The Malting Process

Understanding beer ingredients is an important step towards feeling comfortable talking about beer. And while there's a whole lot of discussion surrounding water chemistry, hop varieties and yeast laboratories, there isn't widespread appreciation for the art of malting. Here's a brief look at how it works.

Steeping
Malting is a process with three main steps—the first is steeping. Giant vats are filled with raw barley and water and allowed to soak. Maltsters are looking to raise the moisture content of the barley to around 45% of its weight, which takes about two days of steeping.

Germination
Once the desired moisture level is achieved, the barley is moved to a germination room. In this room, the barley is spread out in big shallow bins and kept around 60°F. Over the course of the next week or so, the barley is turned and aerated regularly as it begins to grow a root system, at this point called an acrospire. As this occurs, the cell walls within the barley are breaking down and enzymes necessary for brewing are developed. This process is called "modification." Once the growth matches the barley seed in length, it is considered "fully modified" and is ready to be kilned.

Kilning
Kilning serves two main purposes. The first is to kill off certain types of enzymatic activity. This keeps the barley from modifying further and leaves just the enzymes required for the brewing process. The second purpose is to dry the malt and create the flavors we so love as beer fans. The kilning process occurs in two stages: drying and curing. In the first stage, the temperature of the barley is raised to around 100°F for about two days, which ends the germination period and dries the malt considerably. During the curing stage, the temperature is raised even further (think 200°F or so) so the barley continues to dry and develops flavor. To create darker malts, the temperature is raised still higher to darken the malt in color and develop roasted flavors.

Types of Malt
That last roasting process can produce a huge range of flavor in finished malt. While the bulk of the grain used in most recipes is lightly kilned, pale malt, a small percentage of roasted malt can completely change the color and flavor profile of a finished beer. Black malt, for example, is rarely used in quantities exceeding 10% of all the malt in a recipe, but it produces the deep black color and roasty bitterness present in many stouts.
There are many different types malt available to beer brewers, each with its own unique character. The kilning duration and temperature are important in dictating the type of malt that is created, but factors like the pH of the malt are significant as well. A family of "caramel" malts are commonly made as well, in which the starch within the malt is converted to sugar and caramelized after kilning. Take a peek in a homebrew store if you ever get a chance—the range of malt colors and flavors coaxed from the simple barley grain is amazing. It might even inspire you to pick up a brew kettle.