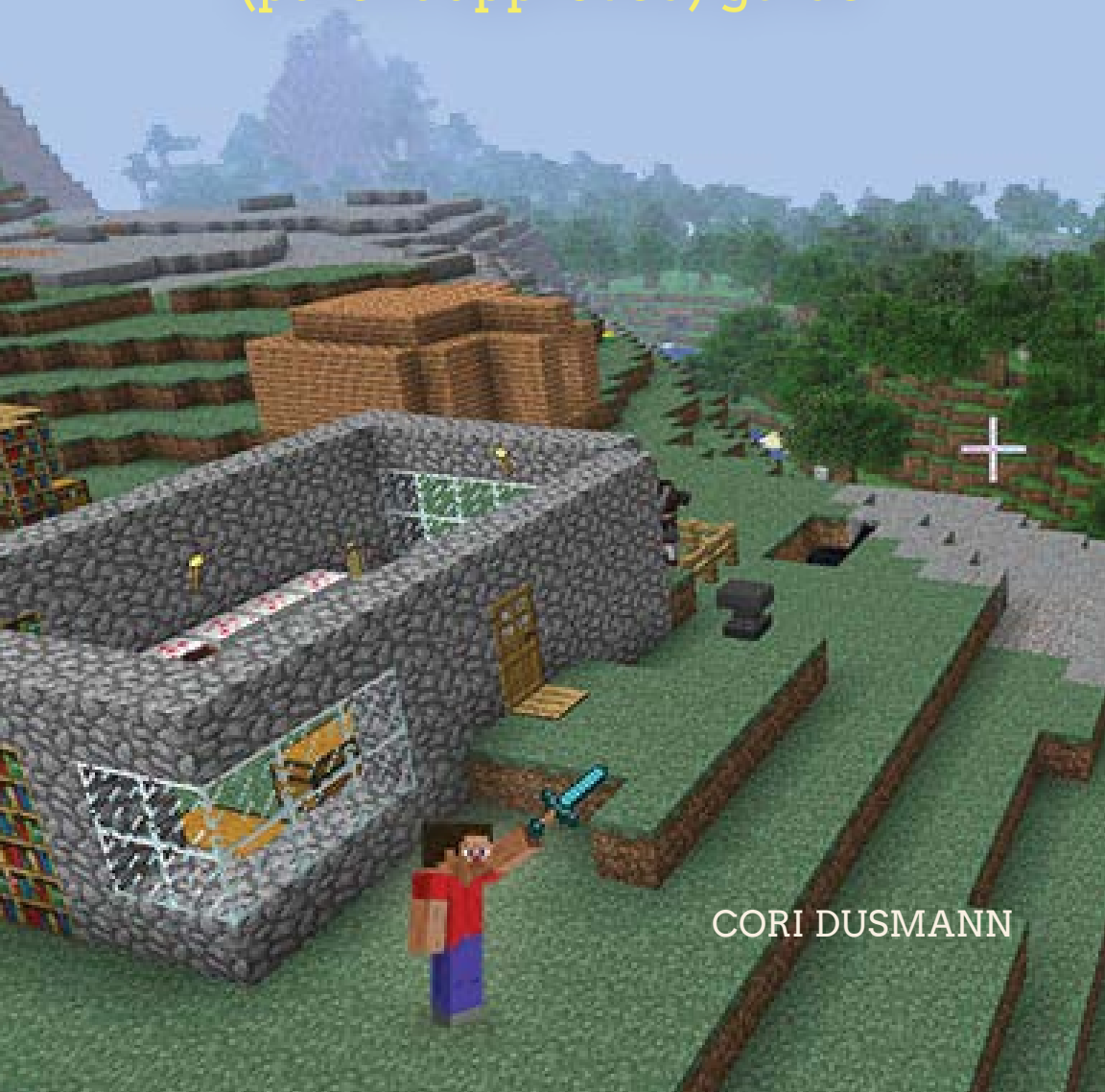


# A MINECRAFT MINI-ENCYCLOPEDIA

Dig into Minecraft with this  
(parent-approved) guide



CORI DUSMANN

## ***A Minecraft Mini-Encyclopedia***

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Peachpit Press

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# Minecraft Basics

As its name suggests, Minecraft is a game in which you need to mine for (and otherwise harvest or collect) materials, which you can then craft into other items and materials. These materials largely consist of blocks that can be placed and removed to create pretty much anything you can imagine. Blocks can be made of stone, wood, glass, clay, wool, or fancy ores, and many can be crafted into a variety of forms. Other items include tools, food, books, potions, and so much more. Add to this all the creatures in the game, both friendly and hostile, and there is a lot to learn and discover.

One of the amazing things about Minecraft is that it is constantly changing and being updated. The creators at Mojang regularly release updates that introduce new blocks, items, and mobs. Players can get a glimpse of what is coming with something Mojang calls *snapshots*. Snapshots are pre-release versions of an update that players can download and try out. Because of these updates, books like this sometimes don't have the most up-to-date information. Version 1.8 is being released as this book is being completed, so while we look at some of the newest additions, they may change a bit.

It's always a good idea to check the wiki for the most recent information on things you're interested in. Of course, there is also much that won't change—we take a look at some of those items, mobs, places, and more.

## It's a Crafty Business

Although the name of the game is Minecraft, many more ways exist to gather materials than simply mining, but there's just one basic way to craft them. Using a crafting bench and recipes, plus the required materials, you can build almost any item found in the game.

### Crafting Basics

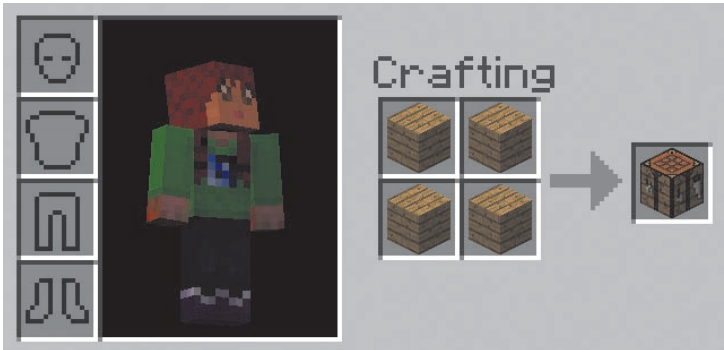
Crafting is the act of taking materials (also known as *mats*) and, using the crafting grid in your personal inventory (accessed by pressing E) or a crafting bench, creating something new from those mats. For instance, a player could take eggs, sugar, wheat, and milk, and by placing them in specific places on the grid in their crafting bench, make a cake (**Figure 1.1**). The items needed to craft something and their specific placement are called a *recipe*. A recipe could be for making a food item, such as cake, or a piece of armor, such as an iron chest plate.



**FIGURE 1.1** The recipe for a cake, in place on a crafting bench grid.

Crafting a bench is simple. It is likely the first thing you'll make, because you'll need a crafting bench to create almost everything else. You need four planks, which you get by punching a tree; the tree will drop logs. When you open

your inventory (by pressing E), you will see a 2x2 crafting grid on the right. When you place your log in the grid in the left, it will show you planks with the numeral 4 in the box on the right, indicating that one log makes four planks. Pick up those planks by hovering your cursor over them and then clicking. Drag them to the grid again, placing a plank in each of the four grid squares. A crafting bench will show in the square on the right (**Figure 1.2**).



**FIGURE 1.2** The crafting grid in your inventory, showing how to make a crafting bench or table using four planks.

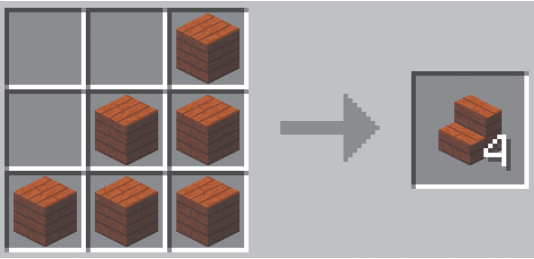
To use a crafting bench, you need to place it by holding it in your hand and right-clicking. Right-click it again, and your 3x3 crafting grid will open. Place the recipe items in the correct squares on the grid, and then pick up the item that appears in the single box by clicking.

You can distribute items along the crafting grid by right-clicking and holding the button down as you move over the grid—this will divide the items evenly between the squares you move over. You can also use your right mouse button to divide a pile of the same item in half. If you want to make more than one of an item, simply place that many of each of the items in the recipe grid and pick up all of them at once.

Most recipes require that you put the items needed into specific spots on the grid, such as making a torch by placing a piece of coal or charcoal directly above a wooden stick. These are known as shaped recipes. Some others, like making dye from flowers, are shapeless—it doesn't matter where on the grid you put your items.

## Basic Recipes

Many recipes for shaped objects are the same no matter what materials you use. If you're building stairs, you'll place six blocks in the crafting table in a step shape (**Figure 1.3**), although those blocks might be cobblestone, stone brick, sandstone, red sandstone, any of the six types of wooden planks, nether brick, or quartz. When we're looking at recipes that can be crafted with many materials, I'll just show one material and list the others that also could be used.



**FIGURE 1.3** Stairs recipe: six blocks will give four sets of stairs. Stairs can be made from any of the six types of wood, cobblestone, stone brick, sandstone, red sandstone, nether brick, or quartz.

## Types of Basic Block





























Minecraft has close to 400 unique items. We can't explore them all here, but we can take a quick look at some of the basic ones.

### Wood

One of the main blocks in the game, and one that is vitally important in order to progress, is wood. When you start, you're able to punch trees with your bare hands to collect wood logs. You'll use wood to craft your first tools, a chest and crafting bench, handles for torches, and doors for your house.

You can punch a tree to break it into logs, but once you make a crafting bench, you can craft an axe, which will make the job of chopping trees for wood much easier.

Wood logs can be crafted into planks, which can then be used to make stairs, slabs, fences, and doors. Each wood has its own color and appearance (**Figure 1.4**), which is reflected in the planks and the items you craft.

Saplings	Leaves	Logs	Planks	Slabs	Stairs	Fences	Doors	
								Oak
								Spruce
								Birch
								Jungle wood
								Acacia
								Dark oak

**FIGURE 1.4** Types of wood, and how each appears in different forms.

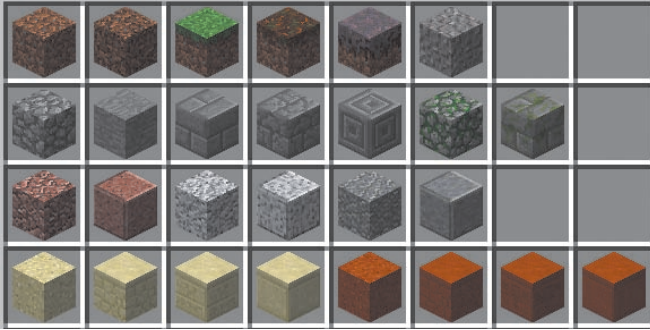
When you cut down a tree, you need only cut the trunk; the leaves will slowly despawn, likely dropping a sapling or two as they do, which you can plant for new trees. Sprinkling bonemeal on planted saplings will help them grow faster. Dark oak trees will grow only if you plant four saplings in a 2x2 square. Spruce and jungle saplings can also be planted in this way for super tall trees.

## Stone, Sand, Dirt, and Gravel

You can fairly easily collect dirt, gravel, stone, and sand (**Figure 1.5**).

Dirt and gravel can't be crafted into other forms, although dirt is needed for farming and is quick to dig with a shovel, making it useful for scaffolding. Coarse dirt, recently introduced, is a darker color and is found in the savannah, taiga, and mesa biomes. It can also be crafted with two blocks of gravel and two blocks of dirt, and when it is tilled with a hoe it becomes regular dirt.

Grass blocks, podzol, and mycelium are similar to dirt but with special properties. They all turn into regular dirt when they are dug up, unless you use a shovel that has been enchanted with Silk Touch, a somewhat rare enchant that allows you to harvest materials in their original form.



Row 1: dirt, coarse dirt, grass, podzol, mycelium, gravel

Row 2: cobblestone, smooth stone, stone brick, cracked stone brick, chiseled stone, mossy cobblestone, mossy stone brick

Row 3: granite, polished granite, diorite, polished diorite, andesite, polished andesite

Row 4: sand, sandstone, chiseled sandstone, smooth sandstone, red sand, red sandstone, chiseled red sandstone, smooth red sandstone

**FIGURE 1.5** The dirt, gravel, stone, and sand blocks to be found and crafted.

Grass blocks are dirt with grass on the top. When placed, the grass will spread to other dirt blocks (although it won't spread to coarse dirt). Podzol looks more like composted dirt; it is a specialized dirt that can grow mushrooms. You can find mycelium only in the Mooshroom Island biome; it is also used to grow mushrooms. Like grass, and unlike podzol, it will expand to connected dirt blocks.

Gravel and sand (regular and red sand) share the unique property of being affected by gravity, meaning that when they are placed, they will fall until they reach a solid block; other blocks remain suspended where placed. You can smelt sand and red sand in a furnace to create glass (more on glass later) and use it to craft sandstone, smooth sandstone, and chiseled sandstone.

You can craft stone into many forms, which gives it great flexibility as a building material. When you mine stone, it will turn to cobblestone, unless you use a pick that has a Silk Touch enchantment on it that will leave it in its original form. You can return cobblestone to its smooth stone form by smelting it in a furnace, and it can be crafted into slabs, fences, and stairs that have a cobblestone texture.



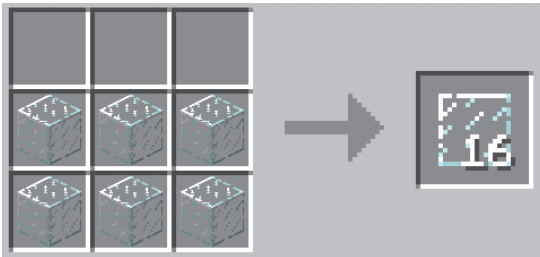
Smooth stone can be crafted into slabs, and it can also be crafted into stone brick, which in turn can be crafted into stairs and slabs.

As of the version 1.8 update, stone brick can also be combined with vines to make mossy stone brick (previously only found in dungeons). Stone brick slabs can be crafted into chiseled stone, which had only been found in jungle fortresses prior to the update.

Some new types of stone have been added: granite, diorite, and andesite. These stones are found when mining but can also be crafted with specific recipes. All three can be crafted into smooth versions, much like cobblestone, but cannot be crafted into stairs or slabs.

## Glass

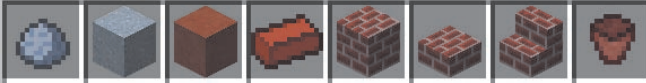
Glass is made by smelting sand in a furnace. Once you have glass blocks, you can craft panes of glass from them on your crafting bench (**Figure 1.6**). Glass can be dyed one of 16 colors, making stained glass. If you want to have colored panes of glass, you need to dye the blocks first and then make the glass panes.



**FIGURE 1.6** Glass pane recipe: six glass blocks (of any color).

## Clay

Clay (**Figure 1.7**) is found in riverbeds and on the ocean floor. Unless your shovel has a Silk Touch enchant, you will get balls of clay that you can craft back into blocks.



**FIGURE 1.7** From left to right: clay ball, clay block, hardened clay, clay brick, brick block, brick slab, brick stairs, and flower pot.

You can smelt clay balls into clay bricks, which you can then craft into brick blocks. Brick blocks can be crafted into stairs and slabs and are often used as a main building material for houses, foundations, roofs, and fireplaces. Clay bricks are also used to make flower pots.

If you use unsmelted clay balls to form clay blocks, the blocks can be hardened in a furnace and then dyed. Because hardened clay has a reddish tone, when it is dyed the result will also be more reddish. For instance, any blue dyes will become more purple when put on hardened clay. We'll look at dyeing clay in the "Dye" section.

## Ores

Ores are the minerals in the game, like coal, iron, redstone, and diamond (**Figure 1.8**). There are two types of ore: those that need to be smelted, like iron and gold, and those that shatter into pieces when mined, like coal, redstone, lapis lazuli, emerald, diamond, and nether quartz. When you smelt gold or iron, the bars are called ingots, and they can be crafted into blocks by placing nine ingots on a crafting bench.

Coal	Redstone	Lapis lazuli	Emerald	Diamond	Nether quartz		Gold	Iron	
									Raw ores
									Ingots
									Blocks
									Nugget
Top row: raw ores		Middle row: mined ores			Bottom row: crafted blocks				

**FIGURE 1.8** Ores in their raw, mined, smelted, and crafted forms.

When you are mining these ores, you should use the correct pick. Although you can use a stone pick to mine coal, lapis lazuli, iron, and nether quartz, you can't mine redstone, gold, emeralds, and diamonds with anything weaker than an iron pick. A diamond pick is the strongest, and you'll need fewer hits to break the ore. Enchanted tools are the best, as a Silk Touch enchant allows you to mine ores and blocks without altering their original form, and Fortune will cause blocks you mine to drop more of the ores. These can't be applied to the same tool, but they can be enchanted alongside an Unbreaking enchantment, which makes gear last longer, or an Efficiency enchant, which helps you mine more blocks in less time.

## Other Building Blocks

Many other types of block exist. Some are found in the Overworld, like wool, obsidian, ice, and packed ice, while others require you to travel to other dimensions. You can find end stone only in the End, and you can find glowstone, soul sand, and netherrack only in the Nether. You can even use some food blocks, like pumpkins and melons, for building.

- Wool is harvested from sheep. You'll get one block of wool when you kill a sheep, whereas shearing them will cause the sheep to drop one to three blocks, and they will regrow their wool if they have grass to eat.  
You can dye blocks of wool or an entire sheep one of 16 colors. It takes one dye per wool block or one dye per sheep, and since sheep can be shorn repeatedly, it makes more sense to dye the sheep than the individual pieces of wool. Sheep and wool can be re-dyed another color as well.  
Dyed wool can be crafted into carpets or used to craft banners.
- Ice is found in snowy biomes and can be harvested with a pick. It is slippery, so when you run on it you can move faster. You can use it to move items more quickly in harvesters. Ice melts when there are torches close by.
- Packed ice is found only in the hard-to-find Ice Plains Spikes biomes. It doesn't melt, making it a better building block than ice.
- Obsidian is a deep black, hard stone that can be mined only with a diamond pick. It is formed when lava and water meet. It can also be found in pillars in the End. Obsidian is the hardest minable block in Minecraft (bedrock can't be mined in survival games) and is useful when making explosive-proof defenses.

You need obsidian to make Nether portals, which you form by making a minimum 4x5 obsidian frame and lighting the inside.

- Prismarine occurs in ocean monuments, a new structure introduced with the 1.8 version update. Prismarine, prismarine brick, and dark prismarine, along with glowing sea lanterns, are new blocks that you can mine in the monuments. You can also craft them from prismarine shards and crystals, which are dropped by the guardian mob, a fish that lives in and near the ocean monuments.
- Nether blocks occur in the Nether (**Figure 1.9**). Most of the Nether is formed of netherrack, which is easy to mine (and lava, which is easy to fall into). With care, though, you can quickly collect netherrack, which can be smelted to form nether bricks. Nether bricks can be crafted into nether brick blocks, and from there into slabs and stairs.



**FIGURE 1.9** Blocks, ores, and items found in the Nether.

You will find nether quartz mixed in with the netherrack. It can be collected like the other ores and crafted into quartz blocks, which can be used to make chiseled and pillar quartz blocks as well as slabs and stairs.

Soul sand is found in patches throughout the Nether and has the unique property of slowing you or mobs down when it is walked on. When placed in water or on ice, the effects are magnified, making it useful for traps. It is also the only block that you can grow nether wart on.

## Dye

Dyes are crafted from various items found in the game: flowers, squid ink sacs, mined lapis lazuli gems, and harvested cocoa beans and cactus.

Dyes come in 16 colors. You use them to color wool, glass, clay, and leather armor. You also use dye to color firework stars, craft banners, and change the color of a dog's collar.

## Crafting Dye

To craft the dye, you simply put the dye ingredient into a crafting grid and collect the dye. These are shapeless recipes—you can place the ingredient anywhere in the grid. Most dyes are craftable with a single ingredient, and may have more than one recipe (**Figure 1.10**), but a few need to be made by combining two dyes (**Figure 1.11**).

	Red: poppy, red tulip, rosebush
	Orange: orange tulip
	Yellow: dandelion, sunflower
	Green: cactus (must be cooked in furnace)
	Blue: lapis lazuli (doesn't need to be crafted before use)
	Light blue: blue orchid
	Magenta: lilac, allium
	Pink: peony, pink tulip
	White: bonemeal (crafted from bones)
	Light gray: Azure bluet, white tulip, oxeye daisy
	Black: ink sac (doesn't need to be crafted before use)
	Brown: cocoa beans (doesn't need to be crafted before use)

**FIGURE 1.10** Many dyes can be crafted from a single ingredient, and often there is more than one way to craft them.

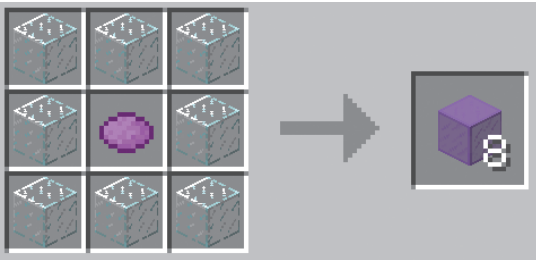
				Lime green: combine green dye and bonemeal
				Cyan: combine green dye and lapis lazuli
				Purple: combine red dye and lapis lazuli
				Gray: combine ink sac and bonemeal

**FIGURE 1.11** These dyes need to be crafted by combining two dyes on a crafting bench.

## Dyeing Wool, Clay, and Glass

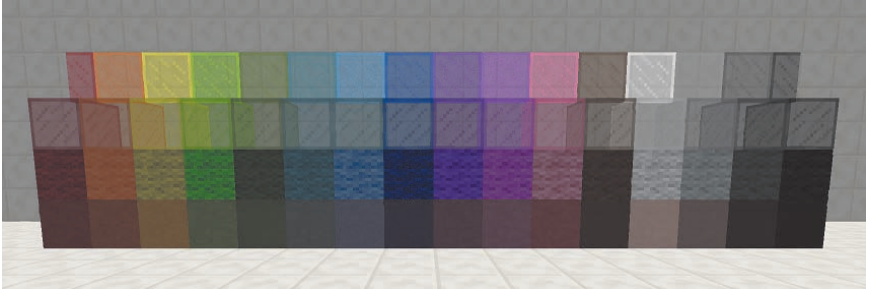
When dyeing wool, you need one piece of dye for each block of wool, and you can just drop the dye and wool in the crafting bench. To color carpets, you need to dye the wool blocks before crafting them into carpets.

When you are dyeing (or staining) blocks of glass or hardened clay, however, you place one piece of dye in the center of the crafting grid, surrounded by eight blocks of glass or clay (**Figure 1.12**). As with the wool, if you'd like stained glass panes instead of blocks, you must dye the blocks before crafting the panes.



**FIGURE 1.12** Stained glass or clay recipe: place 8 blocks around the dye.

Even though the dye is the same, the effects are different for wool, clay, and glass due to the nature of the materials being dyed. The transparency of the glass changes the vibrancy of the colors, and the red tone of hardened clay is blended with the dyes, changing the resulting color (**Figure 1.13**).



**FIGURE 1.13** From top to bottom: Stained glass panes, stained glass blocks, dyed wool, stained clay.

## Dyeing Leather Armor

You can dye leather armor, but unlike any of the other methods of dyeing, you can combine dyes, both on the crafting bench or by adding colors to previously dyed armor (**Figure 1.14**). Thanks to the many color choices, you have millions of tones and shades to choose from, and it can be great fun to play with the options.



**FIGURE 1.14** When dyeing leather, you can combine dyes to make unique color combinations.

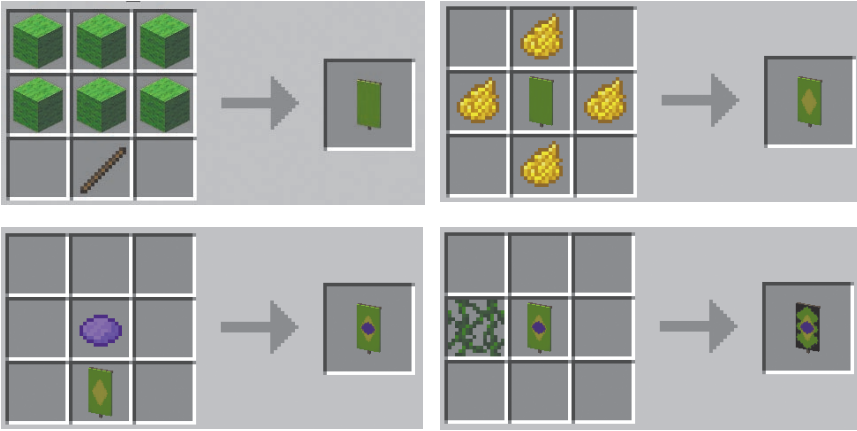
## Banners

Crafted from wool and sticks, banners are an exciting new decoration that can be hung on walls or placed on the floor. You can use dyes and items like vines, mob heads, and golden apples to create virtually endless and unique designs.

You can create patterns on a banner by placing the banner and the dye or other items in specific places on a crafting bench. You can layer up to six

designs, wash them off one layer at a time in a cauldron, and copy them using a blank banner.

You can craft lots of patterns, including stripes, borders, shapes, and symbols. Experiment with them and check the wiki for basic recipes. **Figure 1.15** shows you the basic banner pattern with three patterns layered over it.



**FIGURE 1.15** A basic banner recipe: 6 wool blocks, stick (top left), 4 pieces of dye around the banner for a diamond (top right), a single dye above the banner for a circle (bottom left), and vines beside the banner for a wavy border (bottom right).

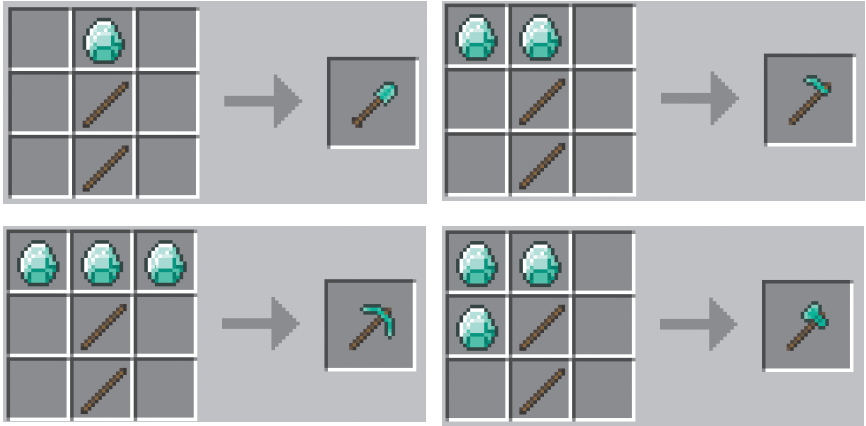
## Tools and Gear

Basic tools and gear will be some of the first things you'll craft. The main tools are the pickaxe, shovel, hoe, and axe (**Figure 1.16**), but tools like flint and steel, shears, fishing rods, and leads will come in handy as well.

Use your crafting bench to make your tools, using wooden sticks to make the handles and using wood, stone, gold, iron, or diamond for the heads.

The materials you choose (or have available) will affect how well your tool works and how long it will last. Some ores need an iron or diamond tool to be mined. When you start to use a tool (and this applies to armor as well), a meter will appear on the tool in your inventory, showing its durability.





**FIGURE 1.16** Basic tools: shovel, hoe, pickaxe, and axe here are made from diamond, although they can be crafted from wood, stone, gold, or iron as well.

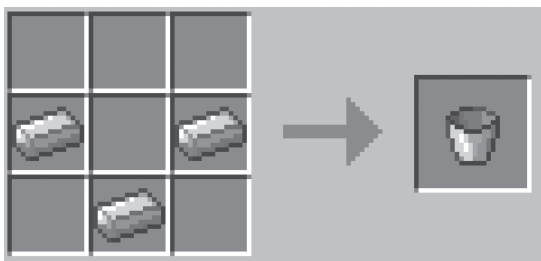
Wooden tools are the least durable, diamond tools the most. Stone tools are great for starting out or for quick jobs, but they're not strong enough to mine all blocks. Gold, while pretty, is soft and will wear out quickly. Iron is a strong material that is less costly than diamonds, making it a good choice for basic tools until you've mined enough diamond (which you can only do with iron or diamond tools). If you use a tool on a block that it isn't suited for, such as cutting trees with a pick, it will take you longer and the tool will wear out faster.

Tools can be enchanted on an enchanting table by using experience points or by using an enchanted book with an anvil. They add specific bonus properties to your gear. If you put an Unbreaking enchantment on a tool, for example, it will last longer. You can repair and name tools on an anvil, but this takes both experience points and more of the material you use to craft your tool. When you name items, the name shows in your inventory. Named weapons show in death messages if you use them to kill an opponent. Because of the cost in experience points, you might want to use your enchantments for iron or diamond tools, which have the best endurance.

Tools have varying levels of efficacy, such as how many hits it takes to break a block. Diamond and iron are more efficient than wood, stone, or gold, meaning it takes fewer hits to break the block. You can get an Efficiency enchantment that means it will take fewer hits to break blocks, letting you work faster.

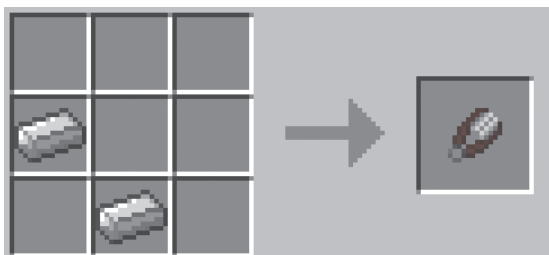
You will likely want to make other tools and items such as buckets, shears, and leads.

- Buckets can be used to carry water, lava, and milk and are incredibly useful tools (**Figure 1.17**). You'll need a bucket to carry water for a farm, though a bucket of water in your hotbar (your main inventory, which shows at the bottom of your screen) can be a lifesaver when you are mining or exploring lava-filled caves. A bucket of milk can save your life if you are attacked by poisonous cave spiders or encounter a potion-throwing witch, because drinking milk is an antidote for their poison.



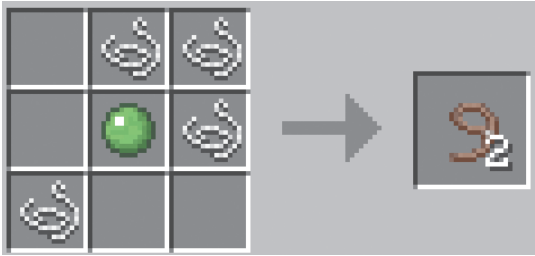
**FIGURE 1.17** Bucket recipe: 3 iron ingots.

- Shears are needed to shear sheep, giving you more wool than if you kill the sheep (**Figure 1.18**). You can also use shears on trees, which will give you leaf blocks, as opposed to cutting down the trees, which will result in the leaf blocks disintegrating. Shears are also helpful with cobwebs, turning them to string, and if you put a Silk Touch enchantment on shears with an enchanted book, you can use shears to collect cobwebs without breaking them.



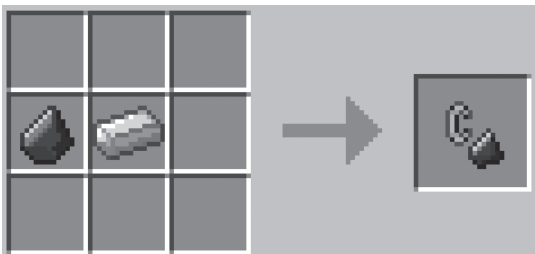
**FIGURE 1.18** Shears recipe: 2 iron ingots.

- Leads are great tools for moving and containing mobs (**Figure 1.19**). By right-clicking the animal with the lead in your hand, you'll attach it and be able to pull it along. Right-click again on a fence and the lead will be tied to it. You can lead more than one animal at a time, each on a separate lead. While you're riding a horse or donkey, you can use a lead to bring a second horse or donkey along.



**FIGURE 1.19** Lead recipe: 1 green slime ball and 4 pieces of string.

- Flint and steel are used to start fires (**Figure 1.20**), but be careful, because trees and wooden houses are flammable, and it would be sad to see everything go up in flames. This is a handy tool for lighting Nether portals. Flint and steel can also occasionally be found in dungeon and fortress chests.



**FIGURE 1.20** Flint and steel: flint and iron ingot.

- Fishing rods are useful tools (**Figure 1.21**). Not only can you use them to catch fish (a good food source and needed to tame ocelots into cats), but you can also “catch” other items when you are fishing. The list of items you can catch is lengthy and divided into treasure and junk by Mojang. Some of the treasures include rare, uncraftable saddles and nametags, enchanted books, and fishing rods. Some of the junk includes useful items like leather, bottles, and ink sacs, though you might just catch boots (old,

used, and without enchantments) or rotten flesh. You can enchant fishing rods with Lure or Luck of the Sea enchantments, which will speed up your fishing and increase your odds of getting a good catch.

If you craft a fishing rod with a carrot, you'll get a carrot on a stick, which is needed if you want to saddle up a pig and go for a ride.



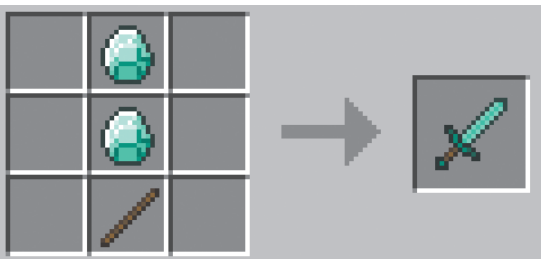
**FIGURE 1.21** Fishing rod recipe: three wood sticks and two pieces of string.

## Weapons and Armor

Weapons and armor are necessary tools if you're playing a survival game, and fun to play with even in Creative mode.

### Weapons

Swords (**Figure 1.22**), needed for defense from hostile mobs and to hunt animals for food, are crafted with a wooden stick for a handle, and wood, stone, gold, iron, or diamond for the blade (**Figure 1.22**). The properties are the same as for tools—iron and diamond last longer and are better than wood, stone, or gold.



**FIGURE 1.22** Sword recipe: one wood stick and two diamonds (also craftable from wood, stone, gold, and iron).

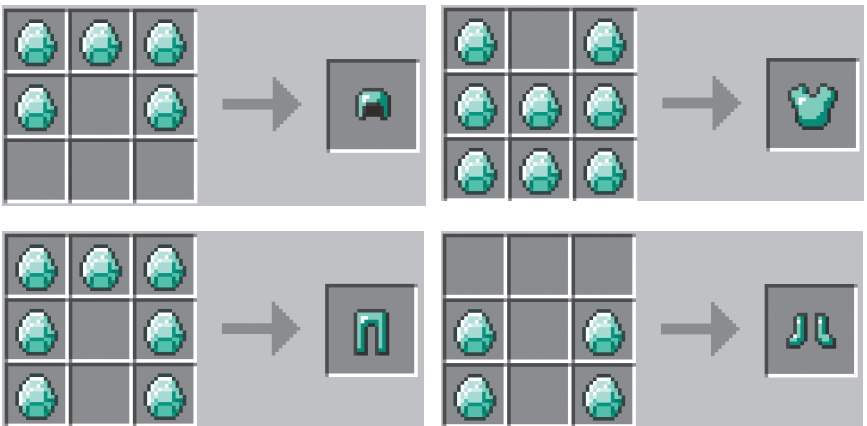
Bows and arrows can be crafted or collected from skeletons (**Figure 1.23**).



**FIGURE 1.23** Bow recipe: three sticks and three pieces of string (left); arrow recipe: flint, stick, feather (right).

## Armor

There are four different pieces of armor: helmet, chest or chest plate, leggings, and boots (**Figure 1.24**). You can make armor from leather, gold, iron, and diamond, and they will have the same relative durability as tools made from each material. You can also enchant armor with various enchantments. Like tools, armor wears out and will need to be repaired or replaced. New with the 1.8 update, you also can craft an armor stand to hold your armor, mob heads, and pumpkins.



**FIGURE 1.24** Helmet recipe: five diamonds; chest plate recipe: eight diamonds; leggings recipe: seven diamonds; boots recipe: four diamonds. Armor can also be crafted with the same recipes using leather, gold, or iron ingots.

## Enchanting

Enchanting is a complex part of the game, and one that has changed with the 1.8 update. You can enchant tools, weapons, and books on a specially crafted enchanting table, and different items have different enhancements (**Figure 1.25**). Enchanting will cost you experience points (XP), and as of the 1.8 update, they will also cost you up to three lapis lazuli.

You can enchant books yourself, find them in chests in dungeons, or catch them when fishing. You can also use an anvil to combine enchants, or to add them to an item from an enchanted book. Village priests sometimes exchange enchanted items in trade for emeralds or other goods.



**FIGURE 1.25** An enchanting table allows you to place a variety of enchantments on your items.

Enchanting is done on an enchanting table, which you can craft with diamonds, obsidian, and a book (**Figure 1.26**). You can increase the level of enchants that are available by surrounding your enchanting table with bookcases. For instance, at a table without shelves, you may enchant items costing only a couple of experience points, but as you add bookcases (up to 15 within a 5x5 square and not directly touching the enchanting table), your table will become

more powerful, allowing you to use up to 30 experience points on one enchant. You have a higher chance of getting a good enchant when the XP cost is higher.



**FIGURE 1.26** Enchanting table recipe: one book, two diamonds, and four obsidian blocks.

The new enchanting system also will cost you lapis lazuli, though it requires fewer XP. You have a choice of three enchants, depending on how many pieces of lapis you use, and you'll get a sneak peek at one of the enchants you'll receive, something that wasn't possible in earlier versions of the game (**Figure 1.27**).



**FIGURE 1.27** The enchanting table menu. Here, I'm using two lapis lazuli, so only the top two enchants are available. Hovering over the second shows me I'll get an Unbreaking II enchant at a cost of 12 XP (when I did enchant the sword, the second enchant was a Smite II).

Enchants are specific to the item. For instance, you may get an Infinity enchant on a bow, which allows you to carry only one arrow but never run out, but you wouldn't get it on a pair of boots, on which you might get a Protection or Feather Falling enchant.

Enchanted books often have a combination of enchants that are unique to certain tools or items. You use an anvil to put the enchants on the item of your choice, but only the enchants that fit that item will be applied to it.

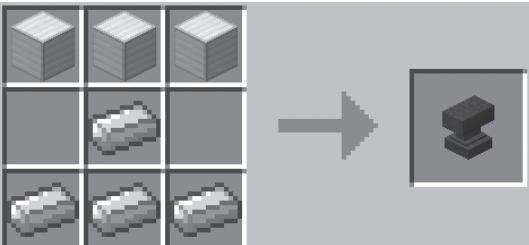
## Experience Points

You collect experience points by mining ores, smelting items in a furnace, killing mobs (including friendly mobs like cows and pigs), and breeding animals. If you die, you lose your experience points.

You can gain experience points much faster by building a mob grinder, which makes use of one or more mob spawners to collect mobs. Usually a mechanism is created within the grinder that will weaken them so that they are easily killed. They may spawn above water, which will move them toward a chute and cause them to fall and take damage. You can then finish them off easily and collect the experience points. You can easily find designs for spawners online.

## Anvil

An anvil is used to repair and name gear, to combine enchants from various tools, and to apply enchants from books to gear. Like the enchanting table, all these actions cost experience points. You craft an anvil with iron bars and blocks (**Figure 1.28**).



**FIGURE 1.28** Anvil recipe: three iron blocks and four iron ingots.

To use an anvil, right-click it, and then place the item to be repaired in the first box. In the second box, place a second one of the same item, an enchanted book (**Figure 1.29**), or raw materials. You will be told how many experience points the repair will cost, and you see from the bar on the item whether it will be fully or partially repaired. The repair is finished when you pick up the item. When you combine two enchanted items, the enchantments are combined on the repaired item. Anvils take damage when used and will eventually break.





**FIGURE 1.29** Using an anvil to add an enchant to an item, such as this Luck of the Sea enchant on a fishing rod, costs experience points and will cause the enchanted item to glow. Here, I've renamed the fishing rod while enchanting it.

## Transportation

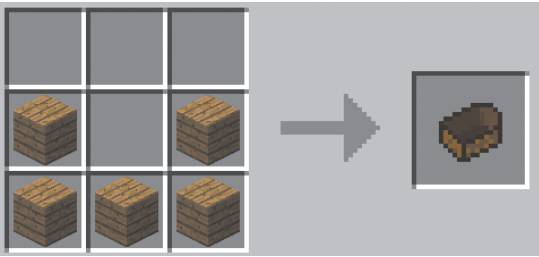
When you start a new map, chances are you'll do a lot of walking, but soon enough you might find that you've run out of land, or just that you'd like to hit the water in your own little boat. Once you've gathered enough materials or stumbled upon an abandoned mineshaft, you may want to set up rail lines too. And let's not forget that you can now travel by horse. There are many more ways to traverse the map than simply on foot. You can find information on horses in the "Mobs" section, but let's take a quick look at boats and rail.

### Boats

Traveling by boat is how I prefer to start exploring a map, particularly if I am on a server with others and might want to get away from my spawn point before I settle but don't have many resources yet. I often find friendly mobs along the shore, and sometimes bump into a village. When you're traveling by boat, your hunger bar disappears and you won't need to eat. This is helpful when you're starting out—you can head to the sea at night, avoid mobs, not need food, and explore the coast line.

All you need to make a boat is five planks, which is easy even when you're just starting out (**Figure 1.30**). Boats break exceptionally easily, dropping planks

and sticks—and you. It is wise to make and carry a few boats, or at least carry some extra planks or logs to make more.

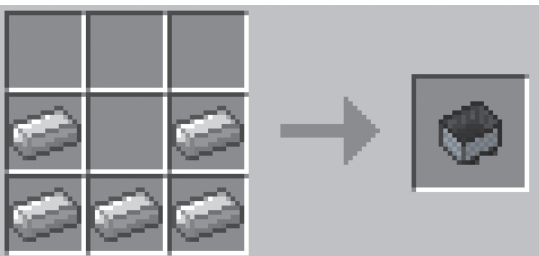


**FIGURE 1.30** Boat recipe: five planks.

You place a boat by right-clicking it, then right-clicking again to get in. To move, use W to move forward while steering with your mouse. Move backward with the S key. Be careful to avoid land and obstacles when you're in your boat or it might break. To get out (presuming it didn't break when you arrived ashore), Shift-click.

## Minecarts

Minecarts, like boats, can be ridden, and you use the same mechanics for getting in and out of the cart. Although you are restricted to traveling only where rails have been laid, carts are much faster than walking, and they can be used to transport mobs and items (**Figure 1.31**). To get moving in a cart, you need to start your minecart on a slope or get a push, unless you use powered rails and a button to launch you. Once in motion, you will slow down pretty quickly unless you use a powered minecart or powered rails to propel you.



**FIGURE 1.31** Minecart recipe: five iron ingots.

Once you make a minecart, you can combine it on a crafting bench with a furnace, a chest, a hopper, TNT, a mob spawner, or a command block to create specialized carts (**Figure 1.32**).



**FIGURE 1.32** You can add items to a minecart.

You can make a powered minecart that carries a furnace filled with coal, and this can be placed alongside other minecarts to make a train. Powered minecarts can only push the other cars, not pull them, so you need to place it at the back of the train, or place one at either end. To start your minecart, right-click it with your fuel (coal or charcoal) while facing the direction you'd like it to move.

Adding a chest to a minecart allows you to use it for storage or to transport items. If you put a hopper on a minecart, it will collect items on or just above the track. The amount of material that a chest or hopper is holding will change how far the cart will go using powered tracks; a full cart will need more powered tracks to keep it running.

A TNT minecart will activate and explode just as TNT does. It will explode if it drops more than three blocks at the end of a track, if it crosses an activator rail (there is a delay before it explodes), if it hits lava or water, or if it is hit by something while it is moving. Be careful when you're playing with TNT, because the explosion will cause damage to you and the surrounding area.

## Rails

Tracks, or rails, are easily crafted with iron and a stick (**Figure 1.33**). You can also find them in abandoned mineshafts, where they are easy to collect with a pick. Tracks are needed for minecarts, but basic unpowered tracks won't help

the cart move unless you use a powered minecart or add powered rails along the route.



**FIGURE 1.33** Minecart tracks or rails recipe: six iron ingots and a stick.

Powered rails (**Figure 1.34**) use redstone power to either propel trains (when they are on) or to stop them (acting as brakes when they are off). They need to be powered, usually with a lever or a redstone torch or block placed beside or under the powered rails, although they can be powered by detector rails as well.



**FIGURE 1.34** Powered rails recipe: six gold ingots, a stick, and redstone dust.

You can lay rails on your route in many ways, and there have been all sorts of experiments to see how hills, weight of the cars, number of cars, and other factors affect the speed and length of time the minecart will travel before it loses speed. A fairly agreed upon spacing is to have one powered rail for every 38 regular rails, although often people will place one after 25 or 30 rails. Feel free to experiment and look online to see what others have done. The Minecraft wiki is a great source for more information on rails, including activator rails, which

activate TNT, hoppers, and command block carts, and detector rails, which provide power when weight crosses them.

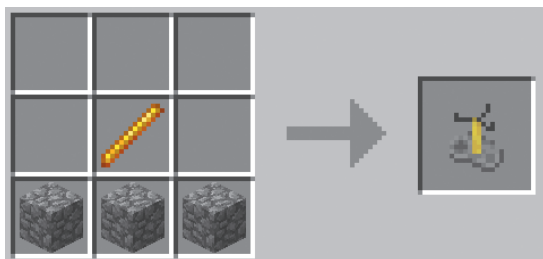
You can use minecarts and tracks for transportation across distances, to transport many items at once, and for fun. Making elaborate rollercoasters can be a great challenge, and they are fun to ride.

## Potions

Once you've been playing for a while and collected many items (and let's face it, Minecraft is a game for hoarders and collectors), you'll be ready to start looking at crafting potions.

Potions come in two forms: a drinkable version, and a splash potion that you can throw at others. Some provide personal benefits, like being able to move faster or become invisible, while others can be used defensively, such as a splash potion that will weaken or slow your enemies.

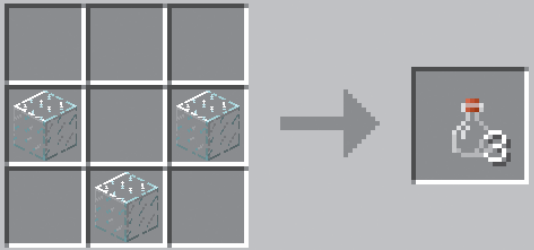
There are several steps to brewing potions, but before you begin any of them, you need to craft a brewing stand (**Figure 1.35**). A brewing stand is easy to craft, but its recipe needs a blaze rod, which you can only get from hunting a blaze in a Nether fortress—it might take you a while before you can get the blaze rod to craft the brewing station. You can place the brewing station on most block surfaces. Many players have brewing rooms where they gather all the materials they need to brew potions, as well as a cauldron or an endless water supply for filling bottles of water.



**FIGURE 1.35** Brewing stand recipe: one blaze rod and three cobbleston.

Brewing potions requires several steps. We're going to make a Potion of Invisibility to illustrate the steps.

All potions except the Potion of Weakness start with an Awkward Potion for the base. For this we need glass bottles of water and nether wart, a plant that grows only on soul sand and is found in nether fortresses. You can craft the bottles from glass blocks (**Figure 1.36**).



**FIGURE 1.36** Glass bottle recipe: three glass blocks.

The brewing stand can brew three bottles of potion at a time, using a single ingredient that is divided between the three bottles, so it makes sense to always make three potions.

To make your Awkward Potion, fill your glass bottles with water by clicking them into an endless water source or a cauldron. Click the brewing stand to open it, and place your bottles of water in it. Add a piece of nether wart to the space at the top, and wait for your potion to brew (**Figure 1.37**).



**FIGURE 1.37** Adding nether wart to bottles of water in a brewing stand to make an awkward potion.

Once you have your base potion, you will add the next potion ingredient to the brewing stand. For some potions, this might be the final step, but in order to make a Potion of Invisibility, we need to first make a Potion of Night Vision. To do this, leave the bottles of Awkward Potion where they are and add a golden carrot (made by surrounding a carrot with golden nuggets on the crafting bench).

When the brewing is complete, you'll have a Potion of Night Vision that will last for three minutes.

Since we're making the Potion of Invisibility, we need to leave the bottles where they are and add a third ingredient. We need a fermented spider eye, which we craft by combining a brown mushroom, sugar, and a spider's eye on a crafting bench. Add the fermented spider's eye to the brewing stand, and wait for it to process. The wait times are short—you can have several stands brewing at once and by the time you're putting the ingredients in the last one, the first will be ready for the next step.

Once the brewing is complete, you will have three bottles of potion of invisibility, but they will only last for three minutes. For the very low cost of a piece of redstone dust, you can extend that to eight minutes. Leave the potions where they are and add the redstone.

Once you have your potions, remove them from the stand. To drink them, hold one in your inventory and right-click. If you want to turn these potions into splash potions, leave them in the brewing stand and add one final ingredient: gunpowder will turn any potion into a splash potion and can be added at any step.

As you can see, brewing can be a complex and complicated process, both in the ingredients needed and in the steps to take. Once you break the steps down, however, and remember that some things are the same no matter what potion you're brewing, it becomes much easier.

There are more potions than we have room to list here, but you can find the recipes for all of them online. Remember that almost all potions start with an Awkward Potion base. Most can be extended from three to eight minutes with redstone dust, or in some cases made more potent with glowstone dust, though redstone dust will cancel the effects of glowstone dust and vice versa. To make a splash potion, add gunpowder. The rest of the ingredients are unique to the potion, but are easily found online. Have fun brewing!

## Fireworks

You can make over 900 different varieties of fireworks. With all those options and a bit of time and energy, you can put on an amazing fireworks show. Because quite a few of the parts are hard to come by, it is good to experiment with fireworks on a creative map, where you can use all the materials you want.

Fireworks are made from a firework rocket and a firework star. If you craft the rocket without adding the star, it will shoot but there won't be any explosives. Firework stars are crafted to contain dye (16 colors to choose from) and special effects items. You then craft your firework rocket, including the firework star (or stars, you can add more than one to a single firework rocket) and one, two, or three pieces of gunpowder, which will determine how high your firework will shoot (**Figure 1.38**).



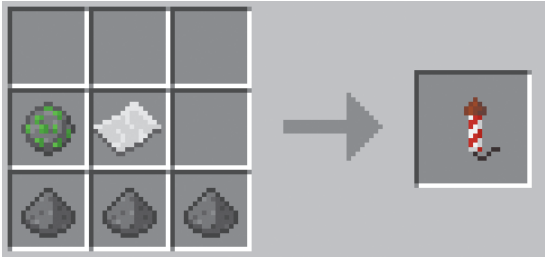
**FIGURE 1.38** Lime green small firework star with a trail recipe: lime green dye, gunpowder, and a diamond.

To make a firework star, you need one piece of gunpowder and up to 8 colors of dye.

To design the shape of your firework, you can add one (and only one) of the following: a fire charge to make a large ball, a gold nugget for a star shape, a feather for a burst, or a creeper head for a creeper-head-shaped explosion. In addition, if you add a diamond, your firework will leave a trail, and if you add glowstone dust, it will sparkle.

Once you have made your firework star or stars, it is time to add them to your rockets. To make your firework rocket, you will need a piece of paper, up to three pieces of gunpowder (these determine height, remember), and one or more firework stars (**Figure 1.39**).





**FIGURE 1.39** Recipe to craft a firework rocket: 1 piece of paper; 1, 2, or 3 pieces of gunpowder (to set the height); and up to 7 fireworks stars.

## Go Crafting

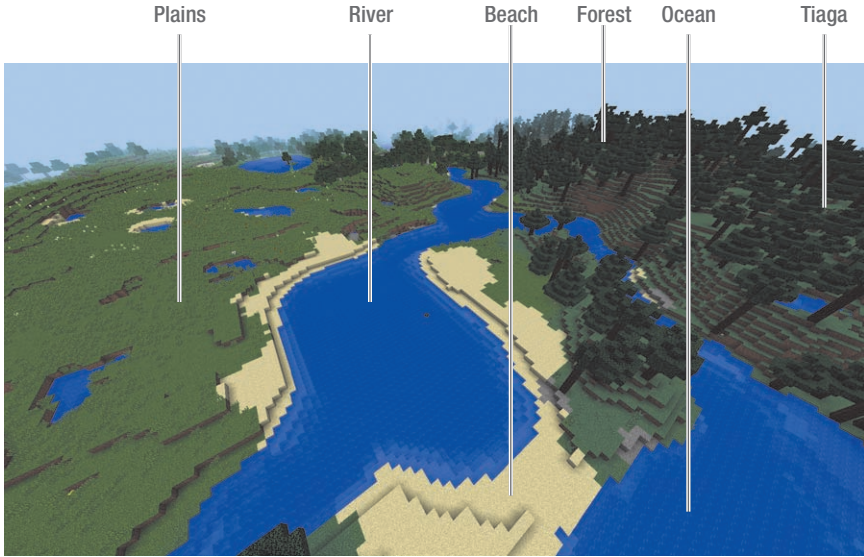
This should give you a good taste of some of the ways that you craft items in Minecraft. There are many more, from foods to all sorts of blocks for building, and from books you can write in, to furniture for your house. Experiment with the various items, see what recipes you can discover, and devise new designs. Most of all, be creative and have fun!

## The Lay of the Land

Just like the real world, Minecraft has many types of land. The different areas are called *biomes*, and each has unique features, such as certain plants, ores, or landscapes. Minecraft biomes are mostly divided by climate (snowy, cold, lush, dry, and so on), and each category has a variety of more specific biomes, for a total of 61 different types.

When you start a new map, the biomes are randomly generated, though in such a way that you won't find a hot desert next to a snowy mountain. They aren't very large, so you can travel from one to the other pretty quickly (**Figure 1.40**). When you're looking for cocoa beans and jungle wood and are in the middle of a desert, you are going to have to go exploring until you find a jungle biome. With relatively small biomes, chances are it won't take you very long.

Sometimes it is hard to tell which biome you are in. Press F3 to display a lot of information, including your coordinates, the direction you are facing, and your current biome.



**FIGURE 1.40** Here we see how small biomes intersect.

We'll look at the main features of each biome (**Figures 1.41** and **1.42**), but if you'd like more information, see the biomes page on the [Minecraft wiki](#).



**FIGURE 1.41** Three neighboring biomes. From left to right: plains, taiga, extreme hills.



**FIGURE 1.42** Three more biomes: roofed forest, swamp, extreme hills.

## Plains and Sunflower Plains

Plains are grassy flatlands, with small hills, scattered flowers, and the occasional tree. Many animals spawn on plains, including cows, sheep, and pigs. You'll also find horses and donkeys here. Sunflower plains are simply plains that also contain sunflowers.

You can find villages here that contain NPC (non-playable characters) that you can trade with.

## Savannah

The savannah is rather like a dry, rain-free version of plains, although there is also the very mountainous Savannah M biome. The same animals, including horses and donkeys, spawn here, but the grass is more brown and dry. You can also find acacia trees in these biomes.

## Forest

Many types of forest biomes exist. Although they share similar traits, the most obvious being that they are filled with trees, they have a lot of variety. In some,

like regular and birch forests, you will find slight hills, a lot of grass, and many trees. Others are more hilly, have larger or taller trees, or in the case of roofed forests with dark oak, are much darker and more difficult to navigate. Hostile mobs can be common in forests, even during the day, because they may not be exposed to the sunlight that will cause them to despawn.

Flower forests have a higher number of flowers, including some that can't be found elsewhere.

## Swamp

Swamps are wetlands that are found along the shore. They are often made of many small islands in shallow water and are a good place to collect sand, clay, and reeds. Slime spawns here, and you'll find witches' huts as well, so be careful!

## Jungle

Jungle biomes are divided into two types: flat and more mountainous. Jungle edges are considered to be their own biome as well, with fewer trees. All jungle biomes feature thick forests with tall jungle wood trees (which produce cocoa beans) and vines. You can find jungle temples here. Jungles are the only place you'll be able to find ocelots, which you can tame to become pet cats by using fish.

## Desert

Deserts are relatively large sand and sandstone biomes, filled with cactus, villages, and the occasional desert temple. You won't find friendly mobs like cows or pigs here, and most hostile mobs don't last once the sun rises, because there is no shade.

## Mesa

Mesa and the Bryce mesa are less common biomes. They are hot and dry, made of layers of clay, and have red sand instead of regular sand. You'll find tall formations and columns in the Bryce mesa (**Figure 1.43**).



**FIGURE 1.43** Desert biome in the foreground with mesa behind.

## Taiga

Much like a forest but filled with spruce trees, ponds, and rivers, taiga biomes can be warm or frozen, and flat or mountainous. Common features are spruce trees and ferns. These are the only biomes that contain wolves, which can be tamed to become pet dogs.

## Extreme Hills

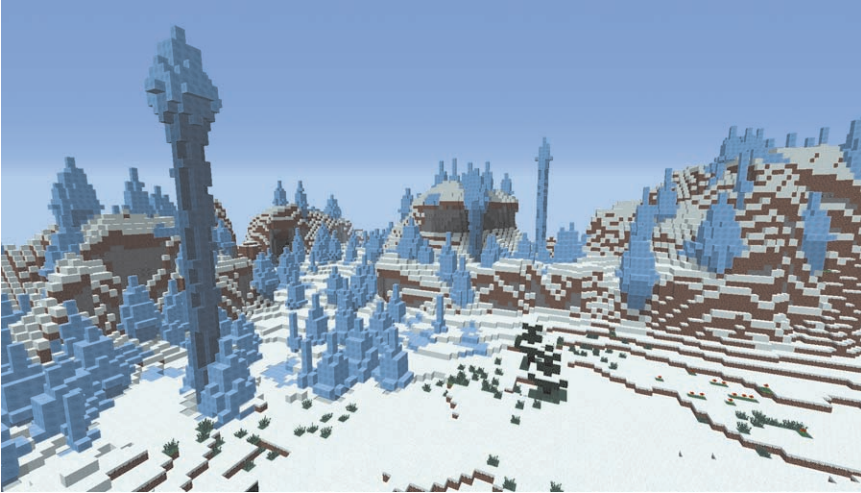
Much like the name suggests, extreme hills biomes feature high and steep hills, mountains, and cliffs. Extreme hills biomes have snow at high elevations and are the only place to find emeralds.

## Mushroom Island

Extremely rare, mushroom island biomes are covered in giant mushrooms. You'll find mycelium blocks in this biome. Mooshrooms (mushroom-covered red cows) spawn here, but no other mobs spawn naturally.

## Ice Plains and Ice Plains Spikes

Another uncommon biome is the ice plains—large plains covered with snow and packed ice and little else. Ice Plains Spikes is a related biome that is very similar and has spikes of packed ice rising from the ground (**Figure 1.44**)



**FIGURE 1.44** Ice Plains Spikes biome.

## Rivers, Hills, Plateaus, Beaches, and Oceans

Many biomes don't have any distinctive features, but form a border between other biomes; they are a variation of major biomes.

Beaches and stone beaches occur along oceans and deep oceans. River biomes are simply rivers, often cutting between other biomes. Like swamps, they are a good place to collect clay and sand.

## Biome Variations

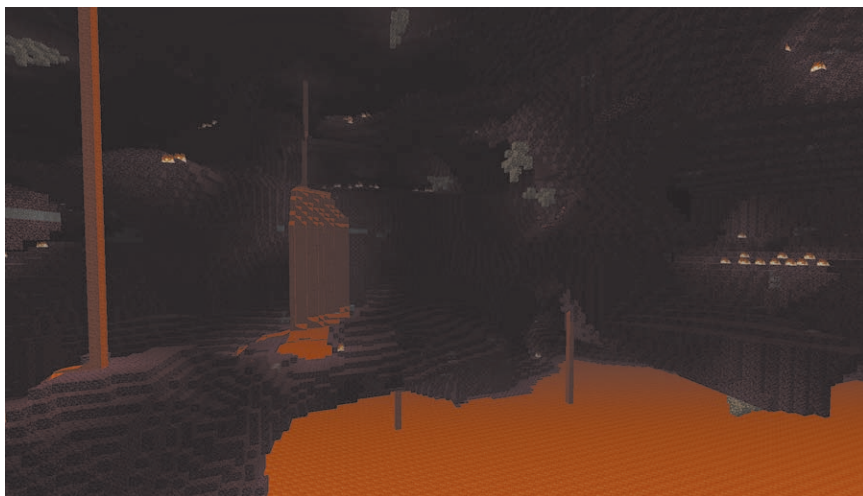
Many biomes have several similar variations. Some are in hill or plateau form, which are exactly as they sound. You can find hilly savannah or mesa plateau, for instance.



One other variation in biomes is the climate—many biomes occur in warm, snowy, or icy versions. For example, you’ll find regular plains and snow plains. Combining all these variations along with the biomes results in 61 different biomes.

## Nether

The Nether is more than simply another biome—it’s more of a world-sized dimension. You can access it only through a Nether portal. The Nether has its own map and is completely underground, with no sky, no night and day, and no weather. Water evaporates here, but there are many seas formed of lava (Figure 1.45).

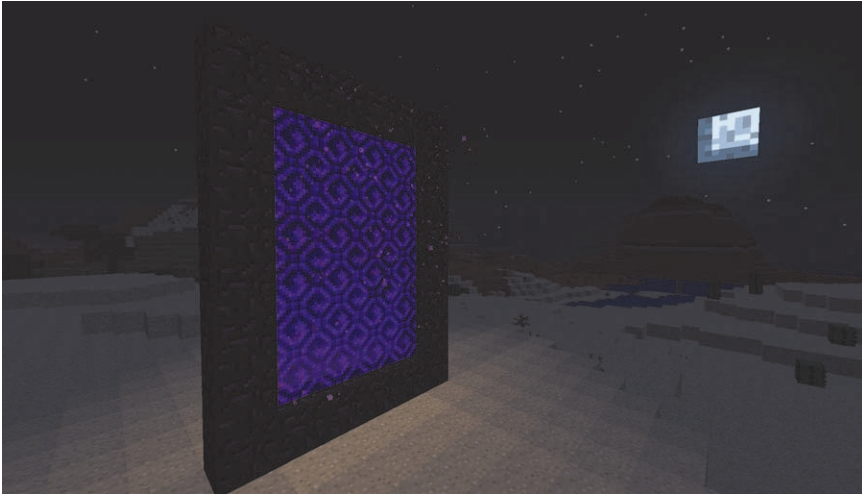


**FIGURE 1.45** The lava-full Nether.

Many blocks and mobs are unique to the Nether. The blocks include netherrack, quartz, glowstone, and soul sand. Mobs that are unique to the Nether include magma cubes, ghasts, blazes, wither skeletons, and zombie pigmen. Nether fortresses, which are large dungeons, are located here.

To access the Nether, you will need to build a Nether portal by making a frame out of obsidian (though the corners can be any material). Your frame needs to be at least four blocks wide and five blocks high, but it can be as large as 23

blocks on each side. To activate the portal, light the inside of the frame with lava, flint and steel, or by using a fire charge. The center will fill with swirling purple light. Step into the opening and you'll be transported to the Nether (Figure 1.46).



**FIGURE 1.46** A nether portal.

Nether portals, also known as gates, can be complicated, as moving one block in the Nether is the same as moving eight blocks in the Overworld. This means that portals can sometimes overlap—while you take one portal to get to the Nether, you may end up somewhere different on the trip home, but it also means that you can make and use Nether portals to help you travel great distances in less time.

## Sky/End

The Sky, or End, is a dark, bare dimension that you can access only through an end portal, which occurs only in a rare, difficult-to-find stronghold. The End is the only place to find and fight the Ender Dragon, the main (and pretty much only) boss fight in Minecraft. You'll also find End stone here, as well as many, many endermen (Figure 1.47).