A Beginner's Guide to Beer Making

By the Staff of Maryland Home Brew, Inc.

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1. The Absolute Basics

Beer is made from water, malted barley, hops and yeast.

Malted barley is barley that has been steeped in water, allowed to germinate (sprout) and is then kiln dried. The germination process does lots of mysterious things inside the grain, the most important of which for the brewer is the formation of certain enzymes and the conversion of some of the starches, which aren't fermentable, to sugar, which is.

In order to make beer, the malted barley ("malt") is "mashed," which is a process that converts the remaining starches to fermentable sugars by soaking the malt in warm water. The resulting sweet liquid (called "wort," but pronounced "wert") is boiled with hops before it can be fermented.

The hops used in beer are the flowers from the hop vine. Dried hop flowers are added to the wort to give bitterness, flavor and aroma to the beer. Some people wonder why you want bitterness in beer, but it's necessary to offset the sweetness of the malt, and if you think about it, most popular drinks are something bitter (tea, coffee, cocoa, cola) mixed with something sweet. Hops also help to preserve beer.

Hops are added to the wort at different times depending on what you want to get out of them. Very simply, you get bitterness from a long boil (e.g., 60 minutes), flavor from a shorter boil (20 to 30 minutes) and aroma from a very short boil (1 to 10 minutes) or even just by steeping the hops in the cool wort.

Yeast is what turns the sweet wort to beer by converting the sugars to carbon dioxide and alcohol. This is called fermentation. There are lots of different yeasts, and brewers need to use ale or lager yeasts, not baking yeast.

After the beer is finished fermenting it has to be kegged or bottled, and sometimes aged.

2. How Is This Done At Home?

Commercially available malt extract syrup (or dried malt extract powder) are condensed versions of wort that homebrewers can use to make beer. And so, the basic ingredients for the beginning homebrewer become:

- Water
- Malt syrup (or dried malt extract)
- Hops,
- Ale or lager yeast.

These ingredients can be purchased separately, or they can be purchased in a kit, which contains everything necessary for a batch of beer. This is often the easiest option for a beginner.

Homebrewing is the simple process of boiling the malt extract syrup along with the hops, diluting the resulting mix with an appropriate amount of water, cooling it to about room temperature and adding yeast. Fermentation takes about a week, but two weeks will make it even cleaner tasting.

3. What Equipment Is Required?

To get a sense of what sort of equipment is required to brew a batch of beer we need to add a few numbers to the basic outline given above. A typical batch of beer might involve combining 6 pounds of malt extract and 2 ounces of hops in 8 quarts or so of water (making about 2 gallons). Once this

concoction gets boiling it will have a tendency to rise, the way boiling milk does, so a large pot is necessary.

Brewers should use either a stainless steel pot or an enameled pot. A 4-gallon pot will do, but it's better to get a 5-gallon brew pot because of the tendency of the boil to foam up and because some recipes call for more ingredients that may increase the volume in your boil.

After boiling, this concentrated mix from the pot is diluted to about five gallons in a fermentation vessel, which is called a "primary fermenter."

By the way, there's nothing sacred about a five-gallon batch, it's just typical, and most recipes assume that volume. You can always make different sized batches.

So, with that background, here's what you'll need.

1. A brew kettle. For beginning brewers, a five-gallon pot works very well, although a smaller pot can do. Brewers who hope to move on to more advanced brewing might want to invest in a 7 gallon (or even larger) pot, but that's getting ahead of things.
2. A primary fermenter. You'll need a food-grade plastic bucket of about 6.5 gallon capacity. Homebrewers can also ferment their beer in 6.5-gallon glass carboy (the kind that you used to find upside down at the office water cooler). In either event, the bucket or carboy has to be fitted with an air-tight lid on the plastic bucket or a drilled stopper and an "airlock," which is usually a three piece plastic filled bubbler with water that allows carbon dioxide to leave the fermenter without allowing outside air in.
3. A bottling bucket. After your beer has finished fermenting you're going to need to add a little extra sugar to it and transfer it into bottles. This is much easier if you have a second food-grade plastic bucket with a spigot attached to the bottom.
4. A siphoning tube. Once the beer is finished fermenting you'll need to be able to transfer it from the primary fermenter into the bottling bucket. Air is both a friend and an enemy of beer, depending on where you are in the process. At certain times you keep the beer away from air, and a siphoning tube is handy for this.
5. Floating Thermometer to check the temperature of your beer at various stages.
6. Bottles and caps, or a keg. Bottles are the cheapest way to store your beer. You need to clean and sanitize them, and then fill and cap each one individually. It's a bit of a pain, but not so bad, especially if you do it with a friend and enjoy a beer while you're at it. Always use brown bottles because sunlight is an enemy of beer. Kegging is nice, but it's a little more expensive. Generally people start with bottling and work their way up to kegging if they choose.

Maryland Homebrew sells equipment kits that contain what you need. See, for example, America'sBest or Brewer's Best Equipment kits.

That was a really quick introduction to the absolute basics. Obviously there's more to say, but at this point you know enough to read a step-by-step explanation of how to brew your first batch.

4. Brewing Your First Batch

Let's move on to actually making a batch of beer.

First, you'll need to pick your style, and this is a good opportunity to discuss the difference between ales and lagers. A lot can be said, but the key distinction you need to know about as a beginner is the fermentation temperature. A lager is most comfortable at about 45-55 degrees, while ale does well at

between 68 and 72 degrees. Start with an ale, it will be just fine in your basement, behind the couch, or just about anywhere. This is the easiest and best place to start.

There are lots and lots of different styles of beer. For the beginning brewer it's wise to start with something simple, like a Brown Ale. The easiest way to do this is to buy a kit. It will have the malt extract, hops, yeast, bottle caps and an extra packet of sugar for "priming," which will be explained below when we get to bottling.

Here are Basic Instructions:

1. Make sure your brewing pot is clean. It doesn't have to be ultra-super clean, because you're going to boil your malt extract and hops in it and that will kill any bacteria or wild yeast, but it does have to be free of soap. Soap will do bad things to your beer's head.
2. If you're using malt extract syrup, put about a gallon of the hottest water you can get from your sink into the pot and let the can of syrup rest in the pot for a half hour or so. That will make the syrup come out of the can a little easier. Pour out the warm water when you're done.
3. Put about 6 quarts of hot water in your brew pot and crank up the heat. If your pot has a lid, use it now, but not after you've added your ingredients!
4. Add the can(s) of malt extract syrup (or dry malt extract) to the boiling water and stir it up well. If you're using dry malt extract it's important to mix it in well.
5. When the water and malt mixture comes to a boil, set a timer for the time the recipe says and add your boiling hops.
6. Keep an eye on your boiling wort and have a long-handled spoon handy. You may need to turn down the heat if the boil gets too active. You want a nice rolling boil, but you don't want it to foam up too high.
7. If the recipe calls for flavor or aroma hops, add them to the boil at the time indicated by the recipe. For example, the recipe may say "Fuggles Hops (20 minutes)," which means that you add the Fuggles hops for the last 20 minutes of the boil.
8. After boiling, move the pot off the heat, and let it cool. If you can, rest the pot in a bath of cool water. Stirring often with a sanitized paddle or spoon while the pot is in a cold water bath will help it to cool even quicker. A wort chiller is a great gadget that will make this process even quicker.
9. While the wort is cooling sanitize the primary fermenter, lid or stopper and airlock.
10. Add your wort to your fermenter. Add enough cold water to bring the total volume up to 5.25 gallons. You're aiming for a final volume of 5 gallons of beer, and you will lose some to sediment and siphoning.
11. When the wort has cooled and it gets to 80 degrees or below, sprinkle your yeast on the top of the wort, let it sit for ten minutes, and then vigorously stir it in. At this point you want to dissolve extra oxygen into the beer by stirring because the yeast needs the oxygen to function.
12. Close your fermentation vessel and add the air lock. Add water to the air lock so that CO_2 can escape but outside air can't get in. Put the fermentation vessel somewhere out of the way and try to forget about it for two weeks.

Now all you have to do is wait while the yeast works its wonders on your wort, transforming it into beer. Your beer will probably be finished fermenting after one week, but it's a good idea to let it go for two, just to be safe.

Cleaning and Sanitizing Bottling Equipment

Once the fermentation is complete, you'll need to bottle your batch, but before you can bottle you need to clean and sanitize your bottles and everything that will come in contact with your beer. Be careful, but you don't have to be an absolute nut. People have been making beer for thousands of years before anybody invented sanitizer, so it's not the end of the world if your environment isn't perfectly sterile.

There are bottle washers that you can attach to your kitchen sink that make bottle washing a lot easier. The basic process goes like this. (1) Wash out any crud in the bottle. (2) Soak the bottles in a solution of sanitizer such as Iodophor for at least 5 minutes (one tablespoon per 5 gallons of water). This is a no rinse sanitizer so we don't need to worry about that.

When it's Time to Bottle

1. First, put all your bottle caps in a pan of boiling water and leave them for 2 minutes or so to sanitize them. Then pour them into a sanitized strainer and let them cool. Try not to touch the inside of the cap -- the part that your beer might touch. You can also sanitize the caps in the Iodophor solution, which ever is easiest for you.
2. Take your packet labeled priming sugar (corn sugar) and add it to about one cup of water in a saucepan. Bring to a boil and boil for about 2-5 minutes. Let the pan cool a little then add to your bottling bucket.
   Your yeast has already fermented all the sugars in your beer by now, converting it to alcohol and carbon dioxide. The extra sugar you add at bottling time allows the yeast to do one last mini-fermentation and thereby carbonate your beer.
3. Take a look at a commercial beer and see how much air space there is in the top. (About an inch.) Fill your bottles to that same level and cap them, being careful not to touch the part of the cap that your beer might touch. If you are using Maryland Homebrews spring tip bottle filler you can just fill your bottle all the way up and when you pull out the bottle filler the beer level will go down to the perfect level.

Now you have to wait again. It will take about a week for your beer to carbonate (also called "conditioning"), but, again, it's best to give it two.

After two weeks, put a couple bottles in the fridge and you are ready to enjoy the fruits of your labor.

Cleanup

But there are two last things you need to know. First, you're going to be surrounded by pots and buckets and things that need to be cleaned. Maryland Homebrew sells many cleaners that are meant for these containers. Regular soap leaves a film and is bad for beer. It is standard to clean your equipment after a batch and again before you start your next batch of beer.

Pour

Oh but wait, how do you pour your beer? When your beer conditions in the bottle, some of the yeast will die and settle to the bottom, creating a small layer of sediment. You need to learn to pour the beer carefully and slowly, and all at once, leaving the last little bit (and the sediment) in the bottom of the bottle. Get in the habit of rinsing the sediment out of the bottle right away and cleaning will be a lot easier.

Enjoy

Now comes the best part. Enjoying a glass of homemade beer. After a time you'll be able to recognize the influence of different ingredients and, unfortunately, you'll also learn about "off" flavors if you weren't careful with your sanitation, or allowed oxygen to get into the beer at the wrong time.

But don't worry, there's nothing in a homemade beer that can hurt you. Even if it doesn't taste 100% the way you wanted it to, the worst that can happen is a funny flavor. It's perfectly safe to drink.