FANTASTIC
MINECRAFT
STRUCTURAL DESIGNS,
FARMS,
AND FURNISHINGS

Dig into Minecraft with this (parent-approved) guide

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Fantastic Minecraft Structural Designs, Farms, and Furnishings

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Supporting Your Lifestyle

As time passes in your world, you will reach a point when you need more of, well, everything, but especially food and wood. You need a farm for each of the different types of food, a mine for pulling materials out of the ground, and of course, you're going to need a place to store all your items.

Storage Room

Your personal inventory and your first few chests will likely be unorganized as you get settled in the world. But if you build a storage room or facility that is easy to expand, you'll be able to keep everything organized and reduce the amount of time you spend grabbing materials from your stores, giving you more time to build.

Chests

When you place a chest on the ground, it will be a single chest. Place another chest adjacent to it to turn it into a double chest (**Figure 3.1**). A double chest gives you twice the inventory of a single chest.

FIGURE 3.1 On the left is a single chest. On the right is a double chest.

Once you've created a double chest, you cannot place another chest adjacent to it. The area immediately above a chest must be free of obstruction for the chest to open. There is, however, an exception to this rule: Place another chest above or below it and it will still function (**Figure 3.2**).

FIGURE 3.2 Chests will still function with other chests on top of them.

While the amount of materials you're storing will ultimately dictate the size of your storage area, you can use this feature to construct a fairly compact storage room.

Labels

There are a couple of ways to label your chests. Signs, when placed on the ground or on a wall, allow you to write up to four lines of text. Each line has a maximum of 15 characters, including spaces and punctuation. You could, for example, place a sign on a column next to a chest and write what's in the chest. For more compact signage, place a sign on a column between two chests. On the first line, write what's in the chest to the left. On the second, "write" an arrow pointing to the chest on the left. On the third line, write what's in the chest on the right. On the fourth line, write an arrow pointing to the chest on the right (**Figure 3.3**).

FIGURE 3.3 Signs can be used to provide a textual guide to your storage room.

You can use item frames to give you a visual guide to your storage room (**Figure 3.4**). Place an item frame on the wall next to a chest, and place an item (representative of what's in the chest next to it) in the frame.

FIGURE 3.4 Using item frames isn't as compact as signs, but it can look nicer. The oak sapling in the item frame could be a signal to you that the chest contains oak saplings or other organic material.

Design Example

In **Figure 3.5**, the chests on the right use item frames as labels. The chests on the left use signs. The columns are made from spruce wood. Glowstone blocks are used for lighting to keep the room compact and uncluttered. Jungle wood planks are used as the primary material for the floor.
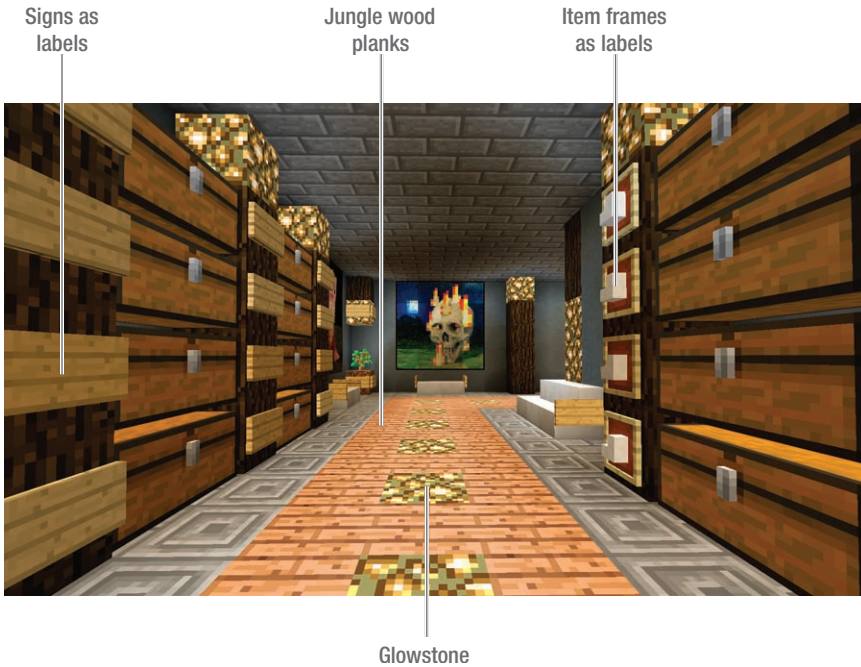
FIGURE 3.5 A completed storage room.

Farming

The goal of any farm is to mass produce materials easily and efficiently. An efficient farm will keep your supplies well stocked with little effort.

Plants for Food

Wheat is grown from seeds, carrots are grown from other carrots, and potatoes grow from other potatoes. You can acquire wheat seeds by breaking tall grass.

Carrots and potatoes can be found in world-generated villages. Rarely, they will drop when you kill a zombie.

In order to grow plants, each type of crop needs to be planted on dirt that has been tilled with a hoe (**Figure 3.6**) and is within 4 blocks of water. The water can be still or flowing.

FIGURE 3.6 From left to right: a dirt block, a tilled dirt block, and planted wheat.

When each crop is fully grown (**Figure 3.7**), aim at the crop and left-click to harvest the crop. Wheat will drop one wheat and up to three seeds. Carrots and potatoes will drop up to four of each. Be careful: Potatoes have a chance of dropping a poisonous potato.

FIGURE 3.7 From left to right: fully grown wheat, carrots, and potatoes.

Plant Farm

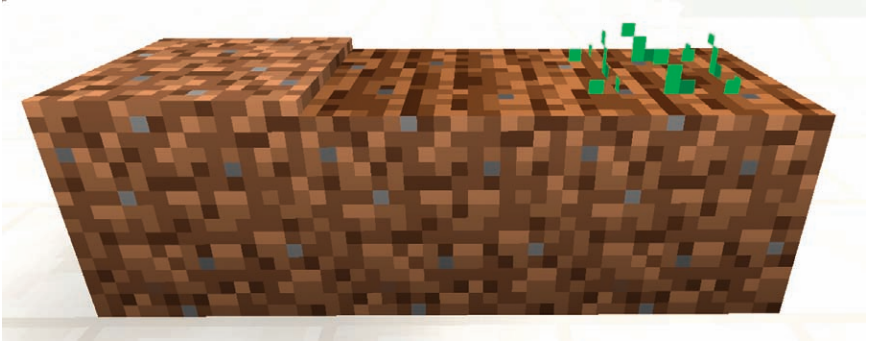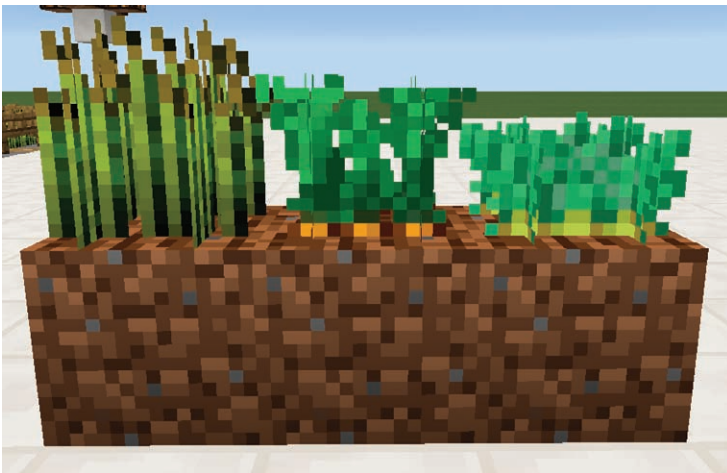Typically, the first farm you set up will be a wheat farm, because these seeds are the easiest to come by in the world.

This basic farm (**Figure 3.8**) is a 9-block-by-9-block square of dirt, with a bucket of water poured into a hole in the center. It is surrounded by stone bricks with fences on top. You don't have to enclose it, but doing so makes the design of the farm look intentional and will also keep the mobs out.
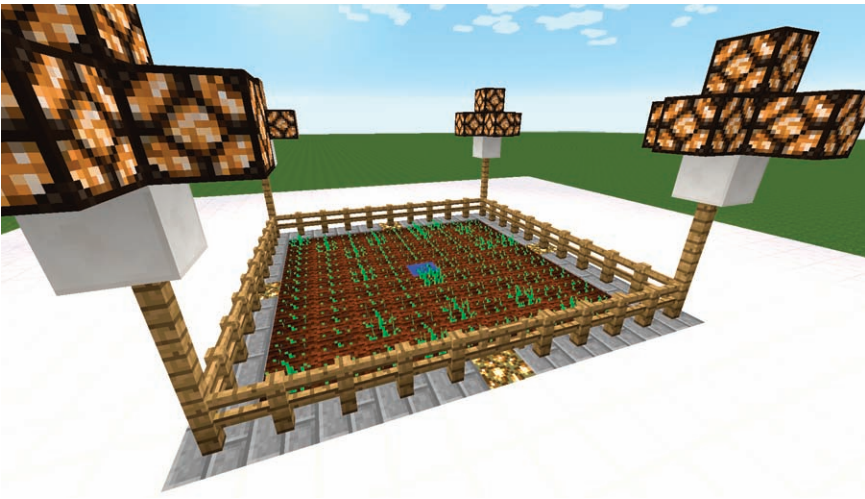
FIGURE 3.8 A basic farm pod.

To light the area, you could just place torches on top of the fence posts, but adding a little design will make your farm look better. You'll notice that the corners of the fence incorporate a version of the lampposts you saw in the previous chapter. Glowstone blocks are placed in the ground in the center of the sides.

A farm as small as this is pretty easy to harvest, but as you expand, harvesting quickly becomes tedious. Water, when allowed to flow over farmland, will wash crops away, harvesting them as if you had left-clicked each plant. This feature can be used to automate harvesting wheat, carrots, and potatoes. And if you build it correctly, the water will push your harvest to one area for easy collection.

There are a few things to keep in mind when building an automated farm. Water will flow 8 blocks, including the source, and toward a drop in terrain height. So water poured on the ground will flow over a portion of the farm and into the hole in the center (**Figure 3.9**).

Growing crops   Water source for soil hydration   Water flowing toward hole   Water source from a bucket

FIGURE 3.9 A failed attempt to harvest a pod with fully grown wheat. Water will flow toward the hole in the center that's used to hydrate the soil inste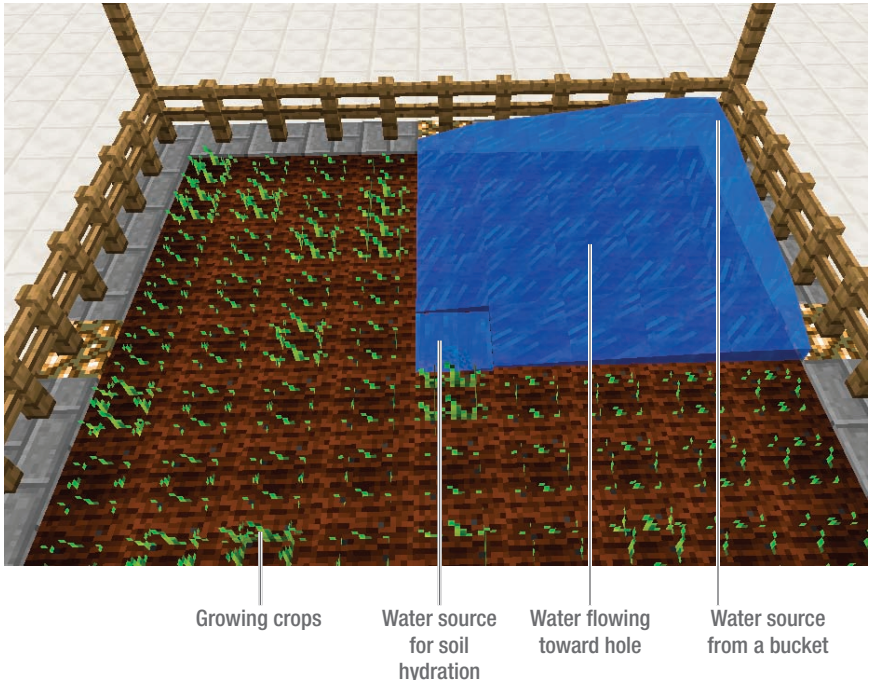ad of flowing its full distance of 7 blocks. And because the farm is 9 blocks wide by 9 blocks deep, multiple water sources would need to be used to fully harvest the pod.

Each time water falls from its initial elevation, it can flow another 8 blocks (**Figure 3.10**).
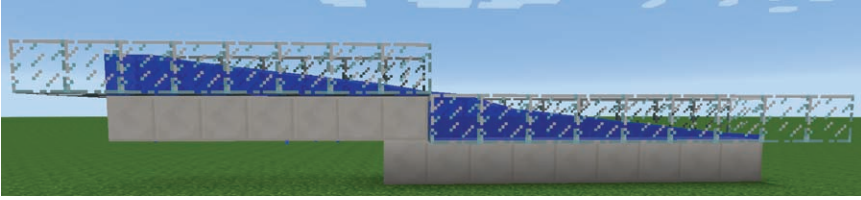
FIGURE 3.10 This side view demonstrates the way water flows. The water on the top layer flows 8 blocks. The water is allowed to drop after 7 blocks and flows another 8.

Taking these features into consideration, you can build a multi-tier farm that you can harvest by releasing water and allowing it to flow over the farm. The farm in **Figure 3.11** is two tiers tall. The bottom tier is 8 blocks deep. The top tier is 7 blocks deep and built 1 block higher than the bottom tier to allow the water to drop a level at the end. Water flows from the top to bottom along one side, hydrating the farmland 4 blocks to the right of the flow. If you place stone slabs above the water, you will be able to walk around the farm without disturbing the crops.

FIGURE 3.11 A multi-tier farm. Buckets of water are poured behind each orange wool block. When the orange wool is broken, water is released and allowed to flow over the farm, harvesting the crops. Stone brick slabs placed along the sides will allow you to walk up and down the farm while preventing the water from flowing outside of the farm.

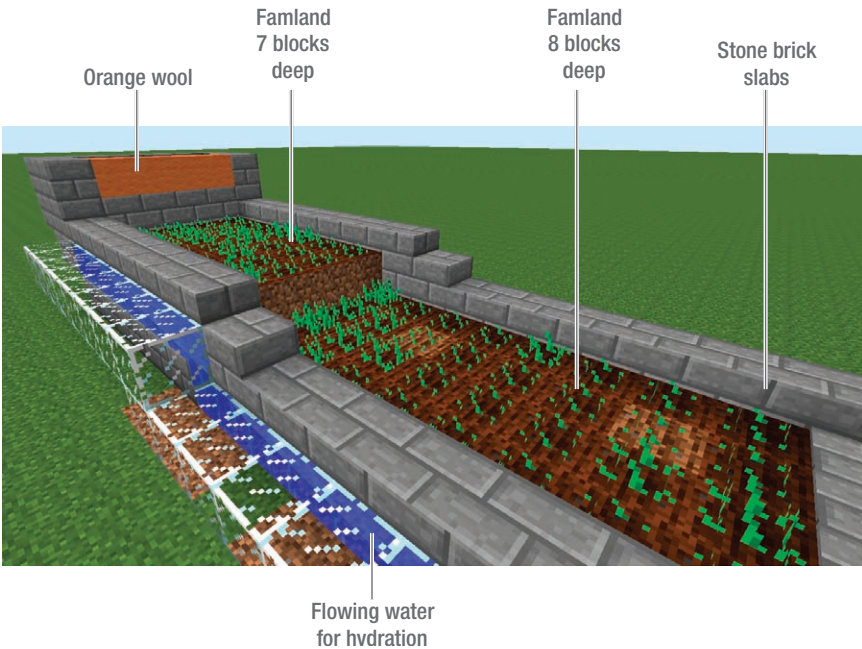When you release water over the farm, it will flow from the top to bottom, pushing all your harvest to the bottom, where you can walk along the path and collect the items. When you're ready to stop the water, place a block back in front of the water, as demonstrated in Figure 3.11 with orange wool.

Automated Farm

There are a couple of additions you can make to further automate the farm. You can completely eliminate the need to place water and break blocks to release it by crafting and placing dispensers. A dispenser spits out an item from its inventory each time it receives a redstone signal. It can also simulate placing a bucket of water (**Figure 3.12**).
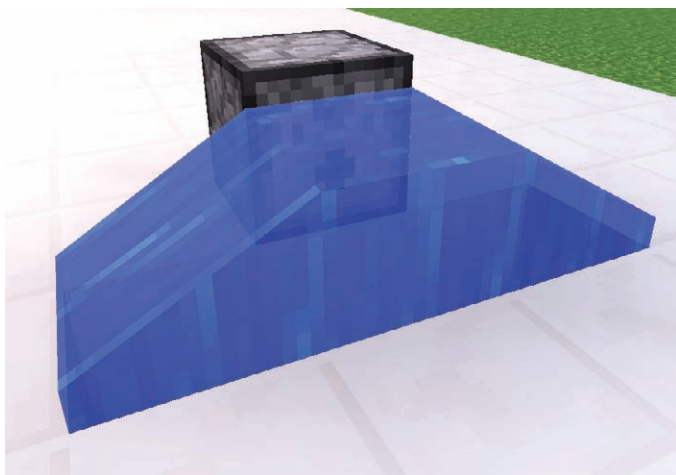
FIGURE 3.12 Demonstrating the use of dispensers to release water.

To place the dispensers, climb to the top of your farm, and with your back to the bottom, right-click to place the dispenser (crafted from seven cobblestone, one bow, and one redstone) next to the farmland. Move to the back of the dispenser, aim your reticle at the block just behind and below the dispenser, and right -click to place a redstone repeater (crafted from three stone, two redstone torches, and one redstone) (**Figure 3.13**). Do this for each dispenser. The redstone repeater, when activated by a redstone signal, will send a signal to the dispenser, causing the dispenser to dispense water.

Redstone   Dispenser   Redstone repeater
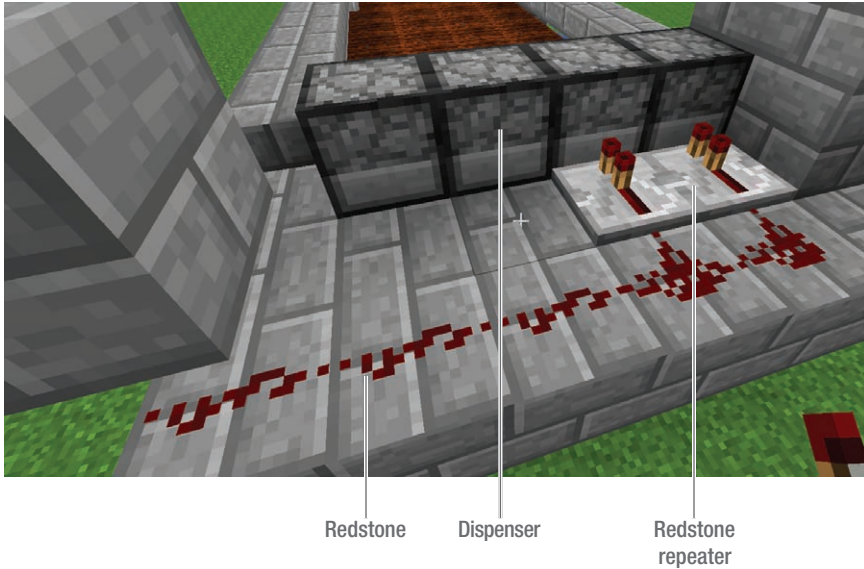
FIGURE 3.13 Demonstrating the placement of repeaters.

Place redstone dust on the block behind each repeater and 1 block to the left or right. Place 1 block of any material on top of the redstone dust that's extending out and not touching a repeater (the block you placed will look like it's floating in the air). Finally, place a button on the front face of the block (**Figure 3.14**).

Right-click each dispenser and move a bucket of water into its inventory. Right-click the button to activate it. It will send a signal to the block below. The signal will travel along the redstone dust, through the repeaters, and into the dispensers. The dispensers will dispense water. Activate the button again and the dispensers will suck the water back up.

You can utilize hoppers to collect your harvest automatically and deliver the items to a chest (**Figure 3.15**). When an item drops onto a hopper, it will be sucked into the hopper's inventory. If the hopper is attached to a chest, it will slowly deliver the items into it.

Dispenser   Redstone   Button

Farmland   Redstone repeater

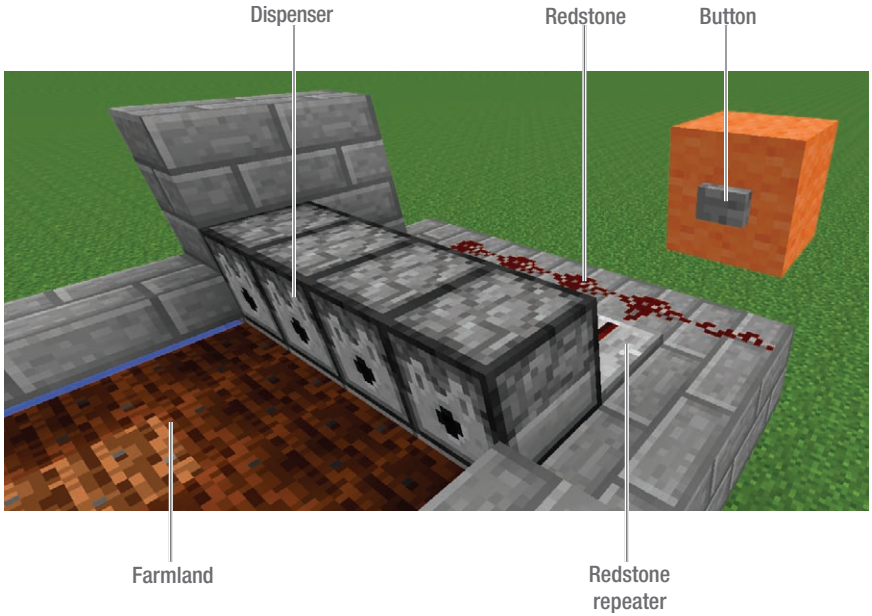**FIGURE 3.14** Proper placement of redstone repeaters, dust, and a button. Here, the redstone runs on stone bricks. The button is placed on orange wool.

Fully grown wheat   Hoppers   Chest

FIGURE 3.15 Hoppers and chests laid out at the bottom of the farm. Each hopper feeds into the one to the right of it, except the last one, which feeds into the chest.

Hoppers attach to the block they're placed against and won't attach to anything around it until the hopper is broken and replaced. To place a hopper against a chest or another hopper, hold the hopper in your hand, press and hold the Shift key, and right-click the side of the hopper or chest.

When your crops are fully grown (**Figure 3.16**), activate the button connected to your dispensers to allow the water to flow. When the water has pushed your harvest down to the bottom, activate the button again and the water will stop flowing, allowing you to replant. Check the chest at the bottom for your harvest.

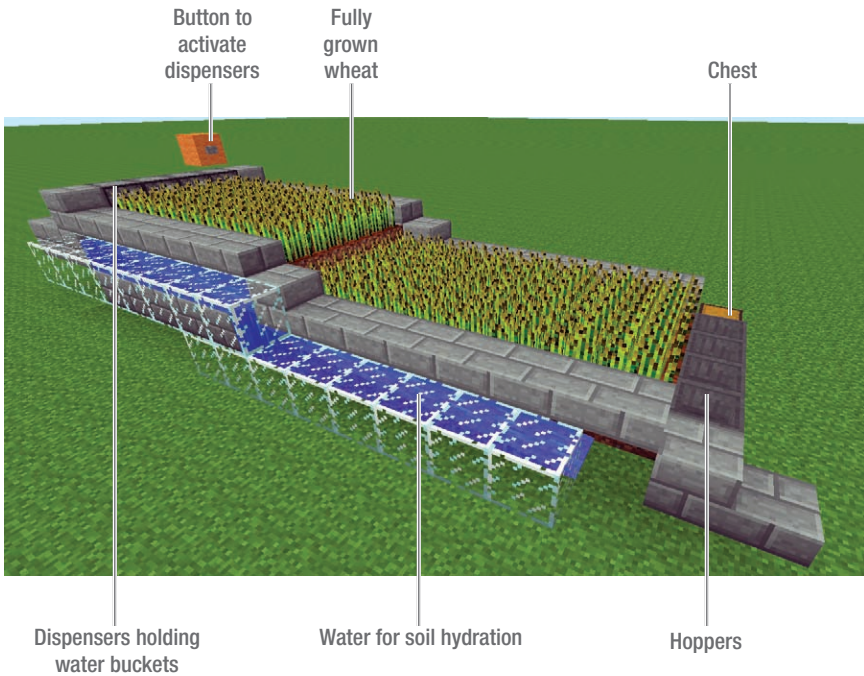**FIGURE 3.16** A completed farm. The wheat crop is ready to harvest.

Trees

Trees grow from saplings—most from a single sapling. You can plant saplings on dirt, podzol, and grass. Trees need a light level of nine in order to grow, but they do not need to be near water. When the wood from the trunk is removed from a tree, the leaf blocks start to decay and will drop saplings. Oak trees drop both saplings and apples.

Minecraft currently has six types of saplings: oak, dark oak, birch, acacia, jungle, and spruce. Generally, the more open space above the sapling, the taller the tree will grow.

- Oak trees grow from a single sapling. To grow, oak saplings need at least 5 blocks of open air directly above them. Taller oak trees have a chance to sprout branches or grow into a large oak tree.

- Dark oak grows from four dark oak saplings sown in a 2x2 square. They need at least 7 spaces of air above them to grow. Dark oak trees have a much lower sapling yield than oak. After you harvest a dark oak tree, you might not have enough saplings to grow another one. Because of this, you'll need a much larger farm to ensure sustainability.

- Birch trees grow from a single sapling. They need at least 6 blocks of air above them and do not grow branches.

- Acacia trees grow from a single sapling and need at least 7 open spaces above them. Branches sprout in the leaf canopy.

- Jungle trees grow from a single sapling and need at least 7 open spaces above. They do not sprout branches. You can grow a giant jungle tree by placing four saplings in a 2x2-block square with at least 13 blocks of air above them. A giant jungle tree grows branches and vines run down its trunk.

- Spruce trees grow from a single sapling and need at least 7 spaces of air above them and 2 blocks all around them. As with jungle trees, it's possible to grow a giant spruce tree by placing four spruce saplings in a 2x2 square. The giant spruce trees need at least 16 open blocks above them.

Tree Farm

The best tree farm to build early on is oak. Oak trees are the easiest to come by in your world, and they drop plenty of saplings. Plus, decaying leaves will sometimes drop apples, which can be eaten.

In addition to being functional, the farm you're going to build will be pleasant to visit. It will include space for 16 saplings and be easy to expand. Because of the sapling spacing used here, you can use this same design for other types of trees, including the giant versions, and yield enough saplings to sustain your farm.

To start, dig out a hole that's 16 blocks by 16 blocks by 1 block deep. Fill the outer three layers with oak wooden planks. This will be your outer path. Place a dirt block in one of the inside corners, and then place a dirt block every 2 blocks until you've placed 16 blocks of dirt inside. Fill in the remaining holes with wooden planks (**Figure 3.17**). Finally, place saplings on the dirt blocks.
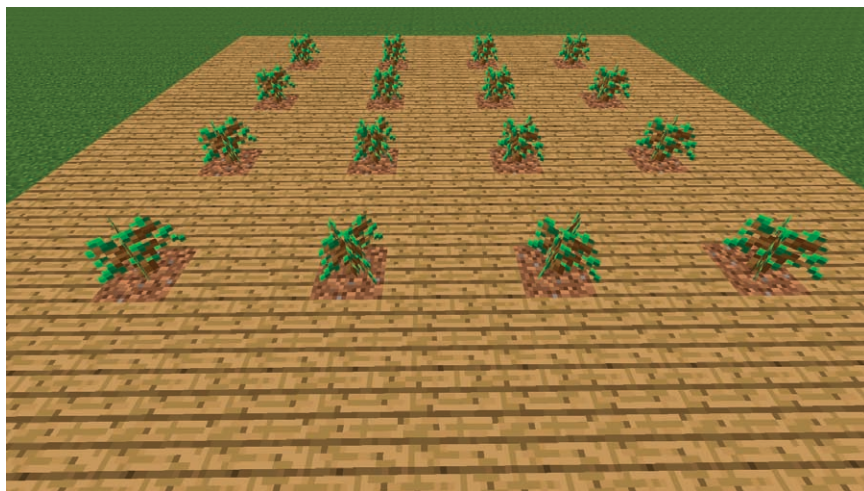

FIGURE 3.17 A basic oak tree farm.

Your choice of building material does not matter, but it's appealing to incorporate the resource you're growing into the building housing it. Later, when you expand the farm to include other types of trees, you can use their wood to add onto your farm.

While you might think that allowing your oak trees to grow large or sprout branches will result in a larger yield, it's actually a great hindrance to creating an efficient farm. Leaves won't fully decay if they're connected to a wood block, and it can be difficult to spot an individual wood block in an area dense with leaves.

The easiest way to prevent the growth of large oak trees is to simply place a block 7 to 9 blocks above where you place a sapling. Blocks at this height can become the floor of the second level of your tree farm (**Figure 3.18**). The second floor, and subsequent floors, of your farm will use the same layout as the floor below it.
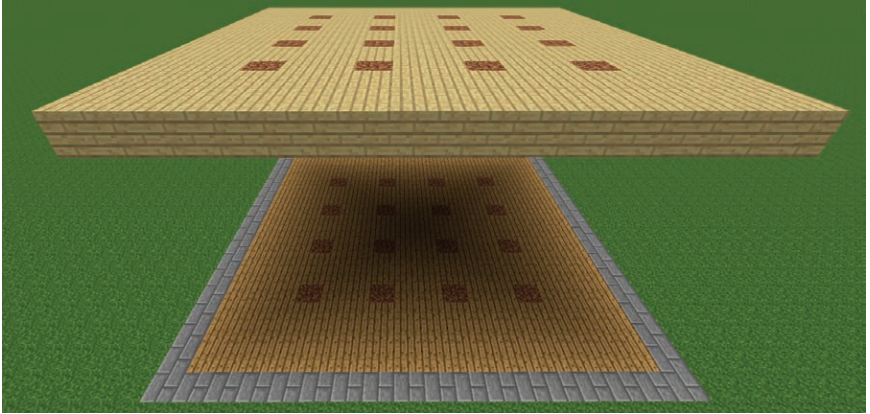
FIGURE 3.18 The second level of your farm will grow birch trees. This floor is set high enough to allow some of the taller oak trees to grow while still preventing the growth of large oaks.

Lighting for the Farm

You could just place torches on the ground to keep your farm lit up, but that makes lighting look like an afterthought. Instead, use recessed lighting with torches in the floor of the first level and glowstone blocks in the floor of the second and subsequent levels (**Figure 3.19**). The glowstone blocks will provide additional light to the room below.

FIGURE 3.19 A fully lit tree farm. Some saplings have grown into trees. The first level is enclosed on three sides with glass panes and edged with stone bricks.

Cactus for Green Dye

Cactus grows naturally in the desert and mesa biomes, but you can farm it in any biome. Cactus, when cooked in a furnace, will turn into cactus green, which can be used to dye wool, hardened clay, or glass. It can be used in fireworks or combined with lapis lazuli to make cyan dye or combined with bonemeal to make lime dye.

Cactus does not grow from seeds. Instead, place a cactus block on sand and wait. It will grow 3 blocks tall. Each block of the plant can then be placed on sand and will grow into a new plant.

However, cactus cannot touch a block on any side.

If growing cactus encounters a block on any side, the cactus block that touches another block will break off. This feature allows you to automate a cactus farm.

First, place a rectangle of blocks (any solid building material, such as stone bricks, will work) 9 blocks wide by 9 blocks deep. Build a 1-block-tall wall around on the sides and the back of the platform (**Figure 3.20**).
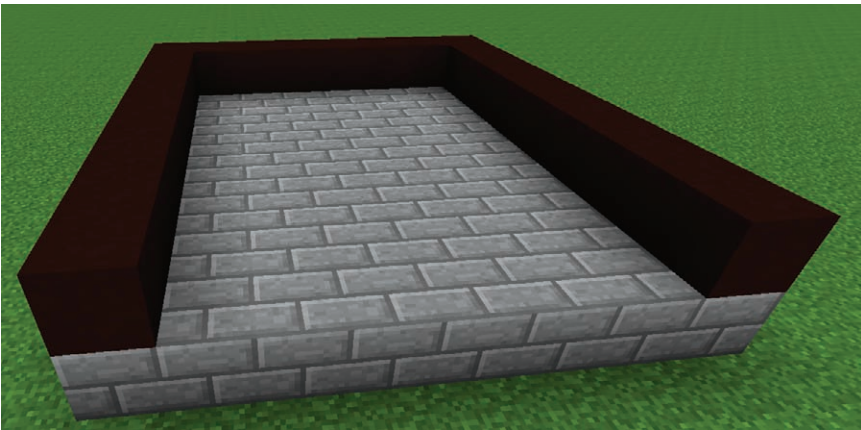

FIGURE 3.20 The base of the cactus farm.

Next, 3 blocks from the left side and 3 blocks from the back, build a 2-block-tall pillar of stone brick blocks. There should be 2 blocks of open space between the left and back walls and the pillar. Build another pillar from stone bricks. There should be 1 block of open air between the 2 pillars and 2 blocks of open

air between the right wall and the back. Build a 5-block-tall pillar between the 2 already there.

Break the bottom 4 blocks on the middle pillar and the bottom block on the pillars to the left and right. You should now have 3 floating blocks (**Figure 3.21**).
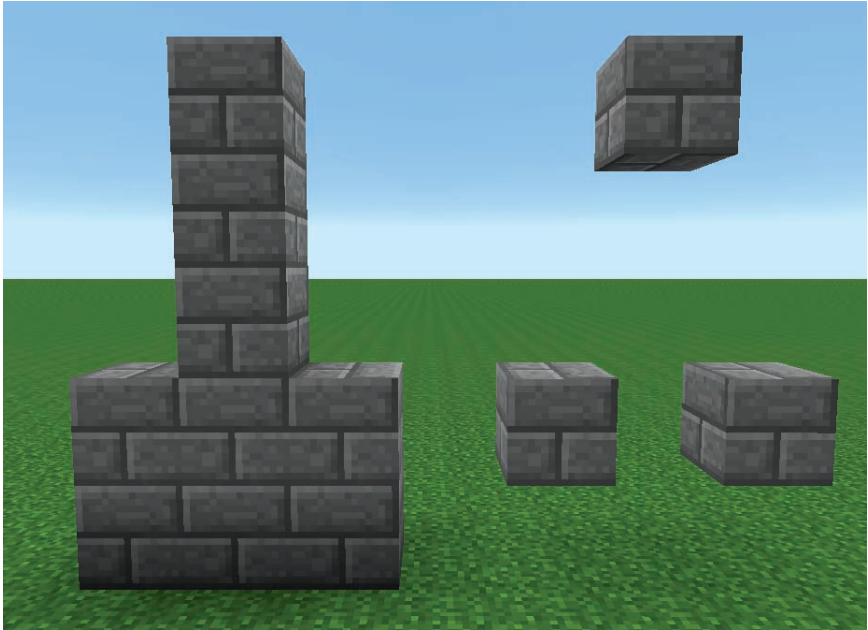

FIGURE 3.21 On the left is the structure you'll have after you construct the pillars. On the right is the base of the pillars that have been removed.

Place 1 block of sand on each of the two lower floating blocks and then a cactus on top of the sand. When the cactus grows, the top cactus block will break off and fall below.

But standing around and waiting for the cactus to break isn't any fun, so you're going to automate the collection. Pour buckets of water on the floor, against the back wall. The water should all flow in the same direction.

As you did for the crop farm, place a chest in front of and 1 block to the right of the platform. Place a hopper so it connects to the chest, and then, moving to the left, place six more so they're all connected (**Figure 3.22**).
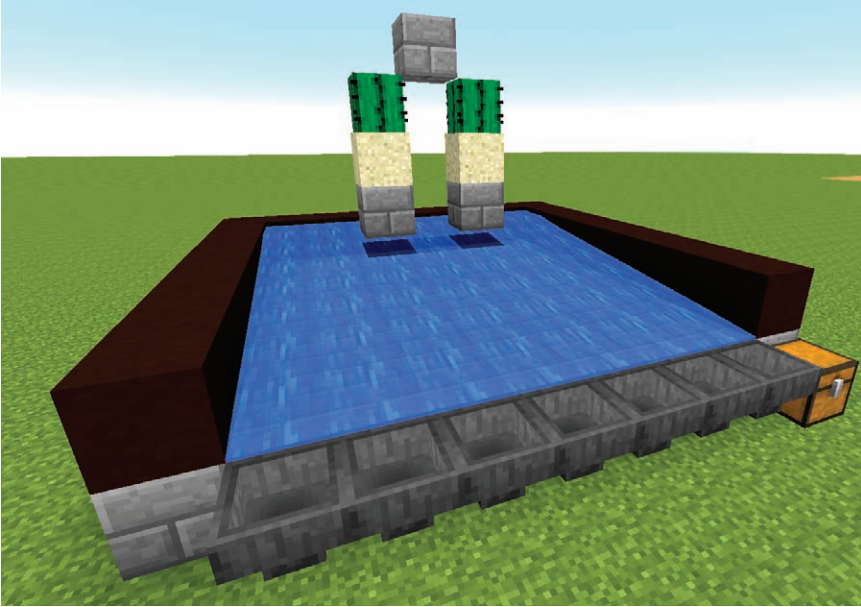
FIGURE 3.22 A fully automated cactus farm.

Now, when the cactus grows and breaks off, the water will push your harvest to the hoppers. The cactus will move through the hoppers and end up in the chest at the end. You can expand this farm by placing four more cactus pads in front of the two already in place or by expanding the base structure to accommodate even more pads. Be sure to leave 1 block of open air between cactus pads.
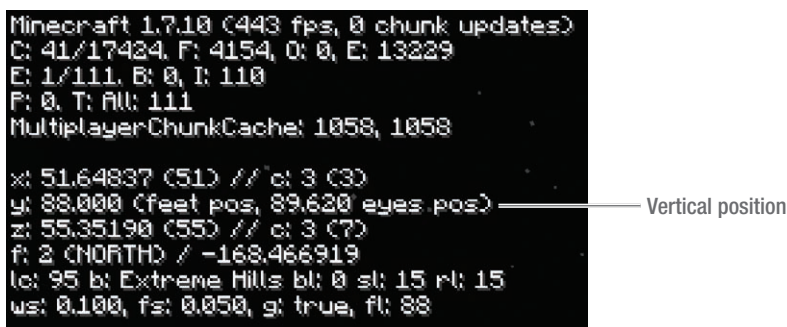
Mining

Mining is an integral part of Minecraft—much of what you can craft and build depends on what you mine. When mining in the overworld, you'll find materials you can use for building; metals you can use for tools, armor, and rails, among other things; and redstone dust you can use for elaborate contraptions. You can use coal as fuel in furnaces and powered mine carts or as a crafting ingredient for fire charges used in fireworks, or you can craft it into a block of coal. You'll also find gravel, which has a chance of dropping flint when dug up with a shovel. Flint is used in the crafting of arrows and an item called "flint

and steel" (hold "flint and steel" in your hand and right-click a block to start a fire). You'll also find gems like diamonds (which are used in a number of crafting recipes, including tools and armor) and emeralds (which can be traded with villagers).

When mining in the Nether, you'll encounter nether quartz and gravel. The most common block in the Nether is netherrack, which, when lit with flint and steel, will burn indefinitely. You'll also find soul sand. Mobs and players move more slowly than normal when walking over soul sand. Nether wart, an ingredient in potions, grows only on soul sand. Glowstone, which is useful for lighting, appears in clusters on the ceiling of the Nether.

Ores, such as iron and gold, are generated in the world at varying levels. The key to an efficient and successful mining trip is to get to the depth of the ore for which you are hunting as quickly as possible. The optimal level for mining is level 11. This will give you access to all of the ores in reasonable concentrations and still keep you (mostly) above the lava pools.

To find your current level, press the F3 key on your keyboard to bring up a debug screen. In the upper-left corner of the screen you should see a bunch of numbers (**Figure 3.23**). The number labeled Y is your vertical position in the world.

FIGURE 3.23 Y is your vertical position in the world. Here, the player is standing at level 88. Your eyes will always be slightly higher. When looking for a certain elevation, you should be looking at where you're standing.

There are three main techniques for mining, with slight variations on each: spelunking (or caving), shaft mining, and branch mining. No matter which technique you choose, always be sure you have torches in your inventory.

Spelunking

Spelunking is simply the exploration of caves or cave systems. Caves (**Figure 3.24**) are a primary feature of a Minecraft world. You'll encounter cave entrances on the surface or while mining or carving out a home. As you explore, mine any ores you see exposed. It's important to bring torches, extra food, and an extra set of tools with you. As you mine, your tools will become damaged until they eventually break. Caves are quite dark, and it's very easy to get lost in a large cave system. In addition to lighting a cave as you go, torches can be used to help you find your way back. An often-used technique is to place torches on the wall to your left as you go. When you're ready to head back to the surface, follow the cave system, keeping the torches on your right side.

FIGURE 3.24 A fully lit cave with exposed iron ore on the far left and gold ore in the bottom.

When exploring, you'll likely encounter a branch of a cave system that you're not ready to explore. If you leave it unlit and exposed to the area you've already explored, you run the risk of having hostile mobs wander out of the darkness. The easiest way to deal with this is to make an X with blocks and place torches on the X (**Figure 3.25**). Not only will this stop mobs from wandering, but it's a signal that you have an unexplored branch.

A cave branch, temporarily blocked by cobblestone.

Shaft Mining

Shaft mining is basically drilling straight down to bedrock, mining any ores or pockets of ore you encounter. One of the fundamental tenets of Minecraft is "Never dig straight down!" It's possibly the most dangerous method. It's hard to get out of the way if you expose lava even if you place ladders as you go. You also run the risk of digging straight through the ceiling of a cave system—taking damage from falling, being attacked by mobs that may be hiding in the cave, or falling straight into a pool of lava. But there are ways to make it a little bit safer.

Be sure you have enough ladders in your inventory to reach from the top of your chute to the level you're digging to. Find a spot to start digging down, and stand in the middle of 2 blocks. Aim your reticle down, and mine the left block (**Figure 3.26**). The right block will continue holding you up. Mine the right block and you'll drop down a level. Choose one side of the hole to place a ladder, and then place one on the wall.
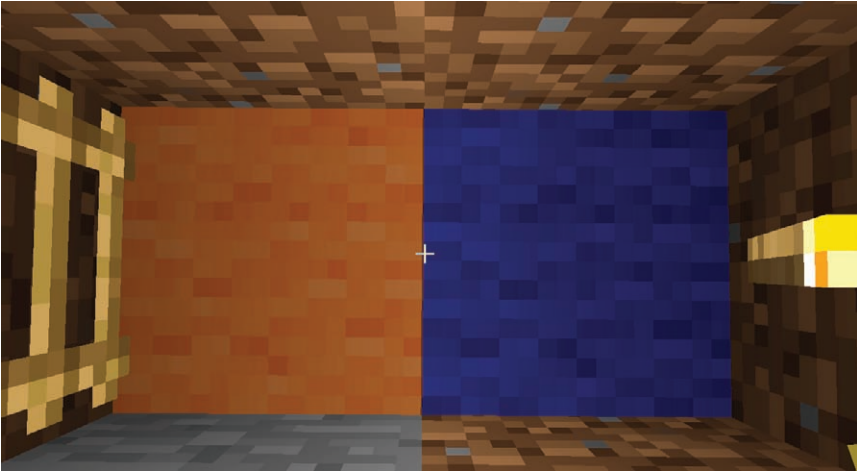

FIGURE 3.26 Alternating between mining the block you're standing on and the one next to it should increase the safety of this method. On the left is a ladder; on the right is a torch.

Each time you dig a level, place another ladder on the wall below the previous one (**Figure 3.27**). Every few blocks, place a torch on the wall opposite the ladders. Continue alternating mining and placing ladders and torches until you reach the level you're aiming for. Alternating between mining the left and right blocks should allow you to stop before you mine straight into a cavern.
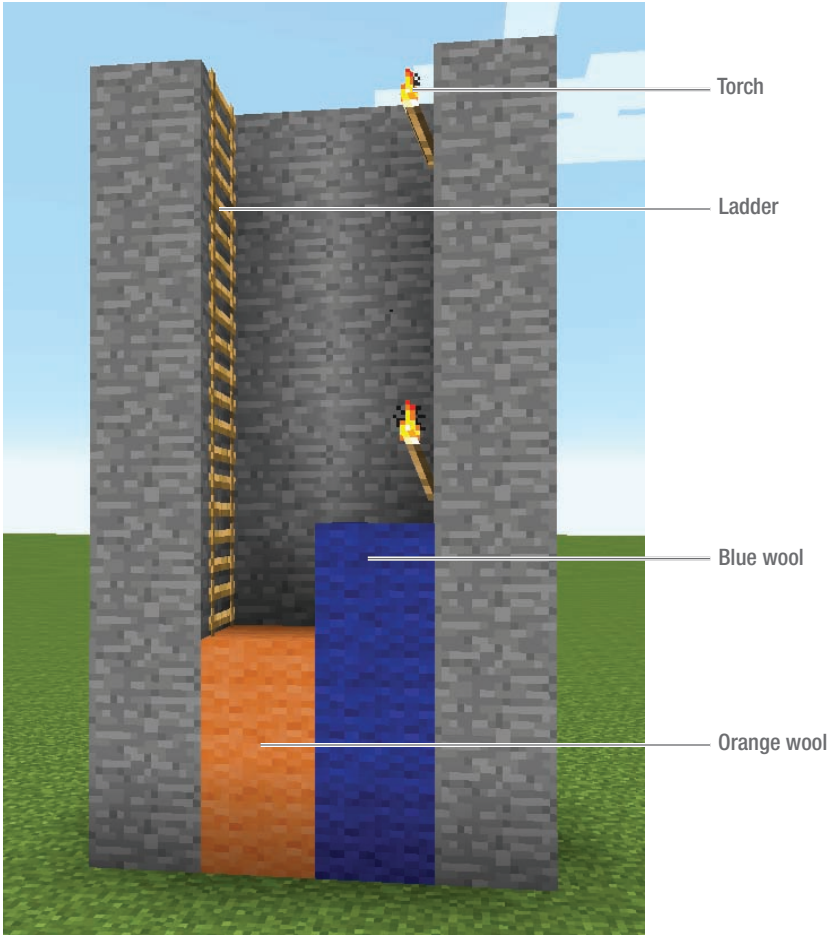
FIGURE 3.27 This side view demonstrates alternating between mining and placing ladders and torches. The orange and blue wool blocks demonstrate where you'll be digging.

Head back to the surface, leave 2 blocks of unmined material between the hole you've just dug and the new hole (**Figure 3.28**), and repeat the process.

FIGURE 3.28 Leaving 2 blocks of space between the holes ensures you expose all surfaces, without having to mine extra.

Branch Mining

Branch mining allows you to reach a desirable level quickly and mine materials with less danger than shaft mining. You first carve a staircase or dig a shaft to the level you'd like to mine (level 11 is most efficient, but any level works). If you've dug a shaft down to the level, you'll find it tedious to climb up and down the ladder each time you need to transfer materials between the surface and your mine. While you can't avoid having to climb up the ladder, you can build a drop chute.

To build a drop chute, dig a 2-block-wide tunnel straight down, as if you were shaft mining. Place ladders on one side of the shaft as you dig down. Suspend water at the bottom (**Figure 3.29**).

Water flow can be stopped by placing blocks, but you need to be able to fall all the way through the water. Use a sign instead; it will stop the water but won't stop you from falling.

When you want to get to the bottom, simply jump in the hole. Ordinarily, falling from a great height will kill you. However, falling through water will slow you down enough that you don't take any damage.
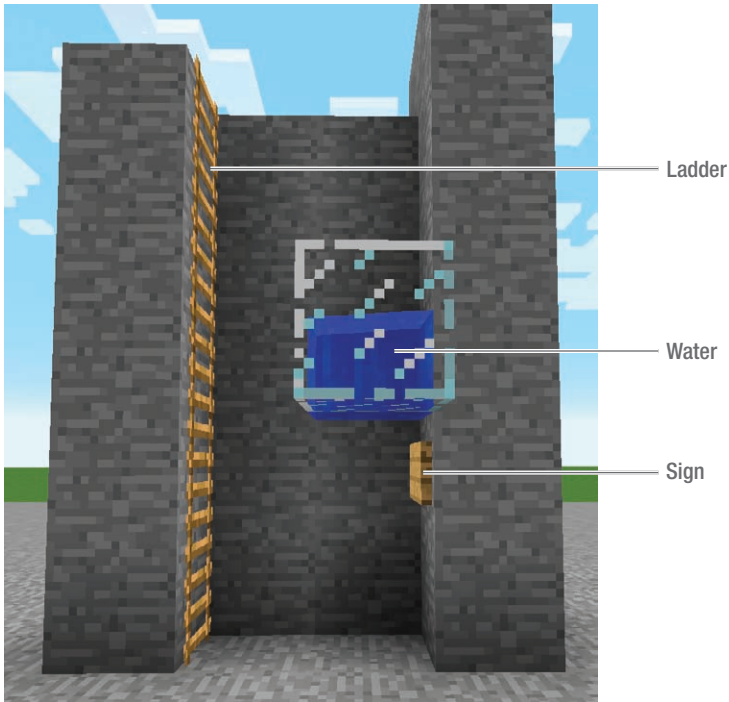
FIGURE 3.29 A cutaway side view of the bottom of a drop chute.

Once the drop chute is completed, carve out a room that's 10 blocks wide by 10 blocks deep by 4 blocks high. Initially, this will give you enough space to place some chests and a furnace or two.

Pick any direction and mine out a tunnel or branch that's 1 block wide by 2 blocks high by 11 blocks deep. Place a torch at the entrance and a torch on the ground at the end of the branch.

Two blocks to the left or right of the tunnel you've just dug, place a torch on the ground, mine another branch with the same dimensions as the first, and place another torch at the end (**Figure 3.30**).

When you're ready to start on another level, dig out a staircase up to the second level above the floor. Start your branching 1 block to the left or right of the tunnels below (**Figure 3.31**), and then follow the same spacing pattern as the first level.
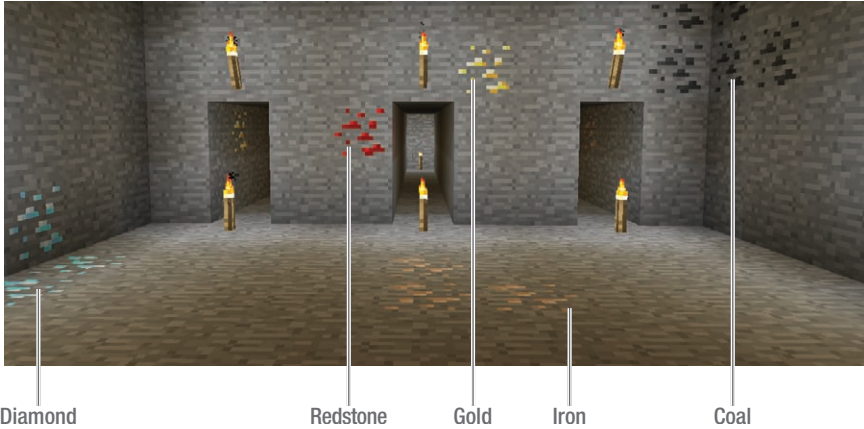
Diamond   Redstone   Gold   Iron   Coal

FIGURE 3.30 The beginning of a branch mine. Your branches can be as deep as you'd like, but following the width, height, and spacing pattern will ensure that you expose as much ore as possible.
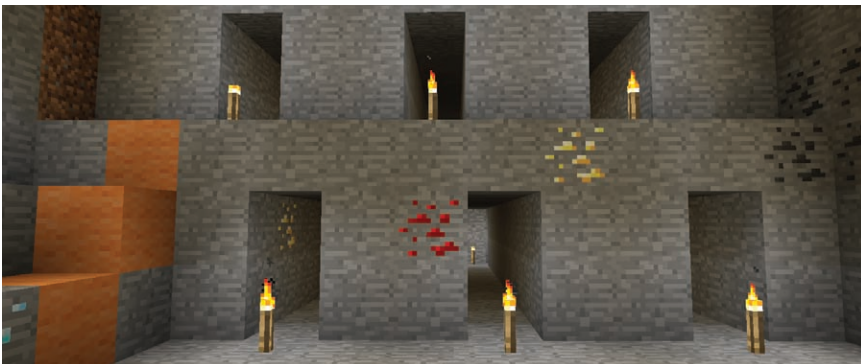

FIGURE 3.31 Adding onto the branch mine. The second level is offset by 1 block in order to expose more ore. The staircase is demonstrated by orange wool on the left.

Summary

In Minecraft, your creativity is limited only by the materials you can gather. Take advantage of the techniques described in this chapter and there will be no limits on what you can build. Automated farms and efficient mines will help you spend less time gathering materials and more time working on your masterpiece.