EXPLANATION OF ALL GRAIN BREWING EQUIPMENT AND PROCESS

All grain brewing is a brewing method where you are essentially making your own malt extract through a process called mashing. Once you mash your grains and extract your sweet wort the rest of the brewing process will be the same as extract brewing. You will need all the equipment necessary to brew using the extract method plus some additional equipment for mashing. We will go over some of the basic steps involved and some of the specialized equipment needed to brew beer using the All Grain method.

Equipment Necessary for All Grain Brewing:

**Brewpot** – This is a necessary item in all grain brewing. For all-grain brewing it needs to be at least 8 gallons for making 5 gallon batches of beer. Stainless steel is the preferred material, although aluminum and enamel coated steel will work as well.

**Thermometer** – a good quality, accurate, and quick-reading thermometer is an asset when mashing the grains, allowing you to know the exact mash temperature.

**Stirring Paddle** – This can be a spoon or paddle, but it needs to be long enough to reach the bottom of the mash-tun and brew pot. It also needs to be very sturdy in order to stir the dense mash.

**Wort Chiller** – This useful tool is designed to cool the wort from boiling temperature to 65-78 to allow the pitching the yeast. While it is optional for extract brewing because the wort can be diluted with cold water, it is necessary when all grain brewing as no water can be added after the boil to cool the wort.

**Propane Burner** – This is a great way to bring larger brew pots to a boil. Often, kitchen stoves lack the power to bring a full 5 gallons to a boil in a reasonable time. These burners have much higher heat output for a faster boil on 5 gallon or larger batches.

**Mash-tun** – This piece of equipment is where the grains and the hot water are mixed to start the mash. Here the starches from the grain are converted to sugars. This vessel can be constructed of stainless steel, like a brewpot. It can also be an insulated vessel, like a picnic or drink cooler.

**Lauter-tun** – This piece of equipment is designed to separate the liquid from the spent grains after the mash. Typically homebrewers use the same vessel for a mash-tun and a lauter-tun.

**Hot Liquor Tank** – This is a vessel to hold hot water until it is needed for the brewing process. Like the mash tun, it can be stainless steel so that water can be directly heated, or it can be an insulated plastic which will hold the temperature.
Overview of All Grain Brewing Process:

**MASH:** There are several methods of mashing, but they all involve steeping the grains with roughly 1-2 quarts of hot water per pound of grain. Ideally, the grain is put into a container that is either insulated or stainless steel, so that temperature can be maintained. This grain is then held between 145°F-158°F for 60 to 90 minutes. The mash temperature will have an effect on the finished beer. Keeping the mash temperatures lower in the range will favor enzymes that produce simpler, more fermentable sugars. These sugars ferment more easily, and will result in a beer that has a slightly lighter body and higher alcohol content. Using a mash temperature in the higher end of the range will result in a beer that is fuller bodied or heavier, with slightly less alcohol.

**RECIRCULATE:** Now is the time to separate the sweet wort from the spent grains. Ideally, the grain is in a container with a false bottom or manifold to facilitate draining. Some of the sweet wort is drained from the mash-tun and gently poured back in on top of the grains. This is done a couple of times, or until there are no more bits of grain coming out. This is called recirculation, and it is intended to set up the grains and husks to act as a filter bed, so that sweet wort can be separated from the spent grain.

**SPARGE:** Once the filter bed has been established through recirculation, the next step is the sparge. Sparging consists of rinsing the grains with hot water to dissolve and remove all the sugars produced during the mash. In continuous sparging, usually another container with hot water (between 170 and 180) is positioned at a level above the grains so that water can be drained gently onto the surface of the mash. Sweet wort is drained from the mash at the same rate as the hot water is added to the top of the mash. This continuously washes all the available sugars from the spent grains. Another method is called batch sparging which is a little less time consuming. In this process, a portion of the sparge water is stirred into the mash after it has finished. Next the wort is re-circulated and drained. Then the remainder of the sparge water is added to the mash tun, stirred, re-circulated and drained again to finish the sparge.

**BOIL:** The sweet wort is then collected in the brewpot and brought to a boil. At this point, you set a timer for at least 60 minutes, although most all-grain recipes boil the wort for 90 minutes. This is where the all grain and extract methods of brewing converge. As the wort is boiling, you will be adding measured amounts of hops to get a bitterness that will balance the sweetness of the malt extract and add flavor and aroma to the finished beer.

**COOL:** After the boil is complete, the wort needs to be cooled down. This would be ideally done in 5-10 minutes, but can take a little longer depending on your equipment.

**FERMENT:** Once the wort is cool, it will be siphoned or poured into a fermenter where the yeast will be introduced. The yeast will start fermenting the malt sugars and converting them into alcohol and CO₂. Over the course of the next week or two, the sugars will have been consumed. After fermentation has stopped, the beer is ready to be bottled.

**BOTTLE:** Siphon the beer off into a clean container and stir in a measured amount (usually about ¾ - 1 cup) of priming sugar, typically corn sugar. Stir this into the beer well, siphon it straight into bottles and cap them up. This will re-energize the yeast and start a new ferment in the bottles, producing a little CO₂ and creating carbonation. The carbonation process generally takes about two weeks at room temperature.

**ENJOY:** Finally the last thing to do is to chill the beer and enjoy!