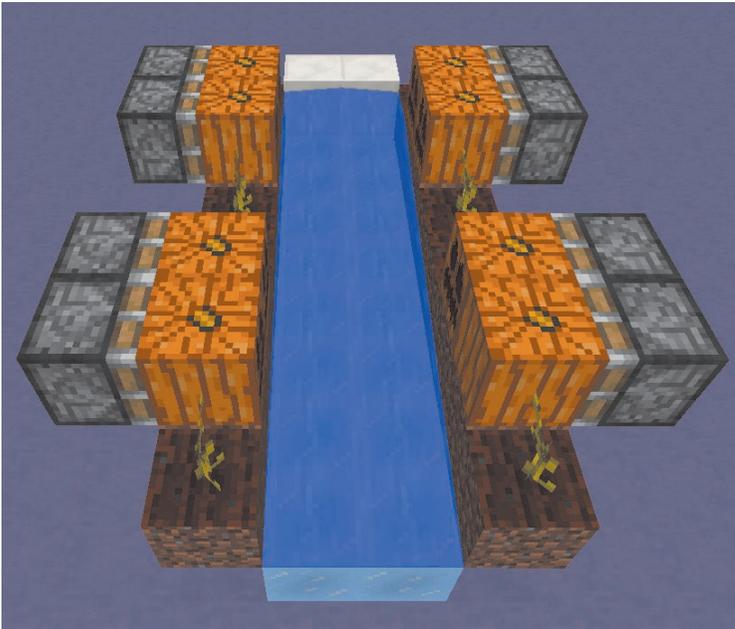


FIGURE 2.20 The basic farm laid out without redstone.

4. Lay blocks above the pistons, running the length of the farm. At the far end of the farm, make steps of the blocks for your redstone.
5. Lay redstone wiring along the length of the farm and down the steps, adding repeaters to extend the current as it goes past 15 blocks. Make

sure the repeaters are facing the right direction, so that the power is extended through them. Run the wire alongside your farm to the opposite end (**Figure 2.21**).

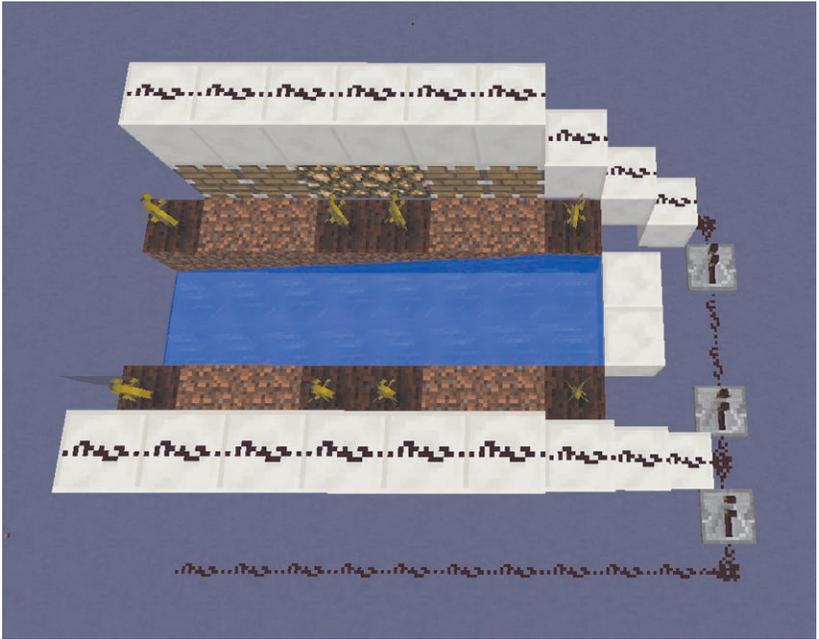


FIGURE 2.21 Place blocks over your pistons, and then run redstone over them to create powered blocks, continuing the redstone along the back and side of your farm.

- 6.** Place a light source, or your plants won't grow.
Here, we've placed glowstone blocks behind the plants, but you could use redstone lamps or torches as well.
- 7.** Add a lever or a button to harvest your plants.
Here, we placed blocks for a button, and ran the redstone to the back of the button block.
- 8.** Add a double chest at the end of the farm, set into the ground, with hoppers connected (**Figure 2.22**).
When you press the button, the pistons will extend, pushing the pumpkins into the water, where they are carried to the hoppers and deposited in the chests.

If you wanted to get fancy and automate this even further, you could make a simple timer. Create a simple circuit that requires a pumpkin to grow in order to complete the circuit. When the pumpkin grows, the power will run through it, activating a signal to the farm (Figure 2.23). The presence or absence of the pumpkin is like the on and off switch.



FIGURE 2.22 Connect the redstone wire to a button, and add hoppers and a chest to collect the harvest.

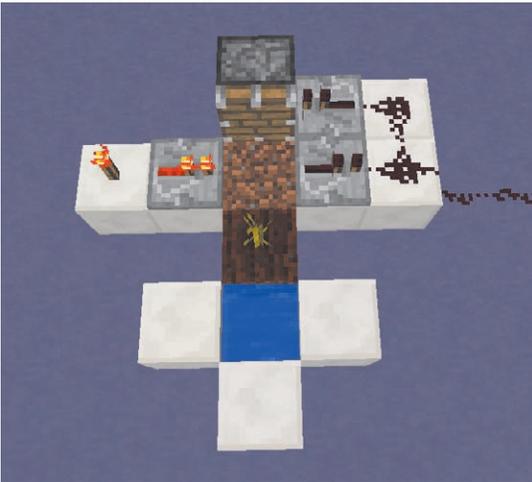


FIGURE 2.23 A simple automatic timer that can be connected to your farm, using the growth of a pumpkin as the switch.

TNT Cannon

When it comes to redstone, what could be more fun than blowing things up? Cannons can be a delightfully destructive pastime, useful for self-defense or going up against others, or simply for the fun of explosions.

You can make incredibly complex cannons, but we're going to look at a basic single-shot cannon that launches on a time delay. Once you have the basics, you can experiment with other designs.

The TNT cannon has these components: a frame, water to ensure the cannon itself doesn't explode, and TNT for propulsion and ammunition.

NOTE: When you're working with TNT, always make sure that you place it last, to avoid unpleasant accidents.

1. Build a basic frame, three blocks wide, with a half slab at the front. This is to help direct the TNT up at an angle, and to contain the water.
2. Add a block on the next layer, at the end. This will prime the TNT by powering it.
3. Place redstone along one side and one end of the cannon frame. This will activate the TNT when the launch button is pressed.
4. On the other side of the frame, place four repeaters between the TNT primer block and the redstone. Click the repeaters to shift the torches to be as far apart as possible. These will provide a signal delay before the TNT is launched.
5. Place a button on the back of the launcher. This will activate both the TNT and the launcher (**Figure 2.24**).
6. Place three blocks of TNT in the cannon, in the water. These will be the ammunition.
7. Place another piece at the front of the cannon, beside the primer block (**Figure 2.25**).
8. To fire your cannon, simply press the button.

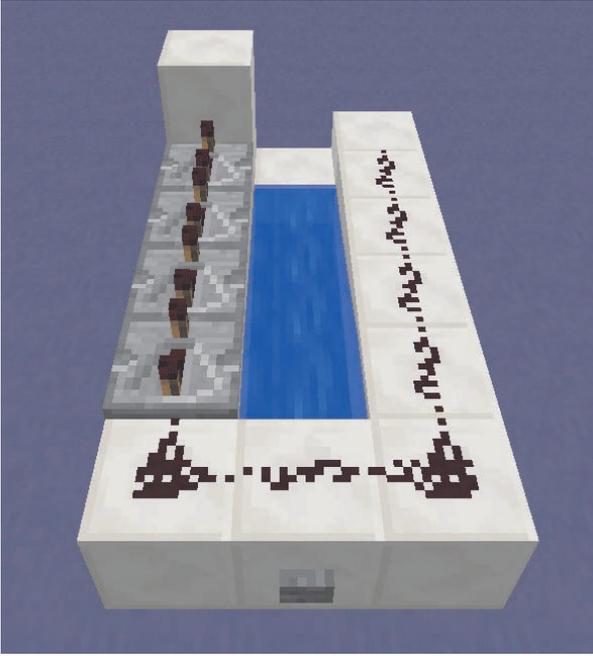


FIGURE 2.24 Prepping your TNT cannon—the repeaters delay the signal from the redstone, allowing you to get out of the way after you ignite the cannon.

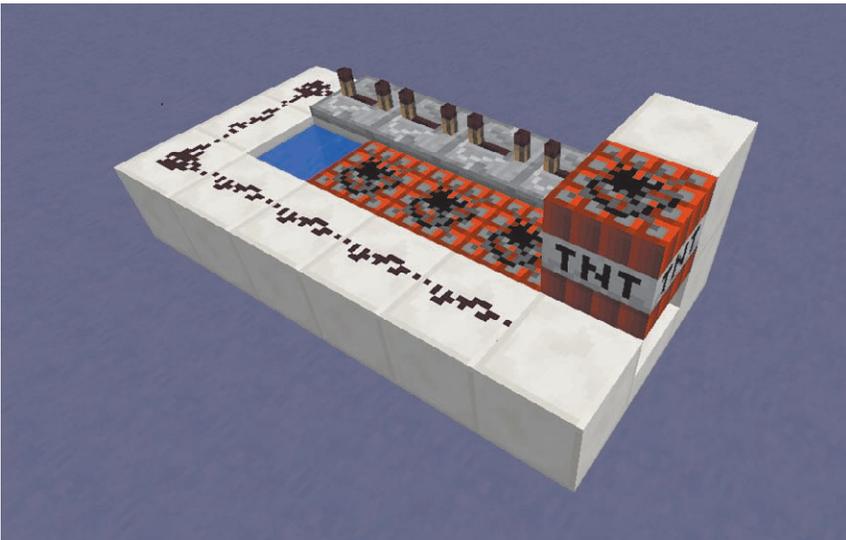


FIGURE 2.25 Place your TNT and prepare to fire your cannon!

To make cannons that fire farther, are more powerful, or even launch mobs or minecarts, experiment with cannons and look online for some of the many tutorials that go into more depth.

Fireworks Launcher

Fireworks are some of my favorite items in Minecraft. Hundreds of variations are available for you to make, and you can launch them easily by hand. A launcher filled with a variety of fireworks is extra delightful.

Simple Fireworks Launcher

You can make a simple or a very complex launcher. Let's start with a simple one.

1. Place dispensers in the ground, facing up, and place pressure plates in the front.
2. Fill them with an assortment of fireworks, and have your avatar run along the pressure plates to launch them (**Figure 2.26**).

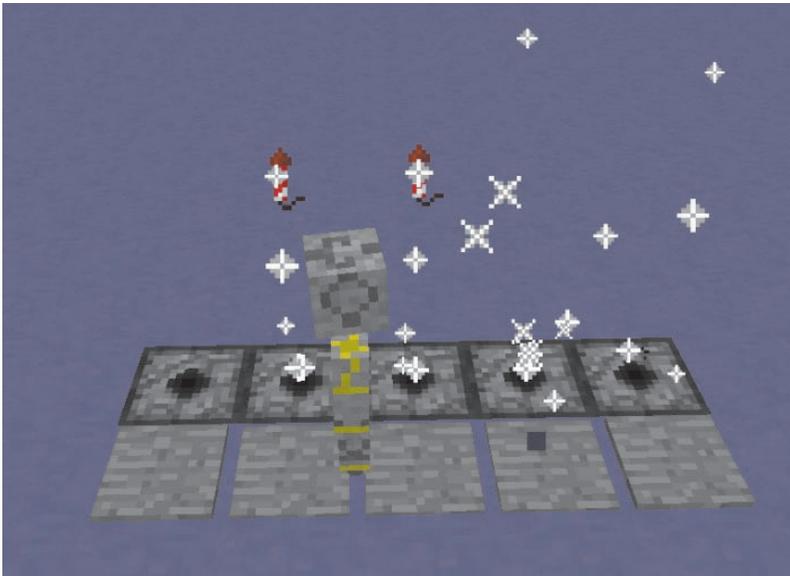


FIGURE 2.26 Wrednax runs along the pressure plates to launch fireworks.

The trouble with a launcher of this design is that although it is fun to play with, you won't be able to enjoy the fireworks as easily, because you must run back and forth launching them.

Repeating Fireworks Launcher

You can make a more complex launcher that sets off fireworks on a delayed cycle from a distance.

We are going to use a redstone clock to set the fireworks off in sequence. The clock is helpful for timing redstone creations.

1. To make a clock, you need to place repeaters in a circuit. Here, we've put them into a square formation.
2. Add dispensers at the corners that will launch the fireworks in sequence when the redstone signal reaches them (**Figure 2.27**).

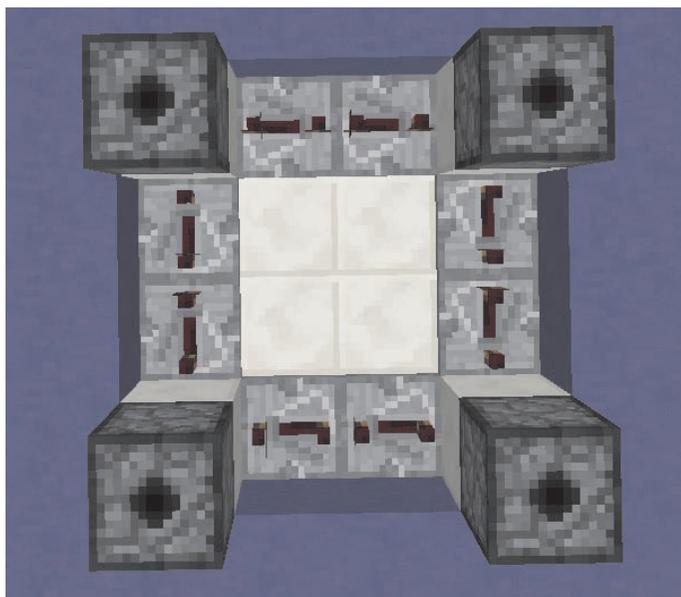


FIGURE 2.27 Redstone repeaters in a circuit that includes dispensers for fireworks.

3. Fill the dispensers with fireworks.

To launch the fireworks, you can build a fuse that runs to the redstone clock and dispensers.

4. Lay a line of redstone from the repeaters to a launch button (**Figure 2.28**). You can make this as long as you need, just remember to add repeaters to extend the redstone signal for every 15 blocks of distance.

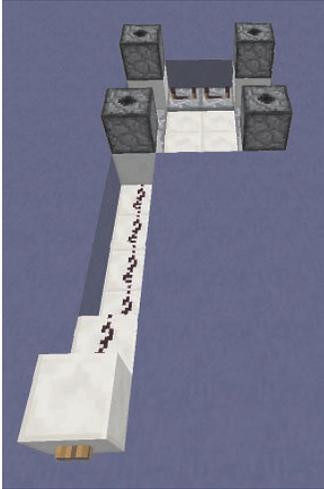


FIGURE 2.28 Make a launch button for your fireworks launcher.

You can make much fancier launchers as well. **Figure 2.29** shows two that Wrednax put together for double the launching fun. Notice that he added a repeater in the middle of the fuse line, as well as at the split between the two launchers. He also added a lever as an off switch.

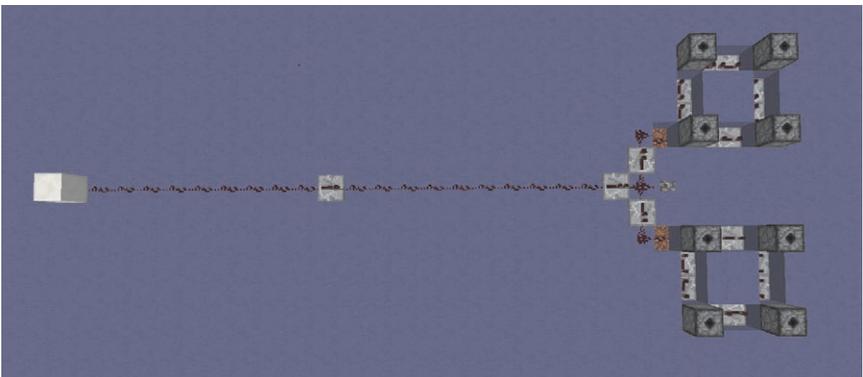


FIGURE 2.29 Two fireworks launchers can be triggered by one button for double the explosions.

Further Fun with Redstone

This has just been a taste of some of the amazing things you can do with redstone. Minecraft players have designed plans for many amazing redstone creations, such as completely automated farms, elaborate defense systems, cool games, and so much more. Players are constantly pushing the limits of what can be achieved with nothing more than redstone components and innovation.

Use what you've learned to practice, explore, build, and create with redstone. If you get stuck, check to make sure that your circuit is complete, that all your repeaters are facing the right direction, that you have adequate power, and that everything is where it should be. Take your time, pay attention to every step, and learn from your mistakes. The more you play with redstone, the easier it will become and the more you'll be able to do with it.

Once you have the basics, expand your knowledge. Work with friends to share knowledge and to brainstorm. If you play on servers, ask more experienced players if they'd be willing to show you some of their work. There is also a lot of information online—on the Minecraft wiki, as well as on other websites. Look for tutorials, let's plays, and directions for far more complex projects. As you explore, your knowledge base and skills will grow, allowing you to experiment even more. Who knows—with practice, skill, and creativity, perhaps you'll become one of the experts that others come to for help and advice!