CraftBeer.com

BEER & FOOD COURSE

Professional Course

February 2016

CraftBeer.com/Culinary

To order copies of this course visit: CraftBeer.com/PrintedCourse

BA BREWERS ASSOCIATION

INTRODUCTION

About the *CraftBeer.com Beer & Food Course*

This groundbreaking course was designed by award-winning chef and Culinary Institute of America graduate Adam Dulye and Certified Cicerone® and Beer Judge Julia Herz. The course can be integrated into any culinary curriculum or beer class and fully covers the topic of craft beer, and includes:

- Lectures and readings that be integrated into existing accredited lab time in a kitchen;
- Two tasting sessions covering 10 popular beer styles and pairing;
- Lab time to practice pairing craft beer and cuisine including suggestions for successful pairings and recipes;
- A draft of the final written exam*, to be administered alongside a practical exam that consists of cooking to a paired beer and pairing a beer to a prepared dish.

* The final exam is only available by request and is provided by the Brewers Association (publishers of CraftBeer.com) to accredited instructors and dedicated educators only.

Why this course on craft beer?

Craft beer and cuisine have long been paired together, and in the last decade, that relationship has grown even closer. Both the craft beer scene and the culinary industry are experiencing a historic period of growth and recognition in local and national communities. With fine dining restaurants stocking vintage beers alongside wine in their cellars and offering draught and bottle lists that go on for pages, craft beer is finally entering the mainstream of the culinary world.

This curriculum will guide students through the relationship between craft beer and food, helping them create harmonious combinations on the plate, in the dining room, and ultimately on the palates and in the memories of their guests.

No curriculum can capture the entirety of the vast and ever-changing landscape of beer made by small and independent craft brewers. Learning to expertly pair craft beer and cuisine is a skill that takes years to develop. By stripping the topic of craft beer and cuisine down to the most basic of beginnings, we can build a strong foundation from which experimentation and expertise can be pursued in years to come.

COURSE SCHEDULE

SECTION ONE	SECTION TWO	SECTION THREE	SECTION FOUR	EXAMS
History of Beer	Who Classifies Beer Styles	Identifying Beyond Beer Flavor Profiles	Craft Beer & Cheese	Written Exam
The Rise of Craft Brewers	Identifying Flavor Profiles of Beer	Intro to Styles: Tasting #2	Interactive Tasting & Pairing	Pairing Exam
Homebrewing & Craft Brewing	How to Present & Pour Beer	How to Pair Craft Beer with Food	Fresh, Aged & Cellared Craft Beer	
Brewing Process	Intro to Styles: Tasting #1		Designing a Beer Dinner	
Ingredients in Beer				
Overview of Beer Styles				

SECTION ONE

SECTION 1: HISTORY OF BEER

From ancient times through the depths of Prohibition and into the 21st century, beer's evolution has been shaped by the same forces that dominate human history: religion, politics, and economic and social factors.

Beer most likely first came about by accident.

Twelve thousand years ago, in an area known as the Fertile Crescent (in the Middle East near the Tigris and Euphrates rivers), Neolithic people grew barley for nutrition. The grain was ground into gruel, and people began to experiment with adding other ingredients, such as bittering herbs. At some point, possibly on many independent occasions, some of that gruel became colonized with wild yeast and fermented, creating the beverage that would eventually become beer.

Gruel was a staple of basic nutrition in civilizations throughout the ancient world as grains, agriculture, and brewing techniques spread through Europe and humans became less nomadic. Particular grains were better suited to certain climates, and the fermented beverages of each region would take on the flavors of locally available ingredients. In this way, local styles of beer eventually began to develop.

In addition to geography and climate, beer's evolution has been shaped by the same forces that dominate human history: religion, politics, and economic and social factors.

1800 BC
The "Hymn to Ninkasi," the Sumerian goddess of beer, is inscribed on a tablet about 4,000 years after humans first leave evidence of brewing activity. It has been said that this hymn is the oldest known recipe.

1350
Beer is seen as a source of basic nutrition throughout Europe in the Middle Ages. Monks brew in order to support the church, which plays a major role in monopolizing herbs for brewing "gruit." Around 1350, hops replace other herbs used in making beer, which weakens the church's grip on the beverage.

Top-fermenting ale yeast (*Saccharomyces cerevisiae*), along with microorganisms, is the dominant method of fermentation during this period. Meanwhile in Germany, the cooler climate leads to the evolution of the bottom-fermenting lager yeast strain.

1516
The Reinheitsgebot Beer Purity Act is established in Bavaria. The original "purity law" permits beer to be made only with barley, hops and water, later acknowledging yeast and permitting wheat in ale-based beers. A revised form of the law still exists today.

1525
Flemish immigrants introduce beers brewed with hops to England.

1750
The Industrial Revolution begins around 1750 and has a major impact on the brewing industry in England. Thermometers, hydrometers and steam power are introduced to the porter breweries of the time.

European immigration to America expands to include greater numbers of immigrants from countries other than England. German immigrants bring their lager recipes and lagers quickly become the most popular styles of beer in America.

1873
America has 4,131 breweries, the most in its history. Refrigeration and refined marketing strategies breed the first national breweries, but many smaller breweries continue to be successful in local markets.

1920-1933
Prohibition, in the form of the 18th Amendment, outlaws the sale of alcohol in the United States. Most breweries close entirely, but some transition into making other types of products.

Key dates to remember:

- January 16, 1919: The 18th Amendment is ratified and goes into effect a year later on January 16, 1920, marking the start of Prohibition. A separate law, the Volstead Act, goes into effect in October 1919 to set criteria for enforcing the ban on alcohol.
- March 23, 1933: President Franklin D. Roosevelt signs legislation permitting the sale of 3.2 percent ABV beer, partially fulfilling his campaign promise to end the national ban on alcohol. He had spurred Congress to modify the Volstead Act in advance of Prohibition's ratification.
- April 7, 1933: Roosevelt himself receives newly legalized beer at the White House to toast the beginning of the end for Prohibition. In the 24 hours that follows, more than 1.5 million gallons of beer flows as Americans celebrate.
- December 5, 1933: The 21st Amendment repeals the 18th Amendment. Prohibition ends, and only about half of the 1,568 breweries in America re-open. Most close shortly thereafter.

1976
Five companies are responsible for 90 percent of all beer produced in the U.S.

1978
There are less than 100 brewing facilities in existence in the U.S.

1979 and beyond
See "The Rise of Craft Brewers," page 5.

Some information in this section was paraphrased from Radical Brewing by Randy Mosher. See endnotes, p. 72.

SECTION 1: THE RISE OF CRAFT BREWERS

In less than 40 years, America's craft brewing industry has grown from fewer than 100 craft breweries in 1978 to more than 4,000 in 2015. As a nation, the U.S. has more beer styles and brands to choose from than any other beer market in the world.

Beer is deeply rooted in this country's framework. This beverage contributes 1.5 percent of our gross domestic product and historically has been enjoyed by both presidents and pilgrims alike. In 2014, the entire U.S. beer category reached $101.5 billion in sales, with small and independent craft brewers contributing $19.6 billion of that total. Comparing these numbers to wine ($36 billion) and spirits ($65 billion), it's fair to say the U.S. is first and foremost a beer-loving nation.

Yet the American beer scene has not always enjoyed the strength and diversity that we know today. From the end of Prohibition through the 1970s, the U.S. was mostly known for American Lager. Though light and refreshing, some unfortunately viewed these beers as nearly identical commodities, simply made by different producers.

Fast forward to today: Now the U.S. is the number-one beer destination on the planet, with 99 percent of the 4,000+ breweries being small and independent. We now have more than 130 U.S. beer styles, from American India Pale Ales to barrel-aged sours, and more than 75 percent of adults of legal drinking age live within 10 miles of a brewery.

The Pioneers of Craft Beer

In the 1970s, Fritz Maytag resurrected Anchor Brewing Company and Jack McAuliffe started New Albion Brewing Company, both in California.

Meanwhile, in the east, heritage brewers like F.X. Matt/Saranac in New York, August Schell in Minnesota, Spoetzl Brewery in Texas, Yuengling in Pennsylvania and many others were also making waves of beer foam. Soon the movement spread, first like a slow-moving brush fire and then like a blazing burn.

Jack McAuliffe (left) and Fritz Maytag (right)

Homebrewing Emerges

Homebrewers, microbreweries and brewpubs are truly at the heart of the rise, once again, of local beer in the U.S. The homebrewing hobby began to thrive because the main way a person could experience the beer traditions and styles of other countries was to make the beer themselves. These homebrewing roots gave birth to what we now call "craft brewing." Since 1979, it has been legal to homebrew up to 200 gallons of beer per family household. This one law has helped an entire community grow and thrive.

Microbrewing Era

Momentum began to pick up for the microbrewing phenomenon in the early 1990s. Soon the U.S. landscape was dotted with taprooms and brewpubs where beer lovers could sample a wide selection of local, flavorful beer while interacting directly with the brewers.

Craft brewing growth slowed to between one and five percent annually between 1997 and 2003, but from 2007 to 2014 it saw 10.9 percent growth each year, on average. The numbers reflect a more advanced U.S. beer culture, as beer drinkers increasingly connect with craft brewers.

What Is Craft Beer & What Is a Craft Brewer?

In terms of the question, "What is craft beer?" a definition is difficult. Craft beer means many different things to many different beer lovers.

Craft beer has been described variously as: "10 minutes of pleasure;" "Pure happiness in a glass;" "An intellectual beverage that is to be savored, not swilled;" and many other flowery phrases. It is enjoyed during everyday celebrations and is viewed by many as one of life's special pleasures. Each glass displays the creativity and passion of its maker and the complexity of its ingredients. How could we pin that down with a precise definition?

However, CraftBeer.com's parent organization, the Brewers Association, does define what it means to be a craft brewer. This definition allows the Brewers Association, which represents the majority of the U.S. beer community, to provide statistics on the growing craft brewery segment.

A U.S. craft brewer is:

- **Small** - Producing less than six million barrels of beer a year.
- **Independently owned** - Less than 25 percent of the craft brewery is owned or controlled by an alcoholic beverage industry member that is not itself a craft brewer.
- **Traditional** - A majority of its total beverage alcohol volume is beer, with flavors derived from traditional or innovative brewing ingredients and their fermentation. (Flavored malt beverages [FMBs] are not considered beers.)

Visit CraftBeer.com for more details and the full definition of a craft brewer (CraftBeer.com/Definition), or visit the Brewers Association for details on the craft beer market sectors: brewpubs, microbreweries and regional craft breweries (BrewersAssociation.org/Statistics/National).

Craft Brewers Today

Today's craft brewers have succeeded in establishing high levels of quality, consistency and innovation, expanding the minds and palates of beer lovers, and creating the most diverse brewing culture in the world. With the number of breweries and beer brands available today, it's clear that craft brewers and craft beer lovers are participants in an American beer renaissance.

As the brewing landscape continues to evolve, so do Americans' tastes in beer. Nielsen research confirms that beer drinkers are shifting to more robust styles, and we know from market research firm IRI Group that India Pale Ale is the top-selling craft beer category in U.S. supermarkets, followed by seasonally released beers.

One sign of the changing times came in 2002 when American-Style India Pale Ale surpassed American-Style Pale Ale as the most-entered beer style at the annual Great American Beer Festival®. It has remained the most-entered category since.

Credit Where It's Brewed

The large multinational brewing companies deserve much credit for establishing beer as the most popular fermented beverage in the U.S.—no small feat. Large global brewers have high standards in terms of quality and consistency. In addition, today's small and independent brewers put U.S. craft beer on the map and continue to fuel it. These little businesses are thriving against all odds, innovating and expanding Old World beer styles with New World twists.

Simply put: It is a great time to be a beer lover in the U.S.

Top U.S. Craft Brewing Companies
(Based on 2014 beer sales volume)

Rank	Brewing Company	City	State
1	D. G. Yuengling and Son, Inc	Pottsville	PA
2	Boston Beer Co	Boston	MA
3	Sierra Nevada Brewing Co	Chico	CA
4	New Belgium Brewing Co	Fort Collins	CO
5	Gambrinus	Shiner	TX
6	Lagunitas Brewing Co	Petaluma	CA
7	Deschutes Brewery	Bend	OR
8	Bell's Brewery, Inc	Comstock	MI
9	Stone Brewing Co	Escondido	CA
10	Minhas Craft Brewery	Monroe	WI
11	Brooklyn Brewery	Brooklyn	NY
12	Duvel Moortgat USA	Kansas City & Cooperstown	MO/ NY
13	Dogfish Head Craft Brewery	Milton	DE
14	Matt Brewing Co	Utica	NY
15	Harpoon Brewery	Boston	MA
16	Firestone Walker Brewing Co	Paso Robles	CA
17	Founders Brewing Co	Grand Rapids	MI
18	SweetWater Brewing Co	Atlanta	GA
19	New Glarus Brewing Co	New Glarus	WI
20	Alaskan Brewing Co	Juneau	AK
21	Abita Brewing Co	Abita Springs	LA
22	Anchor Brewing Co	San Francisco	CA
23	Great Lakes Brewing Co	Cleveland	OH
24	Oskar Blues Brewery	Longmont	CO
25	Shipyard Brewing Co	Portland	ME

Visit CraftBeer.com for a full list of U.S. breweries, sortable by state. Source: Brewers Association

SECTION 1: HOMEBREWING & CRAFT BREWING

Homebrewing is an extremely popular hobby—an estimated 1.2 million Americans brew beer at home. These hobbyists are helping to fuel the growth of the craft beer industry, both by supporting their local breweries and even opening breweries themselves. Learn about the American Homebrewers Association and the National Homebrew Competition, the largest beer competition in the world.

Since 1979, it has been federally legal to homebrew up to 200 U.S. gallons of beer a year, per family household in the U.S. Today more than 1.2 million people brew their own beer at home. More than 800 homebrew shops and 1,700 homebrew clubs in the U.S.

A main advocate and authority for homebrewing is the American Homebrewers Association (part of the Brewers Association). The AHA website (HomebrewersAssociation.org) has a broad selection of information on how to homebrew and on events in the homebrew community.

The primary difference between homebrewers and commercial brewers is that commercial brewers sell their beer. To do that, they must comply with regulations put forth by the federal government and each individual state, including licensing requirements. Homebrewers do not need to apply for any license. As long as a U.S. resident is 21 years of age and only making beer (not selling it), they may brew.

Who are homebrewers?

Based on surveys of American Homebrewers Association members and non-members, homebrewers come from a diverse array of backgrounds. However, a majority:

- have technical or professional occupations;
- are well educated, with the vast majority holding college degrees;
- fall into a middle- to upper middle-class income range;
- are married;
- have a creative, do-it-yourself approach to brewing, which helps encourage creativity in the broader beer community.

SECTION 1: BREWING PROCESS

Let's take a look at each of the steps in the brewing process and the chemical reactions that take place to eventually produce a batch of beer. From creating the mash to carbonation, each step is outlined and explained.

People sometimes refer to beer as "liquid bread" because of the similarity of ingredients. Bread is made from water, grain (usually wheat), yeast and salt; while beer is made from water, grain (usually barley but sometimes wheat, rye and other grains), yeast and hops. And just like in baking, temperature and timing matter throughout the brewing process.

1. Mash

Mashing is the steeping of crushed grains in a specific amount of water, for a specific amount of time, at a specific temperature. On the biochemical level, the heat of the water activates enzymes to convert the starches in the grains to fermentable sugars that the yeast will later consume and process into carbon dioxide (CO_2) and alcohol. When the starch-to-sugar conversion is complete, the liquid is separated from the grains, a process known as lautering, and collected in the boil kettle. (HomebrewersAssociation.org/How-To-Batch-Sparge)

Mashing can take anywhere from 60 minutes to several hours. A variety of mashing techniques and temperature rests (letting the wort sit for a time in a particular temperature range) are often employed depending on the beer style and the type of grain used.

Step Mash

Specific temperatures have various advantages for extracting and modifying the sugars, proteins and other components of the grain. Holding the mash at certain temperatures, called steps or rests, allows brewers to activate different enzymes and to work with a variety of modified (converted) and under-modified malts.

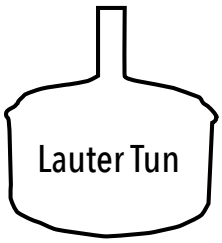
- Acid Rest: 90-120°F
  - Activates the phytase enzyme to acidify the mash, creating a more acidic and less alkaline environment.
- Protein Rest: 122-131°F
  - Commonly performed in wheat beers to break down long protein chains into smaller proteins and amino acids. This also lessens potential chill haze, the cloudiness caused by residual proteins that are soluble at room temperature but clump together when cold, thus creating a haze.
- Saccrification Rest: 140-158°F to achieve a target pH of 5.2-5.7
  - Final temperatures from this mash drive the diastatic family of enzymes and affect body and residual sugar of the end product.
  - Beta amylase and alpha amylase are the two major enzymes driven by this temperature rest.
  - Mash temperatures of 142-149°F drive the beta amylase enzymes to create a less dextrinous wort with more fermentable sugars.
  - Mash temperatures of 149-158°F drive the alpha amylase enzymes to create a more dextrinous wort with fewer fermentable sugars, which lends a bigger body to the finished beer.

Note that introducing temperatures above 160°F at this stage can cause harsh tannins/polyphenols to be leached from the husks of the malted and crushed barley, so this is avoided.

Infusion Mash

In this type of mash, crushed grains are added to water heated at one specific temperature within the range of a saccharification rest. The target mash temperature is then held for the entire period of the mash. This mash is most common when highly modified malts are used, and low-protein malts are the dominant part of the grist (crushed grain).

2. Lautering



Lautering is the method of separating the sweet wort (water with dissolved sugars extracted from grain) from the mash. A lauter tun consists of a large vessel to hold the mash and a false bottom or manifold to allow the wort to drain out while leaving the grain behind. Lautering can be conducted in several ways, but it usually consists of three steps: mash-out, recirculation, and sparging.

The timing of lautering varies based on how slowly or quickly the mash is rinsed. This step is complete when the wort reaches the desired volume and pH.

1. Mash-out is the term for raising the temperature of the mash to 170°F prior to lautering. This step stops all of the enzyme action (preserving the fermentable sugar profile) and makes the grain and wort more fluid.
2. Recirculation, also knows as the vorlauf step, occurs after the grain bed has settled and is ready to be lautered. The first few quarts of wort are drawn out through the drain of the lauter tun and poured back in on top of the grain. This helps settle the grain bed to ensure proper mash filtration and clarity.
3. Sparging is the process of rinsing the grain bed that has settled at the bottom of the lauter tun in order to extract the remaining sugars. The temperature of the sparge water is carefully controlled so as not to also extract tannins from grain husks. (Palmer, 2006, p. 180-181. See Endnotes p. 62.)

Demonstration Video: Brewing with Malted Grains (goo.gl/4mqrde)

3. Boil

There are multiple reasons to boil wort, though it's not done for all styles. Boiling:

- Stops enzymatic activity (no more conversion of starches to sugars), known as 'denaturing' enzymes;
- Blows off undesired volatile compounds including some hop oils, sulfur compounds and dimethyl sulfide (DMS);
- Encourages 'hot break,' which is a coagulation of proteins and tannins that improves beer's clarity and decreases astringency;
- Concentrates wort through evaporation;
- Converts hop alpha acids into isomerized hop alpha acids that provide bitterness to beer;
- Kills off any microbes that may be in the wort, thus sterilizing it (note some microbes are favorable, but are commonly added post-boil as they cannot survive the heat).

4. Whirlpool

Whirlpool happens after the boil and serves to collect hop particulates and coagulated protein from the hot break. This often happens in a dedicated vessel, or can be done in the boil kettle. The beer is spun in a circular fashion, allowing particles (called 'trub') to collect together at the bottom center of the vessel. Then the wort is siphoned away, leaving the trub behind.

5. Chilling

The wort is chilled to prepare it for fermentation. Methods of chilling include immersion chillers, which are set inside the wort, and heat exchangers that pass wort and cold water through a parallel set of coils, thereby cooling the hot wort indirectly. Beer is commonly chilled down to yeast-pitching temperature, which varies depending on yeast strain and the brewer's intentions (usually 40-70°F).

6. Fermentation

Fermentation begins when yeast or microorganisms are introduced to the sweet, cooled wort. Fermentation can last for several days, weeks or months depending on the brewer's intentions. Ales ferment faster and warmer than lagers, which require a slow conditioning period. Ales can ferment and mature as quickly as three weeks. Lagers traditionally require more than sixty days' time.

Fermentation most commonly occurs in steel tanks or wood barrels. Yeast needs oxygen to begin fermentation, so oxygen is often added at the same time the yeast is pitched.

Primary fermentation is when the yeast is the most vigorous and active. As yeast consumes the fermentable malt sugars, it begins to settle to the bottom of the tank (a process called 'flocculation').

Secondary fermentation is when the initial yeast cake (dormant yeast at the bottom of the fermentor) has been removed, and the beer continues to ferment at a slower pace. Beer also begins to clarify during this step.

7. Conditioning

Conditioning occurs when the yeast has stopped fermenting the wort and has finished settling out to the bottom of the fermentor. This is also the period when yeast byproducts such as diacetyl and acetaldehyde are lessened or completely removed. Note that these byproducts are acceptable at lower levels in some beer styles.

8. Carbonation

Carbonation, or CO_2, is a main ingredient in beer. It lends body or weight on the tongue and stimulates the trigeminal nerves, which sense temperature, texture and pain in the face. Carbonation can be detected as an aroma (carbonic acid). It also affects appearance and is what creates the collar of foam common to most beer styles.

Carbonation is introduced into beer in a variety of ways:

Natural carbonation: As yeast eats sugars during fermentation, it produces a variety of byproducts, including alcohol and CO_2. This carbonation can be captured and used to carbonate the finished beer.

Force carbonation: One method of force carbonation is via a device called a carbonation stone. This device injects CO_2 from a separate gas tank into beer that resides in a conditioning or serving vessel. It allows CO_2 to dissolve into the beer.

Bottle conditioning: Addition of yeast at packaging time. This yeast, under the right conditions, will ferment residual sugars still left in the beer and then produce CO_2 that disolves directly into the beer in the bottle. Successful bottle conditioning requires residual sugars and yeast to still be present in the beer. It is a common technique used by smaller brewers and homebrewers.

Review of Brewing Process Steps:

1. Mash
2. Lautering
3. Boil
4. Whirlpool
5. Chilling
6. Fermentation
7. Conditioning
8. Carbonation

SECTION 1: INGREDIENTS IN BEER

In this section, we'll take a detailed look at each of the ingredients necessary to brew beer. Different combinations of carbonation, hops, malt and other fermentables, water, and yeast and microorganisms all play specific and important roles in creating the multitude of different styles of beer common today.

Craft brewers use a wide variety of ingredients to achieve the aroma, body, flavor and finish they desire in their beer. For some styles, they have taken the traditional styles of beer from great brewing countries like England, Germany and Belgium and added their own twists by modifying the amount or type of ingredients or the brewing process. There are now multiple beer styles uniquely credited to the U.S., though many traditional beer styles continue to be brewed both in their countries of origin and in the U.S.

The main ingredients in most beer styles are carbonation, hops, malt and other fermentables, water, and yeast and microorganisms.

1. Carbonation (CO_2)

Visual: None, slow-, medium-, fast-rising bubbles

Palate: Low, medium, high

- Beer's carbonation comes from carbon dioxide gas, which is a naturally occurring byproduct of fermentation. It can also be introduced into beer via force carbonation.
- Nitrogen can also be added to beer, providing smaller bubbles and a softer mouthfeel compared to CO_2.
- Carbonation is measured in terms of volumes of CO_2, which range from 1-3+ v/v (volumes of dissolved gas per volume of liquid) with 2.5-2.7 volumes being the most common.

Whole cone hops

2. Hops

Bitterness ranges: Restrained, moderate, aggressive, harsh

Aroma and flavor ranges: Citrus, floral, fruity, green, herbal, onion/garlic, pine, resinous, spicy, spruce, sweaty, tropical, woody

- Hops deliver both resins and essential oils that influence beer's aroma, flavor, bitterness, head retention, astringency, and perceived sweetness. They also increase beer's stability and shelf life.
- Brewers today use well over 100 different varieties of hops worldwide, with hops grown in the U.S. contributing an estimated 30 percent of the global supply.
- Though there are many varieties of hop plants, the hops used in beer generally fall into three categories: bittering, aroma and dual-purpose. Bittering hops contain more alpha acids and are used primarily to contribute bitterness, while aroma hops are used primarily to add flavor and aroma to beer. Dual-purpose hops can have higher alpha acid content, but also are used to contribute aroma compounds.
- Hop resins lend bitterness via alpha acids to balance the sweetness of malt sugars. When alpha acids are isomerized through boiling, ranges of bitterness can land anywhere from two IBUs (International Bitterness Units) to more than 100 depending on the beer style and brewer's intention.
- Alpha acid content of most hops ranges from 2 to 20 percent by weight.
- Hops' main essential oils influencing aroma and flavor are:
  - Humulene (common in noble hops)
    - Woody/piney notes
  - Myrcene (pungent; largest component of hop oil; can help indicate ripeness of hop cone)
    - Green resin aromatics
  - Caryophyllene
    - Spicy pepper notes
  - Farnesene
    - Floral notes
  - These oils volatize off when exposed to heat, so aroma and flavor hops are added at the end of the boil or during or after fermentation (a technique referred to as "dry hopping").

Chocolate malt, Munich malt, Pilsner malt

3. Malted Barley (Malt)

Flavor ranges: Bread flour, grainy, biscuit, bready, toast, caramel, pruny, roast, chocolate, coffee, smoky, acrid

- Malt is detected in the aroma, flavor and appearance of a beer.
- Malt has been called the soul of beer. It is the main fermentable providing the sugars that yeast use to create alcohol and carbonation. It is most often barley that has been malted by putting it through a series of moisture and temperature steps.
- Malt is converted barley or other grains that have been steeped, germinated, heated, kilned (or roasted in a drum), cooled and dried, and then rested.
- Fresh barley has a moisture content commonly around 13 percent. This is raised, often to more than 40 percent, until the barley begins to germinate. During the malting process it is dried to less than four percent moisture.
- A wide variety of barley and other malts are used to make beer, including: pale malts (pilsner and pale two-row); higher-temperature kilned malt (Munich and Vienna); roasted/specialty malt (chocolate and black); and unmalted barley. Wheat malt is commonly used as well.
- Malt adds fermentable and non-fermentable sugars and proteins that influence beer's aroma, alcohol, aroma, astringency, body, color, flavor and head retention.

4. Other Ingredients

Adjuncts include anything that is not malted, but is a source of fermentable sugars, flavor, color or other characteristics.

- Common adjuncts include: Candy sugar, honey, molasses, refined sugar, treacle, maple syrup
- Unmalted starchy adjuncts include: Oats, rye, wheat, corn/maize, rice
- Note that many adjuct grains can be malted to create unique flavors compared to their unmalted counterparts.
- Other Ingredients: Fruit, herbs, roasted (unmalted) barley or wheat, spices, wood

5. Water

Beer is mostly water, which makes water quite an important ingredient. It provides minerals and ions that add various qualities to beer. Some brewers make their beer without altering the chemistry of their water sources. Many do modify the water to make it most suitable to deliver the beer characteristics they hope to highlight.

- Common minerals include: Carbonate, calcium, magnesium, sulfate
- Common taste descriptors include: Chalk, flint, sulfur

pH, residual alkalinity, water hardness or softness and mineral content all come into play when brewing beer. Let's take a look at these factors.

pH

pH measures the concentration of ions in a liquid. The pH scale runs from 0 (acidic) to 14 (alkaline), with 7 as the neutral midpoint.

- Acidic (0-6) has higher Hydrogen concentration
- Alkaline (8-14) has higher Hydroxide concentration

Just like the Richter scale for earthquakes, pH is logarithmic. Every point on the pH scale is ten times greater or lesser in concentration than the point above or below it. For example: pH 4 is 1,000 times (10^3 or 10 x 10 x 10) more acidic than pH 7.

UNDERSTANDING BEER'S ACIDITY HELPS WITH PAIRING STRATEGY. SALT AND THE RICHNESS OF FOODS ARE CALMED BY ACIDITY.

Common pH levels of some liquids:

2.4	Lemon juice
3-3.4	White wine
3.5	Orange juice
3.3-3.6	Red wine, sour beer styles (post-fermentation)
4-4.5	Most beer styles (post-fermentation)
5.2-5.7	Ideal pH for beer mash
7	Tap water, human saliva

Darker kilned and roasted malts decrease mash pH. Too alkaline a mash (above pH 5.7) lessens the chance for proper malt color extraction. Ideal mash pH ensures:

- Ideal enzyme conditions for proper saccrification (the conversion of malt starch into fermentable sugars, primarily maltose);
- No leaching of harsh tannins/polyphenols from malt husk;
- Proper "hot break," which aids in coagulation of proteins during the mash boil.

Alkalinity

Alkalinity determines the buffering capacity of water (the degree to which water will reduce the acidity of the beer). Calcium and magnesium affect hardness. Carbonates and bicarbonates affect alkalinity. Together they affect mash pH.

To lower alkalinity, brewers:

- Add dark malts to lessen pH to a more acidic environment;
- Use brewing salts;
- Add acidic compounds like lactic acid or acidulated malt (malt that has already been soured with lactic acid);
- Do a sour mash (a particular mixture of grain and water that encourages the development of bacteria that produces lactic acid, which is present in the husk of the barley).

Hardness

Hardness is the concentration of minerals in water. Water high in calcium/magnesium and bicarbonate/sulfate is said to be 'hard.' Hard water is used in German-style Dunkels, German-style Marzen/Oktoberfest beers, Vienna-style Lagers, Irish-style Dry Stouts, Scottish-style Ales and English-Style Pale Ales/ESBs.

On the other end of the spectrum, water low in these ions is said to be 'soft.' Soft water is used in Bohemian-style Pilseners.

The presence of calcium sulfate (gypsum) enhances bitterness, but also can induce dryness and lend a low sulfitic character. This effect has been called the 'Burton snatch,' originating from beers made in Britain in the Burton-on-Trent area.

Ions

Ions in brewing water primarily affect pH and may add or accentuate certain flavors.

CATIONS (positively charged)	ANIONS (negatively charged)
Calcium is most important ion for brewing • Lowers mash pH Magnesium • Lowers mash pH Sodium (flavor ion)	Bicarbonate is the most important ion for alkalinity • Raises pH • Reacts with calcium to reduce hardness during boil Chloride • Increases mouthfeel • Accentuates bitterness and dryness

6. Yeast and Microorganisms

Yeast and other microorganisms eat sugars from malted barley and other fermentables, producing carbonation, alcohol and aromatic compounds. The flavor imparted by yeast differs based on yeast strain, temperature, time exposed to the beer, oxygen and other variables.

Types of Yeast

- **Lager**: *Saccharomyces pastorianus*. Often lends sulfuric compounds. Commonly referred to as bottom-fermenting. Most often ferments at cooler temperatures (45-55°F).
- **Ale**: *Saccharomyces cerevisiae*. Generally produces more flavor compounds (esters). Commonly referred to as top-fermenting. Most often ferments at warmer temperatures (60-70°F).
- **Weizen**: Common to some German-Style Wheat beers.
- ***Brettanomyces***: Considered a "wild" yeast. Lends flavors like barnyard, tropical fruit and more.

Types of Microorganisms (Bacteria)

- ***Acetobacter***: Bacteria that makes acetic acid, which gives vinegar its tart quality.
- ***Lactobacillus***: Bacteria that produces lactic acid, which gives yogurt and sourdough bread their sour qualities.
- ***Pediococcus***: Bacteria that produces lactic acid. Over time, this can create diacetyl (an off-favor in beer that is often described as buttered popcorn).

Saccharomyces cerevisiae

DEMONSTRATION

To experience staling flavors in beer, try this demonstration. Be sure to do the prep for this at least 24 hours in advance.

1. Purchase a canned (not bottled) commercial version of a beer style that is intended to be enjoyed fresh. For example, a can of Sierra Nevada Pale Ale.
2. Ensure any beer you purchase is stored cold and dark (away from sunlight) until ready for tasting.
3. Make sure your beer is within the proper date range indicated by the brewer. For example, Sierra Nevada Pale Ale should be less than 150 days past the date listed on the package.
4. Set aside half of the cans in the refrigerator. Boil the rest, unopened for 20 minutes in an uncovered pot of boiling water (make sure water covers the cans).
5. Let the pot sit until cool to the touch.
6. Remove the cans from the water. Place them back in the refrigerator.
7. Let the cans cool in the fridge for 24 hours so they reach serving temperature (38°F).
8. Pour students a sample of un-boiled beer.
9. Pour students a sample of boiled beer.
10. Sample side-by-side, and note differences.
11. Discuss. At minimum, in the boiled version you should notice diminished hop aromatics, less hop flavor, possibly softer carbonation and different malt flavors.

Quantity

Ensure you will have enough for two ounces of boiled beer and two ounces of fresh beer per person (four ounces total per person).

Supplies

- Two glasses/tasting cups (odorless and tasteless) per person. Judging cups can be purchased from the Brewers Association: BrewersAssociation.org/Store/Cups
- Tasting Mat for notes: CraftBeer.com/TastingMat

Byproducts of Fermentation

Alcohol and CO_2 are the main products of fermentation, but yeast and other microorganisms may produce many other byproducts that can add new flavors and aromas to the beer. These flavors will continue to change over time, especially for aged beers. For a full list of fermentation byproducts and their effects on favor and aroma, see CraftBeer.com/Components

Esters

- Esters are a byproduct of yeast during fermentation and are the result of the presence of acids and alcohol.
- Common aromas (volatiles) include: apple, apricot, banana, black currant, cherry, fig, grapefruit, kiwi, peach, pear, pineapple, plum, raisin, raspberry, strawberry.
- Generally esters are more common in ales than lagers because of warmer fermentation temperatures.
- Common types of esters include:
  - Isoamyl acetate (common from weizen ale yeast)
    - Banana, pear
  - Ethyl Acetate
    - Nail polish remover, solvent
  - Ethyl Hexanoate
    - Red apple, anise seed

Phenols

- Common Phenols include: (Note: Not all phenols are yeast-derived.)
  - 4-vinyl guaiacol
    - Clove, cinnamon, vanilla, white pepper
  - Bromophenols
    - Burnt match, electrical short
  - Chlorophenols
    - Antiseptic, mouthwash
  - Syringol
    - Smoky, campfire
  - Tannins/Polyphenols
    - Velvet, astringent, sandpaper

Staling Flavors

- Staling flavors develop as beer ages.
- Common staling flavors include: Almond, black currant, E-2-nonenal (Papery/cardboard), honey, metallic, sherry and more.

For a full list of fermentation byproducts and their effects on flavor and aroma, see CraftBeer.com/Components

Get to Know More About Beer

1. Arrange for a private tour of a local brewery.
   Visit the CraftBeer.com Brewery Database and search by city or state: CraftBeer.com/FindBrewery
2. Tour a hop field or malting facility.
   Ingredient suppliers are listed at BrewersAssociation.org: BrewersAssociation.org/Suppliers
3. Brew a batch of beer in your kitchen.
   HomebrewersAssociation.org has a "How to Brew" section for homebrewers at all levels of experience: HomebrewersAssociation.org/Beginner/How-To-Make-Beer

Review of Ingredients in Beer:

1. Carbonation
2. Hops
3. Malt
4. Other Ingredients
5. Water
6. Yeast and Microorganisms

CraftBeer.com A-Z of Beer Styles

Use this alphabetical list to identify and describe potential characteristics of a beer style.

Alcohol

- Ranges: Not detectible, mild, noticeable, harsh
- A synonym for ethyl alcohol or ethanol, the colorless primary alcohol component of beer (fusel alcohol may also be present)
- Varies from less than 3.2 percent to more than 25.0 percent ABV.
- Sensed in aroma, flavor and palate

Brewing and Conditioning Process

- Modifying or adding steps to the brewing and conditioning process can create unique characteristics in a beer
- Common variations include: Variable mashing, steeping, unique fermentation temperatures, multiple yeast additions, barrel aging and blending, dry hopping, bottle conditioning and filtering

Carbonation (Visual)

- Visual Ranges: None, slow, medium, fast-rising bubbles
- Volume Ranges: 1-3+ (carbon dioxide per volume of beer)

Clarity (different from color and brightness)

- Ranges: Brilliant, clear, slight haze, hazy, opaque
- Affected by the amount of solids suspended in the beer

Collar of Foam (head retention and texture)

- Retention ranges: None, poor (less than 15 seconds), moderate (up to 60 seconds), good (more than 60 seconds)
- Texture ranges: Thin, interrupted, foamy, rocky, mousse-like

Color/SRM

- Ranges: 2-50
- A numerical range representing the color of a beer, based on absorption of specific wavelengths of light
- The higher the SRM, the darker the beer

Geography/History

- Country/City of origin when relevant

Glass

- Type of glass most common for style

Hops

- Aroma/Flavor: Citrus, floral, fruity, green, herbal, onion/garlic, pine, resinous, spicy, spruce, sweaty, tropical, woody
- Bitterness: 0-100+ IBUs
- Hops also contribute to a beer's astringency

Malt

- Aroma/Flavor: Bread flour, grainy, biscuit, bready, toast, caramel, pruny, roast, chocolate, coffee, smoky, acrid
- Sweetness: Low, medium, high
- Malt also contribute to a beer's astringency

Other Ingredients

- See Other Ingredients (Page 12)

Oxidative/Aged Qualities

- Almond, black currant, E-2-nonenal (papery/cardboard), honey, metallic, sherry, sweat socks, staling flavors, beer darkens over time.

Palate

Palate refers to the non-taste sensations felt on the mouth and tongue when tasting a beer. The palate of a beer can be sensed as:

- Astringency
  - Ranges: Low, medium (-), medium, medium (+), high
- Body
  - Ranges: Drying, soft, mouth-coating, sticky
- Carbonation
  - Ranges: Low, medium, high
- Length of Finish/Aftertaste
  - Ranges: Short (less than 15 seconds), medium (up to 60 seconds), long (more than 60 seconds).

Water

- Common taste descriptors include: Chalk, flint, sulfur

Yeast, Microorganisms and Byproducts of Fermentation

- Yeast: Ale, Lager, Weizen, *Brettanomyces*
- Fermentation Microoganisms: *Acetobacter* (acetic), *Lactobacillus/Pediococcus* (lactic), others.
- Esters, Phenols

SECTION 1: OVERVIEW OF BEER STYLES

Beer styles play a very important role in the appreciation of beer—especially when pairing with food or using beer as an ingredient in the kitchen. The following guidelines provide distinct properties about a beer including bitterness, color, texture and Alcohol By Volume (ABV)—which all play a role in what we taste and how we pair. In this overview, 25 common styles of beer are reviewed, 10 of which you will sample in the two tasting sessions later in the course.

For full style overview see the CraftBeer.com Beer Style Finder: CraftBeer.com/Style-Finder

What Is a Beer Style?

Beer styles continue to evolve over time. Today, there are hundreds of documented beer styles and a handful of organizations that each have their own unique classifications. Style guidelines exist to give beer lovers a methodology to describe, compare and contrast different beers.

Demonstration Video: What is a Beer Style (CraftBeer.com/Styles-Video)

Styles guidelines may provide more information than many beer novices care to know. However, as your beer journey unfolds, your desire for more descriptors and resources will grow.

Do All Craft Brewers Brew Their Beers to Style?

Craft beer resides at the intersection of art and science. It is up to each individual brewer to decide whether they want to create beer within specific style guidelines or forge a new path and break the mold of traditional styles.

Documented beer styles are like guideposts that make it possible to compare and categorize individual beers. By measuring various properties of a beer and comparing them to the style guidelines, we can gain a deeper appreciation of what makes that beer unique.

Craft Beer By the Numbers

Beer styles are defined via a combination of qualitative descriptions and numerical measurements. Here are some of the figures you'll encounter as you compare beer styles.

Original Gravity (OG)

- The specific gravity of wort (unfermented beer) before fermentation. A measure of the total amount of solids that are dissolved in the wort as compared to the density of water, which is conventionally given as 1.000 at 60°F.

Final Gravity (FG)

- The specific gravity of a beer as measured when fermentation is complete (when all desired fermentable sugars have been converted to alcohol and carbon dioxide gas).
- When fermentation has occurred, this number is always lower than Original Gravity.

Alcohol By Volume (ABV)

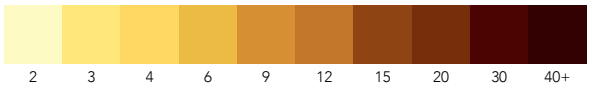
- A measurement of the alcohol content in terms of the percentage volume of alcohol per volume of beer.
- To calculate the approximate volumetric alcohol content, subtract the final gravity from the original gravity and divide by 0.0075.
- Formula: ABV = (OG – FG) / 0.0075
- Example: OG 1.050, FG 1.012
  - ABV = (1.050 – 1.012) / 0.0075
  - ABV = 0.038 / 0.0075
  - ABV = 5.066
  - ABV = 5.1% (approximately)

International Bitterness Units (IBUs)

- 1 bitterness unit = 1 milligram of isomerized hop alpha acids in one liter of beer.
- Can range from 0 (no bitterness) to above 100 IBUs.
- Most people cannot perceive bitterness above a specific level of IBUs (said to be 80 IBUs by some sources).

Color/Standard Reference Method (SRM)

- Very Light (1-1.5), Straw (2-3), Pale (4), Gold (5-6), Light Amber (7), Amber (8), Medium Amber (9), Copper/Garnet (10-12), Light Brown (13-15), Brown/Reddish Brown/Chestnut Brown (16-17), Dark Brown (18-24), Very Dark (25-39), Black (40+)



Volumes of CO_2

- See Carbonation (CO_2) section on page 11

Apparent Attenuation

- A measure of the extent of fermentation wort has undergone in the process of becoming beer. Apparent Attenuation reflects the amount of malt sugar that is converted to alcohol during fermentation. The result is expressed as a percentage and equals 65 percent to 80 percent for most beers.

- Above 80 percent is very high attenuation with little residual sugar. Below 60 percent is low attenuation with more residual sugar remaining.
- Formula: AA = [(OG – FG) / (OG – 1)] x 100
- Example: OG 1.080, FG 1.020
  - AA = [(1.080 – 1.020) / (1.080 – 1)] x 100
  - AA = (0.060 / 0.080) x 100
  - AA = 0.75 x 100
  - AA = 75%

Common U.S. Beer Styles

Most beer styles being made in the U.S. today can be categorized into 15 style families, comprising close to 80 distinct styles.

Below we list 25 styles common at retail establishments in the U.S. today. Later in this course, over two tasting sessions, you will specifically sample 10 of these styles (**bold**). Note: These styles are listed with like styles closest together.

Session Beer

American Amber Lager
German-Style Marzen / Oktoberfest

Belgian-Style Wit
Berliner-Style Weiss
German-Style Hefeweizen
Bohemian-Style Pilsener

American Pale Ale
English-Style Pale Ale / ESB
American Brown Ale
American India Pale Ale (IPA)

Imperial India Pale Ale
American Barley Wine
German-Style Doppelbock

Robust Porter
American Stout
Belgian-Style Dubbel

Belgian-Style Tripel
Belgian-Style Saison

American Brett
Belgian-Style Flanders
Barrel-Aged Beers

Rye Beer
Smoke Beer
Gluten-Free Beer

Session Beer

Style Description: Any style of beer can be made lower in strength than described in the classic style guidelines. The goal should be to reach a balance between the style's character and the lower alcohol content. Drinkability is a factor in the overall balance of these beers. Session beers commonly do not exceed 5 percent ABV.

Fun Facts: This beer style is not specific to defined types of flavors, but instead is specific to the perception and delivery of refreshment and drinkability.

Quantitative Style Statistics:

- OG: 1.034–1.040
- FG: 1.004–1.010
- ABV: 4–5%
- IBU: 10–30
- SRM: 2+
- Volumes of CO_2: Varies
- Apparent Attenuation: 75–88%

American Amber Lager

Style Description: A medium-bodied lager beer with a toasty or caramel-like malt character. Hop aroma and flavor is very low to medium. Hop bitterness can range from very low to medium-high.

Fun Facts: A widely available, sessionable craft beer style that showcases both malt and hops. Brewers may use a decoction mash and/or dry hopping to achieve advanced flavors.

Quantitative Style Statistics:

- OG: 1.042–1.056
- FG: 1.010–1.018
- ABV: 4.8–5.4%
- IBU: 18–30
- SRM: 6–14
- Volumes of CO_2: 2.7
- Apparent Attenuation: 68–76%

German-Style Marzen/Oktoberfest

Style Description: Rich maltiness with a balance of clean hop bitterness. Bread or biscuit-like malt aroma and flavor is common.

Fun Facts: Originating in Germany, this style used to be seasonally available (Marzen meaning March), with the "-fest" style versions tapped in October.

Quantitative Style Statistics:

- OG: 1.050–1.060
- FG: 1.012–1.020
- ABV: 5.1–6%
- IBU: 18–25
- SRM: 4–15
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 67–76%

Belgian-Style Wit

Style Description: Brewed using unmalted wheat, sometimes oats and malted barley. Witbiers are spiced with coriander and orange peel.

Fun Facts: A style that dates back hundreds of years, it fell into relative obscurity until it was revived by Belgian brewer Pierre Celis in the 1960s. This style is currently enjoying a renaissance, especially in the U.S. market. 'Wit' means 'white.'

Quantitative Style Statistics:

- OG: 1.044–1.050
- FG: 1.006–1.010
- ABV: 4.8–5.6%
- IBU: 10–17
- SRM: 2–4
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 80–86%

Berliner-Style Weiss

Style Description: Low in alcohol and refreshingly tart, and often served with a flavored syrup like Woodruff or raspberry, this German-style wheat ale presents a harmony between yeast and lactic acid. These beers are very pale in color and may be cloudy as they are often unfiltered. Hops are not a feature of these beers, but they often do showcase esters. Traditional versions are often fermented with *Brettanomyces*.

Fun Facts: Weiss beers are growing in popularity in the United States, where many brewers are now adding traditional and exotic fruits to the recipe, resulting in flavorful finishes with striking, colorful hues. These beers are incredible when pairing. Bitterness, alcohol and residual sugar are very low, allowing the beer's acidity, white bread and graham cracker malt flavors to find their way to food in rewarding ways. Carbonation is very high, adding to the refreshment factor this style delivers.

Quantitative Style Statistics:

- OG: 1.028–1.032
- FG: 1.004–1.006
- ABV: 2.8–3.4%
- IBU: 3–6
- SRM: 2–4
- Volumes of CO_2: 3.5–4
- Apparent Attenuation: 81–86%

German-Style Hefeweizen

Style Description: South German-style hefeweizens are straw to amber in color and are made with at least 50 percent malted wheat. The aroma and flavor of Weizen yeast is decidedly fruity (banana) and phenolic (clove).

Fun Facts: 'Hefe' means 'yeast' and 'weizen' means 'wheat.' There are multiple variations of this style. Filtered versions are called Kristal Weizen, while darker versions are called Dunkels and a stronger, bock-like version is called Weizenbock. This is commonly a very highly carbonated beer style with a long-lasting collar of foam.

Quantitative Style Statistics:

- OG: 1.047–1.056
- FG: 1.008–1.016
- ABV: 4.9–5.6%
- IBU: 10–15
- SRM: 3–9
- Volumes of CO_2: 2.5-3+
- Apparent Attenuation: 71–83%

Bohemian-Style Pilsener

Style Description: A slightly sweet, toasted, biscuit-like, bready malt character. Hop bitterness is perceived as medium with a low to medium-low level of noble-type hop aroma and flavor.

Fun Facts: This style originated in 1842, with 'Pilsner' originally indicating an appellation in the Czech Republic. Classic examples of this style used to be conditioned in wooden tanks and had a less sharp hop bitterness, despite similar IBU ranges to German-Style Pils. Bohemian-Style Pilsener is darker in color and higher in final gravity compared to German-Style Pilsener, and low levels of diacetyl are acceptable.

Quantitative Style Statistics:

- OG: 1.044–1.056
- FG: 1.014–1.020
- ABV: 4.1–5.1%
- IBU: 30–45
- SRM: 3–7
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 64–68%

American Pale Ale

Style Description: An American interpretation of a classic English style. This style is characterized by fruity, floral and citrus-like American-variety hop character, producing medium to medium-high hop bitterness, flavor and aroma. American pale ales have medium body and low to medium maltiness that may include low caramel malt character.

Fun Facts: This is based on the English Pale Ale style, but with more of a hop bite.

Quantitative Style Statistics:

- OG: 1.044–1.050
- FG: 1.008–1.014
- ABV: 4.4–5.4%
- IBU: 30–50
- SRM: 6–14
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 72–82%

English-Style Pale Ale/ESB

Style Description: English pale ales display earthy, herbal English-variety hop character. Medium to high hop bitterness, flavor and aroma should be evident. The yeast strains used in these beers lend a fruitiness to their aroma and taste, referred to as esters.

Fun Facts: ESB stands for Extra Special Bitter. This style is known for its balance and interplay between malt and hops.

Quantitative Style Statistics:

- OG: 1.040–1.056
- FG: 1.008–1.016
- ABV: 4.4–5.3%
- IBU: 20–40
- SRM: 5–12
- Volumes of CO_2: 1.5–2
- Apparent Attenuation: 71–80%

American Brown Ale

Style Description: Roasted malt, caramel-like and chocolate-like characters should be of medium intensity in both flavor and aroma. American brown ales have evident low to medium hop flavor and aroma, medium to high hop bitterness.

Fun Facts: The history of this beer style goes back to U.S. homebrewers who were inspired by English-Style Brown Ales and Porters. It sits in flavor between an English-Style Brown Ale and English-Style Brown Porter, but is more bitter than both.

Quantitative Style Statistics:

- OG: 1.040–1.060
- FG: 1.010–1.018
- ABV: 4.2–6.3%
- IBU: 25–45
- SRM: 15–26
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 70–75%

American IPA (India Pale Ale)

Style Description: Characterized by floral, fruity, citrus-like, piney or resinous American-variety hop character, this beer is all about hop flavor, aroma and bitterness.

Fun Facts: This has been the most-entered category at the Great American Beer Festival for more than a decade and is the top-selling craft beer style in supermarkets and liquor stores across the U.S.

Quantitative Style Statistics:

- OG: 1.060–1.075
- FG: 1.012–1.018
- ABV: 6.3–7.6%
- IBU: 50–70
- SRM: 6–14
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 76–80%

Imperial IPA (India Pale Ale)

Style Description: High hop bitterness, flavor and aroma. Hop character is fresh and lively from utilization of any variety of hops. Alcohol content is medium-high to high and notably evident, with a medium-high to full body.

Fun Facts: Though higher in alcohol than other IPAs, examples of this style should still deliver a balance between malt and hops without seeming too strong.

Quantitative Style Statistics:

- OG: 1.075–1.100
- FG: 1.012–1.020
- ABV: 7.6–10.6%
- IBU: 65–100
- SRM: 5–16
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 75-81%

American Barley Wine

Style Description: These ales range from amber to deep red, copper or garnet in color. Caramel and toffee aromas and flavors are often part of the malt character, along with high residual malty sweetness. Complexity of alcohols is evident. Fruity ester characters are often high.

Fun Facts: As with many American versions of a style, this barley wine ale is typically more hop-forward and bitter than its UK counterpart. Low levels of age-induced oxidation can harmonize with other flavors and enhance the overall experience.

Quantitative Style Statistics:

- OG: 1.090–1.120
- FG: 1.024–1.028
- ABV: 8.5–12.2%
- IBU: 60–100
- SRM: 11–18
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 73–77%

German-Style Doppelbock

Style Description: Color is copper to dark brown. Malt sweetness is dominant but should not be cloying. Malt character is more reminiscent of fresh and lightly toasted Munich-style malt, more so than caramel or toffee malt character. Doppelbocks are full-bodied, and alcoholic strength is on the higher end.

Fun Facts: Doppel meaning 'double,' this style is a bigger and stronger version compared to the lower-gravity German-Style bock beers. Originally made by monks in Munich, this style is a very food-friendly beer. It is rich in melanoidins and reminiscent of toasted bread.

Quantitative Style Statistics:

- OG: 1.074–1.080
- FG: 1.014–1.020
- ABV: 6.6–7.9%
- IBU: 17–27
- SRM: 12–30
- Volumes of CO_2: 2.5 approx.
- Apparent Attenuation: 75–81%

Robust Porter

Style Description: Robust porters often show more bitter and roasted malt flavor than a brown porter, but not quite as much as a stout. Robust porters have a roast malt flavor, often reminiscent of cocoa, but no roast barley flavor. Their caramel and malty sweetness is in harmony with the sharp bitterness of black malt. Hop bitterness is evident.

Fun Facts: With U.S. craft brewers on the scene and so much experimentation in beer styles and ingredients, the lines between certain stouts and porters are often blurred—yet many deliberate examples of these styles do exist. Diacetyl is acceptable at very low levels.

Quantitative Style Statistics:

- OG: 1.045–1.060
- FG: 1.080–1.016
- ABV: 5.1–6.6%
- IBU: 25–40
- SRM: 30+
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 73–82%

American Stout

Style Description: Coffee and chocolate-forward ale, but with a hop aroma and flavor—often from a citrus-forward variety—the American stout is bold, with a distinctive dry-roasted bitterness in the finish. Fruity esters should be low, and head retention high.

Fun Facts: Oatmeal is a common ingredient also added to American stouts, lending additional body and head retention to these beers. Additionally, roasted barley is a common ingredient often differentiating these beers from porters.

Quantitative Style Statistics:

- OG: 1.050–1.075
- FG: 1.010–1.022
- ABV: 5.7–8.9%
- IBU: 35–60
- SRM: 40+
- Volumes of CO_2: 2.5–3
- Apparent Attenuation: 71–80%

Belgian-Style Dubbel

Style Description: Ranges from brown to very dark in color, with a malty sweetness and possible chocolate-like caramel aroma and flavor. Hop bitterness is medium-low to medium. Yeast-generated fruity esters (especially banana) can be apparent. Often bottle-conditioned, a slight yeast haze and flavor may be evident.

Fun Facts: Dubbel meaning 'double,' this beer is still not so big in intensity as to surpass the Belgian-Style Quadruple, of which it often is considered a less-bold sibling.

Quantitative Style Statistics:

- OG: 1.060–1.075
- FG: 1.012–1.016
- ABV: 6.3–7.6%
- IBU: 20–30
- SRM: 16–36
- Volumes of CO_2: 3–4
- Apparent Attenuation: 79–80%

Belgian-Style Tripel

Style Description: Complex, sometimes mildly spicy flavor characterizes this style. Yeast-driven complexity is common. Tripels are often on the higher end of the ABV spectrum, yet are approachable to many different palates. These beers commonly are bottle-conditioned and finish dry.

Fun Facts: Tripels are similar to Belgian-Style Golden Strong Ales, but are generally darker and have a more noticeable malt sweetness.

Quantitative Style Statistics:

- OG: 1.070–1.092
- FG: 1.008–1.018
- ABV: 7.1–10.1%
- IBU: 20–45
- SRM: 4–9
- Volumes of CO_2: 3–4
- Apparent Attenuation: 80–89%

Belgian-Style Saison

Style Description: Beers in this category are pale to deep light brown in color. Often bottle-conditioned, with some yeast character and high carbonation. Belgian-style saisons may have *Brettanomyces* or lactic character as well as fruity, horsey, goaty and/or leather-like notes. Specialty ingredients including spices may contribute a unique and signature character.

Fun Facts: Commonly called a farmhouse ale and originating as summertime beers in Belgium, these are not just warm-weather treats. U.S. craft brewers brew them year-round and have taken to adding a variety of additional ingredients.

Quantitative Style Statistics:

- OG: 1.055–1.080
- FG: 1.004–1.016
- ABV: 4.4–8.4%
- IBU: 20–40
- SRM: 4–14
- Volumes of CO_2: 3–3.5
- Apparent Attenuation: 80–93%

American Brett

Style Description: These unique beers vary in color and can take on the hues of added fruits or other ingredients. The evolution of natural acidity develops balanced complexity. Horsey, goaty, leathery, phenolic and some fruity acidic character derived from *Brettanomyces* yeast may be evident, but in balance with other components of the beer.

Fun Facts: Brett beer and sour beer are not synonymous. Brett beer may contain acidic components, but the presence of acidity in all *Brettanomyces* beers should not be assumed.

Quantitative Style Statistics:

- OG: Varies
- FG: Varies
- ABV: Varies
- IBU: Varies
- SRM: Varies
- Volumes of CO_2: Varies
- Apparent Attenuation: Varies

Belgian-Style Flanders

Style Description: An ale with character and balance, thanks to lactic sourness and acetic acid. Cherry-like flavors are acceptable, as is malt sweetness that can lend bitterness and a cocoa-like character. Oak or other wood-like flavors may be present, even if the beer was not aged in barrels.

Fun Facts: This beer style is a marvel in flavor complexity of malt, yeast, micoorganisims, acidity and low astringency from barrel aging.

Quantitative Style Statistics:

- OG: 1.044–1.056
- FG: 1.008–1.016
- ABV: 4.8–6.6%
- IBU: 8–25
- SRM: 12–25
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 71–82%

Barrel-Aged Beers

Style Description: A wood- or barrel-aged beer is any lager, ale or hybrid beer, either a traditional style or a unique experimental beer, that has been aged for a period of time in a wooden barrel or in contact with wood. These beers are aged with the intention of imparting the unique character of the wood and/or what has previously been in the barrel.

Fun Facts: Today's craft brewers are using wood (mostly oak) to influence flavor and aromatics. Beer may be aged in wooden barrels (new or previously used to age wine or spirits), or chips, spirals and cubes may be added to the conditioning tanks that normally house beer. A variety of types of wood are used including oak, apple, alder, hickory and more. The interior of most barrels is charred or toasted to further enhance the flavor of the barrels.

Quantitative Style Statistics:

- OG: Varies
- FG: Varies
- ABV: Varies
- IBU: Varies
- SRM: Varies
- Volumes of CO_2: Varies
- Apparent Attenuation: Varies

Rye Beer

Style Description: In darker versions, malt flavor can optionally include low roasted malt characters evident as cocoa, chocolate or caramel, and/or aromatic toffee-like, caramel, or biscuit-like notes. Low-level roasted malt astringency is acceptable when balanced with low to medium malt sweetness. Hop flavor is low to medium-high. Hop bitterness is low to medium. These beers can be made using either ale or lager yeast.

Fun Facts: The addition of rye to a beer can add a spicy or pumpernickel characteristic to the flavor and finish. Color can also be enhanced and made more red from the use of rye. The ingredient has come into vogue in recent years in everything from stouts to lagers, but is especially popular with craft brewers in India Pale Ales. Grist should include sufficient rye such that rye character is evident in the beer.

Quantitative Style Statistics:

- OG: Varies
- FG: Varies
- ABV: Varies
- IBU: Varies
- SRM: Varies
- Volumes of CO_2: Varies
- Apparent Attenuation: Varies

Smoke Beer

Style Description: When malt is kilned over an open flame, the smoke flavor becomes infused into the beer, leaving a taste that can vary from dense campfire to slight wisps of smoke. This style is open to interpretation by individual brewers. Any style of beer can be smoked; the goal is to reach a balance between the style's character and the smoky properties.

Fun Facts: Smoke flavors dissipate over time, so keep this in mind! Originating in Germany as Rauchbier, this style is more open to interpretation by U.S. craft brewers. Classic base styles include German-Style Marzen/Oktoberfest, German-Style Bock, German-Style Dunkel, Vienna-Style Lager and more.

Quantitative Style Statistics:

- OG: Varies
- FG: Varies
- ABV: Varies
- IBU: Varies
- SRM: Varies
- Volumes of CO_2: Varies
- Apparent Attenuation: Varies

Gluten-Free Beer

Style Description: A beer (lager, ale or other) that is made from fermentable sugars, grains and converted carbohydrates. Ingredients do not contain gluten.

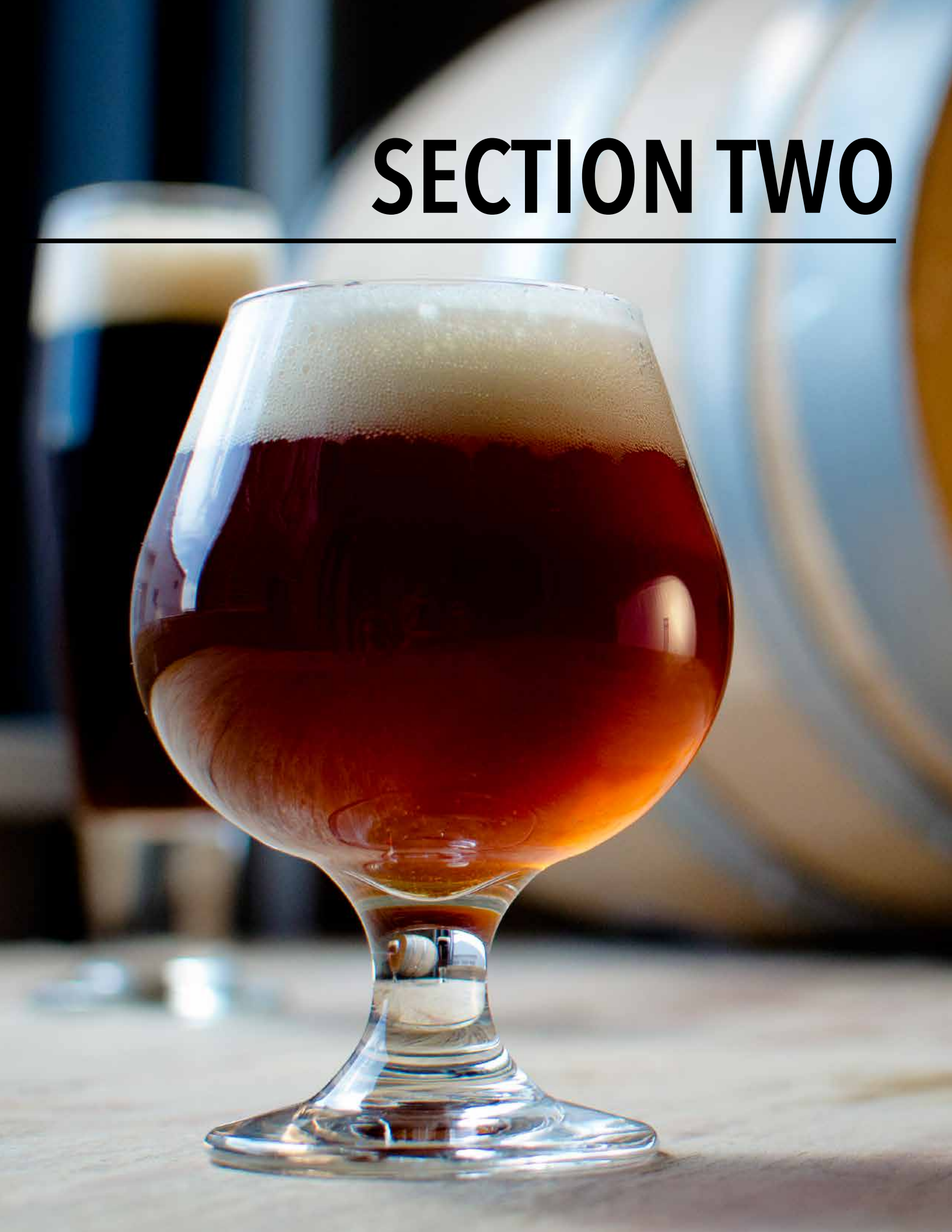
Fun Facts: Barley, wheat, oats, rye and spelt commonly contain gluten, so look for other fermentables to be featured in these beers.

Quantitative Style Statistics:

- OG: Varies
- FG: Varies
- ABV: Varies
- IBU: Varies
- SRM: Varies
- Volumes of CO_2: Varies
- Apparent Attenuation: Varies

To check out the vital statistics and A-Z of all U.S. beer styles, visit CraftBeer.com.

SECTION TWO



SECTION 2: WHO CLASSIFIES BEER STYLES

An overview of four of the main U.S. organizations that publish beer style guidelines: CraftBeer.com, the Brewers Association, the Beer Judge Certification Program and the Master Brewers Association of America. Learn why each of these organization publishes guidelines and who's using them.

CRAFTBEER.COM

CraftBeer.com

The CraftBeer.com Style Finder (CraftBeer.com/Style-Finder) targets beer lovers and provides a methodology to describe, compare and contrast different beers being made by small and independent U.S. producers. CraftBeer.com overviews almost 80 U.S. beer styles in 15 style families. The quick hit Style Finder and in-depth style Study Guide is the most extensive U.S. style guideline that exists today and is free to access and download.

Brewers Association

The Brewers Association publishes a world beer styles list, released annually since 1993. The BA Beer Style Guidelines are developed using sources from the commercial brewing community and input from beer competition judges. They are the most comprehensive set of guidelines on the world's commercial beer styles available today.

The guidelines focus first on a beer's appearance, aroma, flavor and finish, in that order. In 2015, they included ten style categories and 145 world beer styles. Versions of these guidelines are used by judges as a resource to match against when tasting beers entered into the Great American Beer Festival® and World Beer Cup®.

For the majority of styles, the guidelines do not list common ingredients for each style, but instead, emphasize common flavor characteristics. It's up to individual brewers to determine how to reach the flavor profiles described for each style. These guidelines are free to download from BrewersAssociation.org (BrewersAssociation.org/Beer-Styles), and Brewers Association membership is not required.

Beer Judge Certification Program

The Beer Judge Certification Program is a global, volunteer-run program that exists to promote standards of excellence in beer judging and to teach the skills needed to properly taste and evaluate beer. The BJCP guidelines list common ingredients of the beers described and can be downloaded for free at BJCP.org.

According to the BJCP, the goal of the guidelines is to provide a common set of standards for judges so that there is a level playing field for all entrants. Judges and entrants use the same descriptions, so evaluations are based less on personal opinion and more on how well the entered beer matches world- class commercial examples of the style.

Master Brewers Association of America

The Master Brewers Association of America offers a beer steward certification program (MBAA.com/Education/BeerSteward), which has its own specified set of style guidelines. These world beer style guidelines, published in 2011, categorize beer into five style families, comprising 72 unique styles. The guidelines are not available for public viewing except in the Beer Steward Handbook.

SECTION 2: IDENTIFYING FLAVOR PROFILES OF BEER

Color, aroma, carbonation and body are the qualities that determine what the eyes, nose and palate will see, smell, taste and feel with every sip of craft beer. Take a closer look at each of these attributes, as well as six of the main flavor profiles most often identified on the palate—and which beer styles they're associated with.

Identifying beer by its flavor profile is an alternative to identifying it by style, though both methods are complementary. When starting with a preselected style, the flavors are more or less predefined, so pairings and culinary uses will be restricted to what that style will work with. Beginning with flavor profiles allows the guest or chef to focus on descriptive characteristics (outlined below) and find a beer that matches their preferences.

Often the best way to introduce craft beer is to work from flavor profiles as opposed to styles. Guests can identify with words like crisp, clean, bitter, fruity, tart and sour more easily than with beer-specific terminology like IPA, amber, stout or pilsener. Begin by asking which flavors the guest prefers, then select a style that best fits those descriptors.

The process of identifying flavor profiles in craft beer can be quite the challenge. Every palate will taste and react somewhat differently to the same flavors. But by taking the time to develop a descriptive vocabulary, you'll find reference points that will make the language of beer accessible to most people. At the same time, craft beer will reveal itself in greater depth and meaning.

First, let's deconstruct what makes up the flavor profiles of craft beer. In simple terms, the flavor profile is determined by that particular beer's combination of carbonation, hops, malt, water and yeast. The varying aspects of the brewing process and brewers' personal touches add the final notes that make each craft beer unique.

Color, aroma, carbonation and body are the qualities that determine what the eyes, nose and palate will see, smell, taste, and feel with every sip of craft beer.

Color

Color comes mainly from the kilning and roasting of barley. The boil time and brewing specifics will affect how much color the final beer takes on, as will filtration (if used). Color plays tricks on the mind and palate, which identify dark with heavy, light with clean, and caramel (light brown) with sweet. While these associations can sometimes be true, it is also possible to have a dark-colored beer that tastes and feels light, a light-colored beer that boasts rich and complex flavors, or a caramel-colored beer that tastes dry and bitter. It is best to let the final flavors develop on the palate before judging what affect the color has on the flavor profile.

Demonstration Video: Dark Beer Myths (CraftBeer.com/Myths)

Aroma

The aroma of craft beer comes mainly from the hops, malt and yeast strain. Of the three main senses (sight, smell and taste), the aroma of a beer often has the most varied sensory response. Aromas of alcohol, floral scents, fruit, leather, oil, sulfur, yeast and more can often sway what the palate will soon taste.

Carbonation

CO_2 is a byproduct of fermentation, produced by yeast. Less-carbonated beers will sit heavier and longer on the palate, while more-carbonated beers will invigorate the palate.

Palate/Body

The astringency, body, carbonation and finish contribute to the overall palate of a beer—the way it tastes and feels on the mouth and tongue. Proteins and residual sugars from the malt, extracted during brewing and modified during fermentation, determine the final body or consistency of the liquid. Think of the difference between skim milk (light body), whole milk (medium body) and whipping cream (heavy body).

In addition, there are six major flavor profiles in craft beer. Within these main profiles are flavor clues that point to specific beer styles and lead you closer to ideas for pairing.

CRAFTBEER.COM BEER FLAVORS SIX PACK

To download the CraftBeer.com Flavor Six-Pack, visit CraftBeer.com/SixPack

1. **Crisp & Clean**
   Groupings: Clean, Malt, Hop
2. **Malty & Sweet**
   Groupings: Toast, Caramel
3. **Dark & Roasty**
   Groupings: Dark and malty, Dark and dry
4. **Hoppy & Bitter**
   Groupings: Earthy and bitter; Hop-bitter, malt-forward; Strong hop, herbal, earthy or citrus
5. **Fruity & Spicy**
   Groupings: Bright yeast, Dark
6. **Sour, Tart & Funky**
   Groupings: Sour, Tart, Funky

Not all styles listed below are overviewed in Common U.S. Beer Styles starting on page 17. For reference on styles listed, refer to CraftBeer.com Style Finder (CraftBeer.com/Style-Finder) and Brewers Association Styles (BrewersAssociation.org/Beer-Styles)

1. Crisp & Clean

Crisp beers will present clean and refreshing on the palate. They have a very delicate impact on the palate and can sometimes produce a feeling of dryness in the mouth. Crisp beers can cleanse the palate of flavors and leave it feeling refreshed when properly paired. These beers should be paired carefully as to allow the subtle notes of the beer to speak through the pairing. Simple and clean pairings focusing on a single dominant flavor work best to allow the palate to experience the notes in the craft beer style.

Clean: Showing a nice balance of hops and malt. The yeasts used in these beers can contribute flavors of green apple or pear, and the malt comes across smooth on the palate. The flavors from these styles will not linger on the palate and should be paired with ingredients to create an overall delicate outcome.

Examples:
Bohemian and German-Style Pilsener
Belgian-Style Blonde Ale
Blonde Ale
German-Style Kölsch

Malt: These beers bring notes of bread and biscuit to the palate. They can handle more complex pairings and flavor combinations and are versatile with both dry-heat and moist-heat cooking methods that allow the craft beer to finish clean.

Examples:
American Amber Lager
German-Style Helles
American Amber Ale
German-Style Märzen/Oktoberfest
German-Style Maibock

Hop: By dry-hopping these beers, the usual crisp and clean notes of these styles will come across drier and have a distinct hop bite in the finish. Herbal or floral notes from the hops will be noticeable from the aroma all the way to the finish of the beer. The malt notes tend to take a back seat in pairing. Subtle use of grain or vegetal flavors can balance out the malt and hops on the palate.

Examples:
Specialty Beer: Hoppy Lager / India Pale Lager
Specialty Beer: Imperial Pilsner

2. Malty & Sweet

Malt-driven flavors dominate this flavor profile. The palate can expect a degree of sweetness and deep notes of nuts, toffee, caramel, toast and dark fruit. Hops are still present and can be pulled out through careful pairing, but the focus of the pairing should be on highlighting the malt profile on the palate. Pairings rely on carbonation more than hop bitterness to help cleanse the palate.

Toast: Beers with this flavor profile pack in crisp notes along with very full malt flavors. Biscuity, nutty and toast flavors will run through the palate. Stronger versions present the palate with caramel and roasted fruit notes. The biggest of these will begin to pull on flavors from dried fruits such as raisins, dates and figs. Successful pairings often mimic the beer's fruit notes in the dish, and use dry-heat cooking methods that bring out the maillard reaction.

Examples:
English-Style Mild
German-Style Schwarzbier
German-Style Dunkel
English-Style Brown Ale
German-Style Bock
German-Style Doppelbock

Caramel: While still focusing on a very sturdy malt presence, these craft beers will bring a brighter dried-fruit note to the palate. Notes of toffee can be found next to red apples, orange zest and plum. These craft beers pair well with simpler dry-heat cooking methods. The use of vegetal flavors can often bring out the fruit profiles in each style.

Examples:
English-Style Bitter
Scottish-Style Ale
Irish-Style Red
French-Style Biére de Garde
English-Style Pale Ale / ESB
Scotch Ale / Wee Heavy

3. Dark & Roasty

These craft beers focus their flavor profiles on dark roasted malts that contribute coffee and cocoa notes. From aroma to palate to finish, the roast of the malt comes through stronger than in other flavor profiles.

Dark and malty: Intense roasting can produce a delicate bitterness in these beers, which gravitate more toward the profiles of milk chocolate, raw tree nuts and coffee with cream. The more intense these styles get, the more the fruit profile of dates and figs becomes present. Pair these beers by using ingredients that calm the stronger roast flavors on the palate and bring out the more subtle and delicate notes of fruit and hops that can often be hidden behind roasted malts.

Examples
German-Style Schwarzbier
English-Style Brown Porter
Robust Porter
English-Style Oatmeal Stout
American Brown Ale
English-Style Brown Ale

Dark and dry: These craft beers use the darkest roasts and are commonly the driest of the dark flavor profiles. Burnt grain, dark chocolate and espresso are the most notable aromas. Fruit flavors emerge in the strongest versions, often giving off aromas of plums and cherries. Though the aroma often suggests a heavier mouthfeel, these beers tend to be lighter on the palate, which allows the dry notes to come into play in pairing. Both dry and moist heat cooking methods work well for pairings, but caution should be taken with the depth of flavors so as to not overpower the beer. Pair to the mouthfeel of these craft beer styles and use the aroma as a supporting quality.

Examples:
Irish-Style Dry Stout
Specialty Beer: American Black Ale
American Stout
American Imperial Stout

4. Hoppy & Bitter

Hops contribute the majority of aromas and pronounced bitterness found in many beer styles. Though these beers will have a solid malt base, the hops will always provide the most dominant flavors. These beers cover a very wide range and can easily be the most difficult to pair. Hops typically respond well to pairings with fatty foods, which calm the hop flavors on the palate. Fat coats the palate, and the bitterness of the hops pleasantly cleanses it away. Note: Hop bitterness that has very little to no malt support can clash with some seafood, such as salmon, imparting a metallic flavor. Always do a test tasting to be sure.

Earthy and bitter: These craft beers will intentionally use a lighter malt bill in order to focus the palate on the hops. Common hop varieties used here will give more herbal deep bittering notes. Using ingredients in the pairing to calm the hops on the palate will bring the malt forward and hold the hops off, so the palate can experience the full flavor of these craft beer styles.

Examples:
English-Style Bitter
American Pale Ale
American India Pale Ale (IPA)
Specialty Beer: Belgian IPA

Hop-bitter, malt-forward: While the hops are still the driving notes for pairing, these craft beers will have a stronger malt bill that enables them to pair with heavier dishes. Caramel notes will become present from the malt, but the balance of the flavor and finish will still lean toward the bittering of the hops. It is common for the aroma to start with hop notes of pine and then shift to caramel malt while the beer is on the palate. The bitterness of the hops will almost always be the ending note on the palate. These craft beer styles tend to be balanced on the palate and work well with dry-heat cooking methods. Focus the flavor profile of the pairing to pull out either the malt or the hops and let the other be a supporting ingredient.

Examples:
California Common
American Amber Ale
American Barley Wine

Strong hop, earthy, herbal or citrus: The malt takes a back seat and the heavy use of intensely flavorful hops creates craft beers that are brimming with hop-driven notes of citrus, resin and tropical fruit. The aromas in these beers can overtake the senses at times, and the bittering can be in excess of 100 IBUs (past the point at which most people can perceive additional bitterness). A current trend in American craft brewing with these styles is hops, hops and more hops, which can overpower many flavors. Cooking methods that utilize dry-heat methods or the addition of fat help the palate cut through the intense hop profiles.

Examples:
American Pale Ale
India Pale Ale (IPA)
Speciality Beer: Fresh Hop IPA
Imperial IPA

5. Fruity & Spicy

While still showing flavors of malt and hops, these craft beers are dominated by notes of fruit and spice. The spice flavors are derived from the yeast and can be supported by adding additional, complementary spices. To enhance the fruity notes present, actual fruit puree or fruit may be added to the beer. Common pairing practices can be to highlight the fruit or spice in the pairing, or to use the fruit or spice profile in the craft beer as a supporting ingredient in the dish.

Bright yeast: Brighter fruit notes are common aromas in these styles, like tart apple, pear, peach, orange, lemon and apricot. Bubblegum is also a very common aroma sensation, as well as the following spices: clove, pepper, vanilla, coriander, cinnamon, nutmeg and bay leaf. Darker versions with more of a malt presence may show notes of toast, caramel, and deep dark fruit, but still maintain a spicy yeast note.

Examples:
Belgian-Style Wit
German-Style Hefeweizen
Belgian-Style Saison
Speciality Beer: Gruit Ale
Belgian-Style Blonde Ale
Belgian-Style Golden Strong Ale
Belgian-Style Tripel

Dark: Darker fruit notes come to the palate of these styles, like fig, raspberry, prune, raisin, cherry, plum and strawberry. Pairing is sometimes akin to pairing a red wine with deep vinous notes. Spicy aromatics will present on the palate as notes of clove, pepper, rose, nutmeg, cinnamon, and even a hint of smoke in some cases. Malt flavors are more present in these styles and can strengthen the overall body of the beer. These craft beers can be heavy on the palate and flavors can linger post-sip for several minutes. Pairing to the richness of these beers and using key ingredients in the dish will cut through their depth to further explore the entire flavor profile. Richer foods are commonly used so that the beer does not dominate the palate.

Examples:
Belgian-Style Dark Strong Ale
Belgian-Style Dubbel
Belgian-Style Quadrupel

6. Sour, Tart & Funky

Sour craft beers show a wide range of flavor profiles. Rustic, funky, barnyard, farmhouse, leather, hay, grass, and even wet socks are notes that have commonly been attributed to many of these styles. When acidic, these craft beer styles will also show the most wine-like notes and are often aged in wood to add complexity. These craft beers can also be blended with other styles to deepen the overall impact on the palate. When pairing these styles, it is best to address the sour, tart or funky notes head-on and decide if your pairing will echo the flavor profile and elevate it, or calm the dominant notes and allow the palate to explore the secondary flavors in the craft beer.

Tart: Gentle acidity, lighter malts, lower alcohol and lighter body make these craft beers the tamest of the group. They are delicately tart with bright citrus notes, but will not overpower the palate with a defining funky character. They will leave the palate almost bone-dry and often have a gentle citrus finish. The carbonation level found in these styles is generally very high and can be used to refresh the palate. Pairing these craft beer styles is a delicate balance of simple clean flavors. Delicate cooking methods and raw ingredients tend to bring out the most well-rounded pairings on the palate.

Examples:
Berliner-Style Weiss
Specialty Beer: Leipzig-Style Gose

Sour: The most wine-like of all the styles. Pronounced acidity is blended on the palate with fruity aromas of cherry, plum, apricot, peach, pluot and strawberry. These styles can often see the addition of whole fruit to the beers. Notes of caramel from the malt can balance the middle, and if the craft beer has been barrel-aged the palate will pick up additional supporting notes of vanilla and spice. In pairing, cooking proteins with the maillard reaction can pull out roast notes in the beer that balance the vinous character on the palate. Overpowering these beers with fat can hide the acidity, and caution should be taken to not completely diminish those palate reactions.

Examples:
Belgian-Style Flanders
American Brett
Belgian-Style Fruit Lambic

Funky: These craft beers will possess intense qualities of earthy, farmhouse, grassy, barnyard and leather notes. Milder fruit notes in the aroma are commonly identified on the palate as peach, strawberry, apricot and grape. The carbonation level in these craft beers will often be higher and can have a refreshing quality on the palate. These craft beer styles can hide their ABV quite well and therefore are more versatile than the initial flavors may suggest. Cleaner cooking methods with the gentle use of fat and supporting notes of herbs and spice can round out these craft beer styles on the palate.

Examples:
Belgian-Style Saison
American Brett
Belgian-Style Lambic / Gueuze

SECTION 2: HOW TO PRESENT & POUR BEER

Learn the proper way to present and pour a beer from each of the six most common formats: draught, individual bottle, large-format bottle, magnum bottle, can and growler. Temperature, glassware and pouring technique all play important roles in a beer's presentation and taste.

Once the guest has decided which craft beer to enjoy, the next step is presenting the craft beer to the guest and/or table.

There are the six main types of packaging that craft beer can come in for presentation:

1. Draught: Any craft beer coming from a draught system, including both CO_2 and nitrogen carbonation as well as cask pours.
2. Individual bottle: 12-ounce to 16-ounce bottles as well as 375ml bottles.
3. Large-format bottle: 22-ounce and 750ml bottles.
4. Magnum bottle: Any bottle larger than 750ml.
5. Can: 12-ounce cans are the most common, though 16-ounce and 22-ounce cans have also made their way into the market.
6. Growler: Rare at retail, these refillable containers that transport fresh craft beer from the local brewery or filling station to an even more local location (i.e. a refrigerator) are quickly becoming more popular. Growlers come in a variety of sizes, but the most common is 64-ounce (half gallon).

1. Draught

Draught Systems

The number-one factor affecting how draught beer pours is temperature. At retail, even a few degrees increase above the ideal maximum of 38°F can create pouring problems, especially excessive foaming, unless the system has been balanced with the warmer temperatures in mind.

See Temperature Tips For Retailers (CraftBeer.com/Temperature).

How To Pour

Pouring a craft beer from a draught system is an art form. Once you have selected the proper glassware for the beer style you are pouring and have inspected it for cleanliness, position the glass underneath the tap just below the nozzle. It is important never to touch the glass to the nozzle or hold the glass so that the nozzle is inside the glass. This prevents unsanitary conditions and glass breakage.

Hold the glass at a 45-degree angle. Pull the tap toward you to open the flow of beer. As the level of beer rises, slowly reduce the angle of the glass to vertical while keeping the beer pouring into the center of the glass.

Close the tap with one inch of room to spare before getting to the desired pour size. As you top off the beer, begin to lower the glass from the tap to allow the proper head of foam to form (for the majority of beer styles, the Brewers Association recommends a one-inch collar of foam).

Once the pour is complete, the craft beer must be delivered to the guest immediately. Should the head begin to collapse prior to service, it is appropriate to return the beer to the tap and pull a quick top-off to reinvigorate the head.

Tip: Frosted glassware is not cool. Serving craft beer in a frosted glass is like taking an ice pick, chipping some ice off your freezer wall, and dropping it into your customer's beer. It is best to serve beer in glassware that is room temperature or slightly chilled. Rinsing glassware with a fresh shot of water is also recommended to prime the glass, lessen foaming and remove any residual sanitizer, detergent or water spots. Shake out excess water, but do not towel-dry the inside of the glass.

For more details on draught pouring technique, see the Draught Beer Quality Manual (DraughtQuality.org).

Demonstration Video: The Perfect Craft Beer Pour (CraftBeer.com/Pour)

Nitrogen

For nitrogen draught pours, place the appropriate glass directly underneath the tap, resting on the drain tray. Begin by pulling the nitrogen tap forward and allowing the first third of the total pour size to pour into the glass. Close the tap and allow the beer to rest until it has settled and the collar of foam has collapsed to less than one inch. Pour the next third of the volume and again close the tap and rest the beer. Finish with the final third of the pour size, which should result in a thick, creamy one-inch collar of foam. As with CO_2 draught pours, serve the beer immediately.

Cask

Traditionally, cask beer is matured by secondary fermentation in the container from which it will be dispensed (instead of maturing in a tank and being transferred to a keg, can or bottle). Cask beer is usually unfiltered, unpasteurized and still has active yeast. It is also less carbonated and commonly served at a temperature of 45°F to 55°F.

There are two common methods of dispensing beer from a cask: through the use of a beer engine or a gravity-forced dispensing system. Purists insist on no addition of CO_2, but some modern dispensing systems do employ a blanket of CO_2 inside the head space of the cask.

Place the appropriate glass under the cask engine and bring the glass all the way up until the spray nozzle touches the bottom of the glass. Begin to pull the engine handle toward you. As beer fills into the glass, lower the glass to keep the nozzle at the level of the top of the beer in the glass. Once you have pulled the total pour size into the glass, pull the glass straight down from the nozzle and serve immediately. Return to the cask engine after each pour and wipe down the nozzle with a sanitized towel. For more information on cask dispensing methods, see Draught Beer Quality Manual (DraughtQuality.org).

2. Individual bottle

There are two types of bottle tops for individual bottles: cork-and-cage tops, and the more common bottle cap. Both types should be presented to the guest unopened, with the label facing the guest.

While bottle caps are very easy to open, the cork-and-cage requires a bit of finesse. First remove the cage, then very slowly twist the cork while gently pulling up. It is important to keep the bottle vertical while opening.

Once the cap/cork is removed, begin by holding the glass at a 45-degree angle and slowly pour the beer into the glass. Keep a constant slow stream pouring and begin to bring the glass to vertical.

As the beer nears the top of the glass or the last third of the bottle, begin to raise the bottle away from the glass to create the final head. The head should rise one to one and a half inches above the beer line. Unless requested by the guest, remove the empty bottle with you and present the glass to the guest.

Some styles, such as German-Style Hefeweizen, may require rousing of the yeast. Yeast sediment in beer contains vitamins and minerals that are healthful to consume, but it is up to the customer—ask their preference before service. If the customer does desire to consume the yeast, you can facilitate this by swirling, rolling or inverting the bottle and pouring the remaining

yeast in the center of the glass (often bringing the head of the beer well above the rim of the glass). Each establishment should set guidelines for which technique servers will use.

3. Large-format bottle

Large-format bottles are treated much the same way as wine bottles at tableside. Present the bottle to the guest who ordered the craft beer. Proceed with the proper opening steps, whether a bottle cap or cork-and-cage top.

Pour a taste of the beer for the guest who ordered the bottle. Once approval has been given, begin pouring four-ounce portions in steady, slow streams into each of the glasses at the table. If there is beer remaining in the bottle, it may be left on the table or returned to a chiller to stay cold. Return often to pour off the remaining beer evenly among the guests.

Watch for beers that have been bottled-conditioned and may have yeast sediment at the bottom of the bottle. Be careful not to disturb the yeast. When handling, keep the bottle more upright than horizontal. Pour slowly to prevent mixing the yeast into the beer. Exceptions to this vary based on beer style and customer. Some people enjoy consuming the yeast which is high in vitamins and minerals.

4. Magnum bottle

Present the magnum to the guest who ordered the craft beer. When you are ready to open the magnum, hold the bottle at a slight angle with the cap/cork facing away from any guests. Have a bucket tableside to catch any overflow from the release of pressure in the bottle. Slowly remove the cap/cork, maintaining one hand on top of the cap/cork at all times until fully opened.

Place one hand on the bottom of the bottle to support the weight and the other hand on the neck to control pour speed. Pour in a slow, constant stream into the center of the glass to offer a small taste to the guest who ordered the bottle. Once approved, pour the beer into each glass at the table.

Magnums may be left on the table, stored in an ice bucket tableside, or kept at a side station with trips to re-pour. Stay attentive—you never want the guest refilling their own glass. As the bottle nears the bottom, be cautious of sediment and pour slowly. Once you see the color change to cloudy, consider the bottle finished.

5. Can

Away from the guest, just prior to pouring the craft beer, pop the can open. Take the opened can and appropriate glassware with you to the guest. Present the craft beer with the label facing the guest and announce the beer by name. This acts as a final order confirmation for the guest as well.

Hold the glass at a slight angle, with the can about an inch from the top of the glass, and begin pouring. As the glass fills, adjust the angle of the glass until vertical. Once the glass is vertical, begin to slow the pour to form the head. The last third of the can should be poured in a constant slow stream into the center of the glass as the head rises. It is appropriate for the level of the head to crest over the top of the glass and form a peak. It is not appropriate to have beer drip down the side of the glass, nor for the head to be more than one inch in height.

6. Growlers

These vessels vary from traditional glass and handmade ceramics to the latest stainless steel technologies. Though not generally served tableside, growlers allow guests to take fresh craft beer home with them. Filling a growler should be done with care to ensure the beer remains fresh until the customer is ready to drink it.

- Growler shelf life is not nearly as long as that of a bottle, can or keg.
- Filling warm or hot growlers causes foaming. For best results, make sure that your growler is cool or at least room temperature before filling.

- Clear glass growlers (which potentially allow sunlight through) can cause skunking, which can negatively alter the taste of your beer. For more information on beer flavor, see Flavor Components In Beer (CraftBeer.com/Components).
- Keep filled growlers cold and dark. Customers should not leave a filled growler in a car on a hot or very cold day.
- It's just a fact: Once opened, the beer is never as fresh and carbonated as when the growler was first filled.
- When finished, be sure to rinse your growler well with warm water so it's clean for the next fill , but never fill a growler that is warm as this causes foaming.
- Growlers are fragile, so don't drop them!
- For more information, see Getting the Most Out of Your Growler (CraftBeer.com/Getting-The-Most-Out-Of-Your-Growler).

See CraftBeer.com Glassware Chart for a full overview of common U.S. glassware (CraftBeer.com/Glassware)

Beer Glassware Features

	Belgian-Style Tulip	Flute	Vase	Nonic	Abbey/ Chalis	Snifter	Thistle
Sensory Enhancement	X	X	X		X	X	
Temperature Control	X	X			X	X	X
Foam Support		X	X				X
Aesthetics	X	X	X		X	X	X
Historical/ Nostalgia		X	X	X	X		X

Glassware Chart Key

Sensory Enhancement - The shape of the top of a glass may be open or closed to expand or restrict exposure to volatile aroma compounds.

Temperature Control - The shape of a glass can encourage or discourage exposure to body temperature. A stem or handle keeps the hand away from the beer, while a large-bowled glass (like a snifter) encourages cupping of the glass in the hand to warm the beer.

Foam Support - A concave lower glass shape or convex upper glass shape keeps beer foam collected and dense. Beer foam adds sensory enhancement as well as aesthetics.

Historical and Nostalgia - Having historical or symbolic significance to a particular style.

Beer Glassware Components

While glassware suggestions are provided with the beer styles above, it is important to understand the components of popular beer glasses. Theses components will help you choose the right beer glass based on the options available to you. As always, glassware should be served beer-clean, free of damage and at the appropriate temperature. Beer glasses can be served chilled to room temperature, but never frozen.

Handle - Holding a beer glass by a handle or stem lessens the opportunity for body heat to transfer to the beer.

Shape - The shape of the beer glass aids in the restriction and expansion of beer foam and beer's volatile aromas. A convex (outward curved) shape may aid in trapping and concentrating aromas, while a concave (inward curving) shape helps to concentrate foam.

Bowl - A wide lower portion of a glass that collects aromas when coupled with a tapered top half. The bowl can be held to warm beer to optimal temperature for sensory enhancement.

Bulb - Convex portion of the upper half of a beer glass that captures an exorbitant amount of foam typical of certain styles, and aids in concentrating delicate aromas when lifted to the nose. While a bowl often is paired with a tapered top, a bulb is accompanied by a thinner, more tapered bottom.

Rim - Responsible for the smooth transition of beer from glass to palate. The rim of the beer glass should be smooth and free of damage like chips. Often a rim may be slightly convex, allowing for the beer to be placed more directly on the front of the tongue.

Size - The size of a beer glass most often corresponds to the alcoholic strength of a beer. Beers of higher alcoholic strength should be served in smaller glasses. This helps the restaurant or bar capitalize on their investment, and also helps staff and the beer drinker enjoy responsibly.

Why not list the shaker pint glass you may ask?

There is a multitude of glassware that enhances beer flavor and enjoyment. The shaker pint, although common today in the U.S, was originally intended to mix spirit drinks.

Recommend Tasting Glass

If you have to choose an all-purpose glass for serving all beer styles, we suggest a 16-ounce footed Belgian-Style Tulip.

Temperature

Temperature has the greatest effect on the flavor, aroma, texture, and carbonation of beer. The appropriate temperature for serving craft beer is dependent on the style, but will fall in the range of 38°F to 55°F. Serving a beer below 38°F will hold the aromas back and lessen flavor.

Easy guide to temperatures:

- Stronger beers should be served warmer than weaker beers.
- Darker beers should be served warmer than lighter beers.
- Lager beers, which are fermented at a colder temperature, should be served cooler than ales.

As a general rule, most American craft beers should be served between 38°F and 45°F. Cask-conditioned beers should be served at 50°F to 55°F. Most draught systems should run at 38°F. The higher the temperature a draught system runs, the the bigger the chance for foamy beer because CO_2 breaks out of solution (leaves beer) as beer temperature rises.

Storage of packaged beer:

No matter the packaging type, all beer should be stored cold. Most craft beer is perishable. Aging and the development of oxidative qualities will occur faster at warmer temperatures. Think of beer like bread or milk. If you keep it cold, it stays fresher longer.

Always pay attention to and track expiration dates. These dates can reflect the bottling date, best-before date, and other time-specific information tied to when the brewery expects a beer will be past its prime. Never serve a beer that is out of date.

Checklist for a properly served beer:

____ Beer at proper temperature

____ Proper glass selected and rinsed (free of detergent, lipstick, oils and water mineral spots)

____ Good pour with a proper one-inch collar of foam

____ Beer not past expiration date

____ Beer never stored in sunlight

For more information on beer service and pouring temperatures, see Temperature Tips for Retailers: CraftBeer.com/Temperature

SECTION 2: INTRO TO STYLES

Instructor Prep

Have the following materials ready in advance of tasting. Each taster will need:

___Tasting Mat (CraftBeer.com/TastingMat)
___Pen or pencil
___Tasting Form (p. 40 or CraftBeer.com/TastingForm) for each beer
___5 glasses (stemmed tulip is ideal)
___1 water glass, filled
___Several white napkins or sheets of blank white paper

In addition, the group will need:

___ Water pitchers filled with water and no ice
___ Seltzer water (to clean palate)
___ Unsalted crackers (to clean palate)
___ Paper or cloth towels
___ Bottle opener(s)
___ Empty trash can for trash/recycling
___ Flower vase or champagne bucket for dumping (1 per every 4 tasters)
___ Cooler or fridge with beers inside

Tastings will take place over two sessions during section two and section three of the *CraftBeer.com Beer & Food Course*, with five styles tasted at each tasting. For each style, we provide three classic examples that are regionally or nationally distributed to ensure that you have the best chance to procure them. If you cannot find a listed example, we encourage you to visit your largest better beer provider to ask for similar world-class examples of those specific beer styles.

A brief guide to tasting craft beer

There are six steps in evaluating the flavor profiles of craft beer during a tasting. Consider using the CraftBeer.com Tasting Form (CraftBeer.com/TastingForm).

1. **Look**
   Raise the beer in front of you with the white napkin or paper behind it to evaluate the true color. Describe in your notes the color, what the carbonation looks like, the head, and the overall consistency of the craft beer.

2. **Smell, Part I**
   Without agitating or swirling the craft beer, bring the glass to your nose and breathe in with your mouth closed. Then agitate the beer by gently swirling the glass to pull out aromas and stimulate the carbonation.

3. **Smell, Part II**
   90 percent of what you taste, you first experience through smell. Pay attention to the aroma now, compared to before agitating. Breathe in with your mouth both closed and open and take note of the subtle differences. If the aroma is intense or you keep sensing the same flavor profile, give your sense of smell a break by tucking your nose into the sleeve of your shirt or something else neutral to reset your sniffer.

4. **Taste**
   Sip the beer but do not swallow. Hold the beer on your palate, moving it around from side to side. Note the body consistency, and remember to breathe out through your nose with the beer still on your palate. Pay attention to how the beer starts on your palate, where it hits in the middle, and, once you swallow or spit, what the lasting effects of the beer are.

5. **Rest and Reset**
   Do not sip water right away. Let the fading flavors of the beer linger. Take note of the finish (the last flavor profile), and your palate senses. How long does the finish last? Is it clean, bitter, sweet, sour, weak, strong? Once you have rested your palate, reset your palate with a cracker or sip of water.

Here are five main points to evaluate for each craft beer:

1. **Appearance**
   Color, clarity, and the head (collar of foam) may provide some clues to the flavor profile of the beer. The shade of the beer can indicate the roast malt character. Most beers are filtered to give the beer a brilliant clarity. However, not all beers are perfectly clear. Cloudy appearances are the result of not fully filtering the beer and/or bottle-conditioning, which may leave suspended proteins for a heavier, cloudier color. Carbonation also is part of each beer's appearance.

2. **Aroma**
   Can you smell floral or citrus aromas from the hops? Or do you get more malty notes with aromas of biscuit, caramel, or chocolate?

3. **Taste**
   The first taste as the beer crosses the front of your tongue.

4. **Palate/Body**
   The specific feel of the beer as it crosses the middle of your palate.

5. **Finish**
   Does the flavor profile fade quickly or linger? Where is the finish: On the front or back of your palate? Or is the finish in the aroma?

Tasting #1

1. German-Style Marzen/Oktoberfest
2. Belgian-Style Wit
3. Berliner-Style Weiss
4. American Pale Ale
5. American India Pale Ale (IPA)

See detailed descriptions of each style on the following pages. Qualities not listed were left out because they are not stand-out attributes for the specific style.

Glassware suggestions reflect what is commonly available in the U.S. and are not necessarily the traditional glassware for each style.

1. German-Style Marzen/Oktoberfest

Style Description: A beer rich in malt with a balance of clean, hop bitterness. Bread- or biscuit-like malt aroma and flavor is common.

Fun Facts: Originating in Germany, this style used to be seasonally available in the spring (Marzen meaning March), with some barrels saved for tapping in October.

Quantitative Style Statistics:

- OG: 1.050–1.060
- FG: 1.012–1.020
- ABV: 5.1–6%
- IBU: 18–25
- SRM: 4–15
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 70–76%

Country of Origin: Germany

Glass: Flute

U.S. Commercial Examples: Gordon Biersch, Märzen; Great Lakes Brewing Co., Oktoberfest; Spoetzl Brewery, Shiner Oktoberfest; Victory Brewing Co., Festbier

Style A-Z:

- Alcohol: Mild
- Brewing and Conditioning Process: A decotion process is commonly used.
- Carbonation (Visual): Medium
- Clarity: Brilliant
- Collar of Foam and Head Retention/Texture: Good/Foamy
- Color/SRM: Pale to reddish brown
- Hops: German Noble
- Malt: Pilsener, Vienna, Munich
- Palate:
  - Body: Soft
  - Carbonation (Palate): Medium
  - Length/Finish: Short to Medium
- Yeast: Lager

2. Belgian-Style Wit

Style Description: Brewed using unmalted wheat, sometimes oats and malted barley. Witbiers are spiced with coriander and orange peel.

Fun Facts: A style that dates back hundreds of years, it fell into relative obscurity until it was revived by Belgian brewer Pierre Celis in the 1960s. This style is currently enjoying a renaissance, especially in the U.S. market. 'Wit' means 'white.'

Quantitative Style Statistics:

- OG: 1.044–1.050
- FG: 1.006–1.010
- ABV: 4.8–5.6%
- IBU: 10–17
- SRM: 2–4
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 80–86%

Country of Origin: Belgium

Glass: Tulip

U.S. Commercial Examples: Allagash Brewing Co., Allagash White; Avery Brewing Co., White Rascal; Boulevard Brewing Co., ZON; Port City Brewing Co., Optimal Wit

Style A-Z:

- Alcohol: Non-existent to mild
- Brewing and Conditioning Process: Often bottle-conditioned
- Carbonation (Visual): Fast
- Clarity: Hazy
- Collar of Foam & Head Retention/Texture: Good/Moussy
- Color/SRM: Straw to pale
- Hops: German Noble
- Malt: Pilsener, Munich, Flaked Wheat
- Other Ingredients: Orange peel, coriander seed
- Palate:
  - Body: Drying
  - Carbonation (Palate): High
  - Length/Finish: Medium
- Water: Varies
- Yeast: Ale
- Phenols: Spicy, pepper
- Esters: Orange, citrus

3. Berliner-Style Weiss

Style Description: Low in alcohol, refreshingly tart, and often served with a flavored syrup like Woodruff or raspberry, this German wheat ale presents a harmony between yeast and lactic acid. Very pale in color, these beers may be cloudy as they are often unfiltered. Hops are not prominent, but these beers often showcase esters.

Fun Facts: Weiss beers are growing in popularity in the United States, where many brewers are now adding traditional and exotic fruits to the recipe that result in flavorful finishes with striking, colorful hues. These beers are incredible when pairing. Bitterness, alcohol and residual sugar are very low, allowing the beer's acidity and white bread and graham cracker malt flavors to find their way to food in rewarding ways. Carbonation is very high, adding to the refreshment factor this style delivers.

Quantitative Style Statistics:

- OG: 1.028–1.032
- FG: 1.004–1.006
- ABV: 2.8–3.4%
- IBU: 3–6
- SRM: 2–4
- Volumes of CO_2: 3.5–4
- Apparent Attenuation: 815–86%

Country of Origin: Germany

Glass: Goblet or Stemmed Tulip

U.S. Commercial Examples: Bell's Brewery, Inc., Oarsman; The Bruery, Hottenroth Berliner Weiss; Nodding Head Brewery, Berliner Weisse

Style A-Z:

- Alcohol: Non-existent to mild
- Brewing and Conditioning Process: Hops often not boiled and instead added to a decoction mash. Acidity may be introduced from a sour mash, lactic acid additions or acidulated malt.
- Carbonation (Visual): Slow to Medium
- Clarity: Clear to hazy
- Collar of Foam & Head Retention/Texture: Poor/Foamy to Rocky
- Color/SRM: Very Pale to pale
- Hops: German Noble
- Malt: Pilsner and Malted Wheat
- Palate:
  - Body: Drying
  - Carbonation (Palate): Low to Medium
  - Length/Finish: Short to Medium
- Yeast: Ale and Lager (sometimes *Brettanomyces*)
- Esters: Fruity ester flavors will be evident
- Microorganisms: *Lactobacillus*

4. American Pale Ale

Style Description: An American interpretation of a classic English style. Characterized by fruity, floral and citrus-like American-variety hop character, producing medium to medium-high hop bitterness, flavor and aroma. Medium body and low to medium maltiness may include low caramel malt character.

Fun Facts: This is based on the English Pale Ale style, but with more of a hop bite.

Quantitative Style Statistics:

- OG: 1.044–1.050
- FG: 1.008–1.014
- ABV: 4.4–5.4%
- IBU: 30–50
- SRM: 6–14
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 72–82%

Country of Origin: United States

Glass: Nonic Pint

U.S. Commercial Examples: Deschutes Brewery, Mirror Pond Pale Ale; Sierra Nevada Brewing Co., Sierra Nevada Pale Ale; Stone Brewing Co., Stone Pale Ale

Style A-Z:

- Alcohol: Non-existent to mild
- Brewing and Conditioning Process: Dry hopping or late kettle hop additions
- Carbonation (Visual): Medium to fast
- Clarity: Slight haze to clear
- Collar of Foam & Head Retention/Texture: Good/Foamy
- Color/SRM: Deep golden to copper or light brown
- Hops: Horizon, Cascade, Centennial
- Malt: American two-row, Caramel, Munich
- Palate:
  - Body: Soft
  - Carbonation (Palate): Medium to High
  - Length/Finish: Short to Medium
- Water: Water can vary in sulfite content but carbonate content should be relatively low.
- Yeast: Ale
- Esters: Citrus, tropical fruit, pine

5. American India Pale Ale (IPA)

Style Description: Characterized by floral, fruity, citrus-like, piney or resinous American-variety hop character, this beer is all about hop flavor, aroma and bitterness.

Fun Facts: This has been the most-entered category at the Great American Beer Festival for more than a decade and is the top-selling craft beer style in supermarkets and liquor stores across the U.S.

Quantitative Style Statistics:

- OG: 1.060–1.075
- FG: 1.012–1.018
- ABV: 6.3–7.6%
- IBU: 50–70
- SRM: 6–14
- Volumes of CO_2: 2–2.5
- Apparent Attenuation: 76–80%

Country of Origin: United States

Glass: Tulip

U.S. Commercial Examples: Bell's Brewery, Inc., Bell's Two Hearted Ale; Firestone Walker Brewing Co., Union Jack, Great Divide Brewing Co., Titan IPA; Odell Brewing Co., IPA; Tap It Brewing Co., IPA

Style A-Z:

- Alcohol: Mild to noticeable
- Brewing and Conditioning Process: Dry hopping
- Carbonation (Visual): Medium to Fast
- Clarity: Slight haze to clear
- Collar of Foam & Head Retention/Texture: Good/Foamy
- Color/SRM: Gold to copper or red/brown
- Hops: Centennial, Simcoe, Amarillo
- Malt: American two-row
- Palate:
  - Body: Varies
  - Carbonation (Palate): Low to High
  - Length/Finish: Medium to Long
- Water: The use of water with high mineral content results in a crisp, dry beer.
- Yeast: Ale
- Esters: Citrus, tropical fruit, pine

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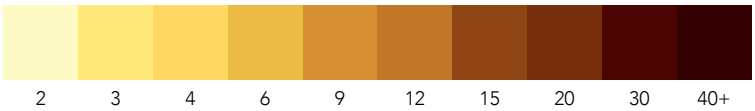
Beer Tasting Form

Beer Style / Brand / Name: _____

Circle what is detected in each section below. Print this sheet in full color to view SRM (color) gradients.

Appearance

Color (SRM): Very Light (1-1.5) / Straw (2-3) / Pale (4) / Gold (5-6) / Light Amber (7) / Amber (8) / Medium Amber (9) / Copper/ Garnet (10-12) / Light Brown (13-15) / Brown/Reddish Brown/Chestnut Brown (16-17) / Dark Brown (18-24) / Very Dark (25-39) / Black (40+)



Clarity: Brilliant / Clear / Slight Haze / Hazy / Opaque

Collar of Foam & Head Retention/Texture: None / Poor (Up To 15 Seconds) / Moderate (15 To 60 Seconds) / Good (More Than 60 Seconds)

Texture: Thin / Interrupted / Foamy / Fluffy / Rocky / Mousse-Like

Carbonation (Visual): None / Slow / Medium / Fast-Rising Bubbles

Aroma

Alcohol: Not Detectible / Mild / Noticeable / Harsh

Hops: Citrus / Fruity / Floral / Green / Herbal / Onion-Garlic / Pine / Resinous / Spruce / Sweaty / Spicy / Tropical / Woody / Other _____

Malt: Bread Flour / Grainy / Biscuit / Bready / Toast / Caramel / Pruny / Roast / Chocolate / Coffee / Smoky / Acrid / Other _____

Esters: Apple / Apricot / Banana / Blackcurrant / Cherry / Fig / Grapefruit / Kiwi / Peach / Pear / Pineapple / Plum / Raisin / Raspberry / Strawberry / Other _____ / None

Phenol: Clove / Cinnamon / Vanilla / Smoky / White Pepper / Other _____ / None

Other: _____

Flavor And Aftertaste

Alcohol: Not Detectible / Mild / Noticeable / Harsh

Hop Flavor: Citrus / Fruity / Floral / Green / Herbal / Onion-Garlic / Pine / Resinous / Spruce / Sweaty / Spicy / Tropical / Woody / Other _____ / None

Hop Bitterness: Restrained / Moderate / Aggressive / Harsh

Malt Flavor: Bread Flour / Grainy / Biscuit / Bready / Toast / Caramel / Pruny / Roast / Chocolate / Coffee / Smoky / Acrid / Other _____

Malt Sweetness: Low / Medium / High / Cloying

Other: _____

Palate

Astringency: Low / Medium / High

Body: Drying / Soft / Mouth-Coating / Sticky

Palate Carbonation: Low / Medium / High

Length/Finish: Short (Up To 15 Seconds) / Medium (15 To 60 Seconds) / Long (More Than 60 Seconds)

Oxidative/Aged Qualities

Almond / Blackcurrant / E-2-Nonenal (Papery/Cardboard) / Honey / Metallic / Sherry / Sweat Socks / Other _____ / None

Desirable / Undesirable

Balance and Drinkability

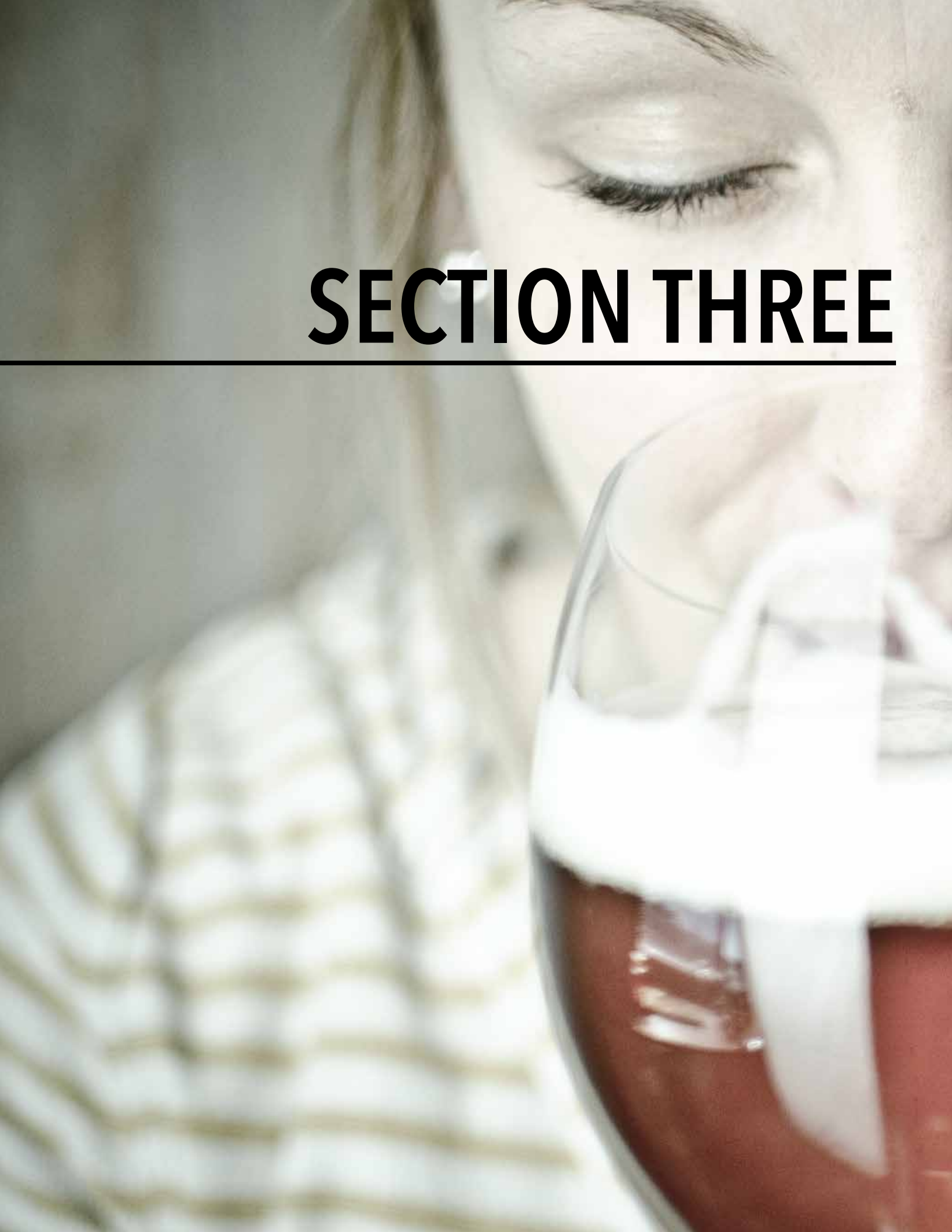
Desirable / Undesirable

Style

Appropriate / Out of Style

- **Pairing Notes:** _____
- **Other Comments:** _____

Download at CraftBeer.com/TastingForm



SECTION THREE

SECTION 3: IDENTIFYING BEYOND BEER FLAVOR PROFILES

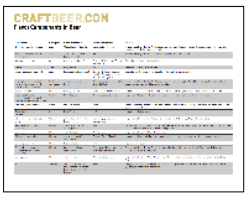
Many different flavors can be present when tasting beer, both intentional (in accordance with the style) or unintentional (due to flaws). This section includes a tasting of five more classic beer styles, how common beer characteristics interact with food and detailed instructions on how to choose a beer to pair with a specific dish or developing a dish to pair with a specific beer or beer style.

Beer flavors vary broadly based on the variety of ingredients used.

For the purposes of further sensory training, we have broken down common beer flavors that should be identifiable to evolving and advanced palates. The flavors listed do sometimes have a place in specific beer styles; however, it's important to understand whether a specific flavor is a flaw or was actually intended by the brewer.

For example, beer may intentionally or unintentionally contain microbiological organisms beyond yeast, including bacteria. Agents such as *Brettanomyces*, *Lactobacillus*, *Pediococcus* and *Acetobacter* can be introduced by inoculation to add specific flavors (intentional presence), or those flavors can be red flags indicating an infection in the beer (unintentional presence).

Comprehensive Beer Flavor List



For a very comprehensive favor list, see Flavor Components Chart (CraftBeer.com/Components)

For a quick cheat sheet on what to do if you think something doesn't taste right in your beer, see What's Wrong With My Beer? (CraftBeer.com/WhatsWrong)

Tasting #2

American Stout
Belgian-Style Dubbel
Belgian-Style Saison
American Brett
Barrel-Aged Beer

See detailed descriptions of each style on the following pages.

Qualities not listed were left out because they are not stand-out attributes for the specific style.

Glassware suggestions reflect what is commonly available in the U.S. and are not necessarily the traditional glassware for each style.

American Stout

Style Description: Coffee- and chocolate-forward ale, but with a hop aroma and flavor, often from a citrus-forward variety.The American stout is bold with a distinctive dry-roasted bitterness in the finish. Fruity esters should be low, but head retention high.

Fun Facts: Oatmeal is a common ingredient also added to American Stout, lending additional body and head retention to these beers. The common use of roasted barley also differentiates these beers from porters.

Quantitative Style Statistics:

- OG: 1.050–1.075
- FG: 1.010–1.022
- ABV: 5.7–8.9%
- IBU: 35–60
- SRM: 40+
- Volumes of CO_2: 2.5–3
- Apparent Attenuation: 71–80%

Country of Origin: United States

Glass: Tulip

U.S. Commercial Examples: Deschutes Brewery, Obsidian Stout; Rogue Ales, Shakespeare Oatmeal Stout; Sierra Nevada Brewing Co., Stout

Style A-Z:

- Alcohol: Mild to noticeable
- Brewing and Conditioning Process: When U.S. brewers add ingredients such as coffee, chocolate, vanilla beans or cherries, or age it in oak, the beer would then be considered a specialty style instead of a strict American Stout.
- Color/SRM: Black
- Clarity: Clear to opaque
- Collar of Foam & Head Retention/Texture: Good / Foamy
- Carbonation (Visual): Slow to medium
- Hops: Horizon, Centennial
- Malt: Pale, Black Roasted Barley, Chocolate Malt, Crystal
- Other Ingredients: Oatmeal occasionally used.
- Palate:
  - Body: Moderate to thick
  - Palate Body: Mouth-coating
  - Carbonation (Palate): Carbonated
  - Length/Finish: Medium to long
- Yeast**:** Ale
- Esters: Fruity esters, if present, are low.

Belgian-Style Dubbel

Style Description: Ranges from brown to very dark in color. Has a malty sweetness and chocolate-like caramel aroma. Hop bitterness is medium-low to medium. Yeast-generated fruity esters (especially banana) can be apparent. Often bottle-conditioned, a slight yeast haze and flavor may be evident.

Fun Facts: Dubbel meaning double, this beer is still not so big in intensity to surpass the Belgian-Style Quadruple, of which it often is considered a less bold sibling.

Quantitative Style Statistics:

- OG: 1.060–1.075
- FG: 1.012–1.016
- ABV: 6.3–7.6%
- IBU: 20–30
- SRM: 16–36
- Volumes of CO_2: 3–4
- Apparent Attenuation: 79–80%

Country of Origin: Belgium

Glass: Tulip

U.S. Commercial Examples: Allagash Brewing Co., Allagash Dubbel Ale; Anderson Valley Brewing Co., Brother David's Double Abbey-Style Ale; Flying Fish Brewing Co., Belgian Abbey Dubbel; The Lost Abbey, Lost and Found Abbey Ale; New Belgium Brewing Co., Abbey

Style A-Z:

- Alcohol: Mild to noticeable
- Color/SRM: Brown to very dark
- Clarity: Clear to slight haze
- Collar of Foam & Head Retention/Texture: Good/Mousse-like
- Carbonation (Visual): Medium to fast
- Malt: CaraMunich, Special "B", Pilsner Malt
- Other Ingredients: Belgian candi sugar, other sugars
- Palate:
  - Body: Moderate to thick
  - Palate Body: Mouth-coating
  - Carbonation (Palate): Carbonated
  - Length/Finish: Medium
- Yeast: Ale
- Phenols: Spicy, peppery, rose-like, perfumey
- Esters: Fruity (banana)

Belgian-Style Saison

Style Description: Beers in this category are pale to deep light brown in color. Often bottle-conditioned with some yeast character and high carbonation. Belgian-style saisons may have *Brettanomyces* or lactic character and fruity, horsey, goaty and/or leather-like notes. Specialty ingredients including spices may contribute a unique and signature character.

Fun Facts: Commonly called a farmhouse ale and originating as summertime beers in Belgium, these are not just warm-weather treats. U.S. craft brewers brew them year-round and have taken to adding a variety of additional ingredients.

Quantitative Style Statistics:

- OG: 1.055–1.080
- FG: 1.004–1.016
- ABV: 4.4–8.4%
- IBU: 20–40
- SRM: 4–14
- Volumes of CO_2: 3–3.5
- Apparent Attenuation: 80–93%

Glass: Goblet

U.S. Commercial Examples: Brewery Ommegang, Hennepin; The Lost Abbey, Red Barn Ale ; Funkwerks, Saison

Style A-Z:

- Alcohol: Mild to noticeable
- Brewing and Conditioning Process: Often bottle-conditioned, sometimes dry-hopped; fermented at higher temperatures.
- Color/SRM: Pale to light brown
- Clarity: Slight haze
- Collar of Foam & Head Retention/Texture: Good/Rocky
- Carbonation (Visual): Fast
- Hops: Noble, Styrian, East Kent Goldings
- Malt: Pilsener, Munich, wheat malt
- Other Ingredients: Sugar, honey, spelt. Specialty ingredients (spices, herbs, flowers, fruits, vegetables, fermentable sugars and carbohydrates, special yeasts of all types, wood aging, etc.) may contribute a unique and signature character.
- Palate:
  - Body: Moderate
  - Palate Body: Soft to mouth-coating
  - Carbonation (Palate): Carbonated
  - Length/Finish: Short to medium
- Water: Sulfate-rich
- Yeast: Ale
- Phenols: Pepper
- Esters: Fruity (orange, lemon)
- Microorganisms**:** *Brettanomyces* and/or *Lactobacillus* possible

American Brett

Style Description: These unique beers vary in color and can take on the hues of added fruits or other ingredients. Natural acidity develops balanced complexity. Horsey, goaty, leathery, phenolic and some fruity acidic character derived from *Brettanomyces* organisms may be evident, but in balance with other components of the beer.

Fun Facts: Brett beer and sour beer are not synonymous. Brett beer may contain acidic components as the result of acetic acid (vinegar-like flavors), but the presence of acidity in all *Brettanomyces* beers should not be assumed.

Quantitative Style Statistics:

- OG: Varies
- FG: Varies
- ABV: Varies
- IBU: Varies
- SRM: Varies
- Volumes of CO_2: Varies
- Apparent Attenuation: Varies

Country of Origin: United States

Glass: Tulip

U.S. Commercial Examples: Logsdon Farmhouse Ales, Seizoen Bretta; Russian River Brewing Co., Sanctification; Wicked Weed Brewing, Serenity

Style A-Z:

- Alcohol: Varies
- Brewing and Conditioning Process: Wood vessels may be used during the fermentation and aging process. Blending is also common.
- Color/SRM: Varies
- Clarity: Varies
- Collar of Foam & Head Retention/Texture: Varies
- Carbonation (Visual): Varies
- Hops: Varies
- Malt: Varies
- Palate:
  - Body: Varies
  - Palate Body: Varies
  - Carbonation (Palate): Varies
  - Length/Finish: Varies
- Water: Varies
- Yeast: Ale or Lager
- Esters: Fruity esters may be present.
- Microorganisms: Brettanomyces may produce acetic acid as a byproduct. Horsey, goaty, leathery, phenolic and light to moderate and/or fruity.

Barrel-Aged Beers

Style Description: A wood- or barrel-aged beer is any lager, ale or hybrid beer, either a traditional style or a unique experimental beer, that has been aged for a period of time in a wooden barrel or in contact with wood. This beer is aged with the intention of imparting the unique character of the wood and/or what has previously been in the barrel.

Fun Facts: Today's craft brewers are using wood (mostly oak) to influence flavor, aromatics and provide microorganisms. Beer may be aged in wooden barrels (new or previously used to age wine or spirits), or chips, spirals and cubes may be added to the conditioning tanks that normally house beer. A variety of types of wood are used including oak, apple, alder, hickory and more. The interior of most barrels is charred or toasted to further enhance the flavor of the barrels.

Quantitative Style Statistics:

- OG: Varies
- FG: Varies
- ABV: Varies
- IBU: Varies
- SRM: Varies
- Volumes of CO_2: Varies
- Apparent Attenuation: Varies

Country of Origin: Undetermined

Glass: Snifter

U.S. Commercial Examples: Firestone Walker Brewing Co., Double Barrel Ale; New Holland Brewing Co., Dragon's Milk; Oakshire Brewing, Hellshire III; Perennial Artisan Ale, Barrel-Aged Sump Coffee Stout

Style A-Z:

- Alcohol: Varies
- Brewing and Conditioning Process: Aging in wood barrels necessary.
- Color/SRM: Varies
- Clarity: Varies
- Collar of Foam & Head Retention/Texture: Varies
- Carbonation (Visual): Varies
- Hops: Varies
- Malt: Varies
- Other Ingredients: Wood aging
- Palate:
  - Body: Varies
  - Palate Body: Varies
  - Carbonation (Palate): Varies
  - Length/Finish: Varies
- Water: Varies
- Yeast: Ale or Lager
- Phenols: Varies
- Esters: Varies
- Microorganisms: These beers may or may not have Brettanomyces character.

SECTION 3: HOW TO PAIR CRAFT BEER WITH FOOD

Craft beer and food pairings are arguably the most versatile pairings on menus today. Discover the three most common pairing interactions—complement, contrast and cut—-and how to decide which one best suits the dish you're preparing. See examples of food pairings for common beer styles and find out why they work.

A pairing is a match between beverage and food, with the goal of having the individual parts interact in a synergistic way to create an enhanced and elevated experience. Simply stated, craft beer and food can transform each other. From the simplest pairing of crisp herbal hops with the char of the grill, to the rich complexity of a Belgian-Style Quadrupel with crème brûlée, craft beer can create savory and memorable flavor combinations.

Craft beer and food pairings are arguably the most versatile and challenging pairings on menus today. Where wine and spirits cannot go, craft beer paves the way to harmonious interactions on the palate.

Craft beer has no equivalent of the "white wine with delicate flavors, red wine with bold flavors" rule. Pairing craft beer to food simply comes down to tasting the beer and then deciding which characteristics in the craft beer should be best highlighted by the food. See CraftBeer.com Flavor Triangle (CraftBeer.com/Triangle).

Because of the vast variety of flavors that can be found in craft beer, it's important to consider the entirety of the dish to be paired. Use the dominant flavor or ingredient in each dish as the starting point for each pairing. Then take into account all ingredients and techniques in the dish to complete the pairing. That said, first impressions go a long way when forming a pairing. Often the first ingredient that comes to mind ends up as a component of the final dish in some form.

PAIRING A DISH SHOULD TAKE ALL INGREDIENTS AND THEIR PALATE REACTIONS INTO ACCOUNT. DON'T JUST FOCUS THE PAIRING ON ONE INGREDIENT.

Expand your tasting notes to include places, memories, and sensations as well. Take, for example, a crisp Kölsch that might trigger thoughts of watermelon. While that pairing works well on its own, delve deeper into your imagination. What memories are associated with eating watermelon outside on a hot summer day? What other flavors and ingredients can conjure the scene for your guests? Create a dish that tells a story, and the pairing will be on

its way to making a memory. While the interplay of taste elements and aroma combinations is what makes a pairing, the memory of a dish is what people will recall and seek to repeat.

PAIRING STEPS: SPECIFIC DISH VS. SPECIFIC BEER

How to choose a beer to pair with a specific dish:

1. Determine the dominant flavors of a dish.
2. Compile list of ingredients for the dish.
3. Consider what cooking methods and techniques could contribute to pairing.
4. Select a beer style that will pair well with both the ingredients and cooking methods of the dish.
5. Test taste to gage interactions of food to beer.
    - If it works, stick with the pairing.
    - Could it be better if you tweaked the ingredients or modified the preparation?
    - Not what you're looking for, take notes and try a different beer.

How to choose a dish to pair with a specific beer:

1. Taste beer in proper glassware at the desired serving temperature.
2. Take note of first reaction of the beer on the palate write down any and all thoughts that come to mind.
3. Consider what ingredients would highlight the flavors of the beer.
4. Consider what ingredients the beer could highlight on the palate.
5. Decide on a dominant flavor profile or main ingredient for the dish.
6. Complete the dish by adding in the remaining components for a complete dish.

Because perception is personal, so is pairing. Each individual perceives pairings differently. Each guest's reaction to a pairing will depend on:

- What taste elements, aroma elements and sensations they individually notice;
- The varying intensity of characteristics in both the food and the craft beer;
- The guest's experience (past and present); and
- Their personal preferences.

The chef or pairing guide that keeps the above in mind will have more success when presenting their pairings.

One approach to pairing is to start by focusing on the main ingredient of the dish (though it should be said here that if the pairing is built solely around the main ingredient, it may ultimately fall flat). Take into consideration the cooking method you will use. Next, identify supporting ingredients that will complement both the main ingredient and the craft beer the dish will be paired with. The addition of herbs, spices, fat, and sugar will create secondary pairings in the dish.

Think of the paired craft beer as a supporting ingredient and consider how it will interact with different characteristics of the dish. Does the beer bring the sauce to the front of the palate? Does the beer pair too strongly to one part of the dish, thus hiding the whole pairing? Is the beer a standalone component that cleanses the whole palate?

How Common Beer Ingredients Can Impact Pairings

The flavors from malt can be accented by cooking methods like grilling, roasting, smoking and baking when done at higher temperatures. Consider these cooking methods if notice these flavors in your beer: bread flour, grainy, biscuit, bready, toast, caramel, pruny, roast, chocolate, coffee, smoky and acrid notes.

Hop flavors can mimic the flavors of a variety of herbs and spices. When tasting a hop-forward beer, look for citrus, tropical, fruity, floral, herbal, onion-garlic, sweaty, spicy, woody, green, pine, spruce and resin. These flavors may present opportunities to create resonance in your dish with herbs and spices.

The flavor from yeast can complement a wide range of supporting ingredients and flavors including apple, apricot, banana, blackcurrant, cherry, fig, grapefruit, kiwi, peach, pear, pineapple, plum, raisin, raspberry, strawberry, other, clove, cinnamon, vanilla, smoky, white and pepper.

THINK OF THE PAIRED CRAFT BEER AS A SUPPORTING INGREDIENT AND CONSIDER HOW IT WILL INTERACT WITH DIFFERENT CHARACTERISTICS OF THE DISH.

If you have found the craft beer you want to pair with a specific dish but it seems to be just a flavor short of a complete pairing, consider adding something to or taking something away from the dish. Remember, the beer is already brewed and ready to go. You can't change the beer, but you can adjust your recipe to achieve a great pairing.

Palate Interactions Between Craft Beer and Food

- Hop bitterness is balanced and settled on the palate by the addition of fat.
- Roasted malt notes are matched on the palate by sweetness.

- Carbonation is intensified by increasing the umami of a dish.
- Alcohol is calmed on the palate by both sweetness and fat.
- Notable malt flavor profiles match well with acidity.
- Hop aromas are transferred to the palate when paired with sweet aromas.
- Sweet malt notes calm spice on the palate.
- Hop bitterness enhances notes of spice.
- Carbonation is an effective tool to cleanse lighter fats.

Pairing Practices
The strongest approach to pairing is to look at the following three interactions—complement, contrast and cut—and decide which one best suits the dish to be paired.

The palate will react to the combination of food and craft beer by recognizing flavors that match each other (complement); flavors that intensify one another (contrast); and flavors that cleanse the palate (cut).

It could be argued that all three of these interactions happen to some extent with each bite and sip; they become more or less noticeable depending on the dominant characteristics of the food and the craft beer in the pairing.

Complement
Successful pairings often work by finding harmonies between the craft beer and the dish. This can be done by identifying complementary flavor or aroma elements that tie the beer and the dish together.

For instance, roasting, grilling or developing the Maillard reaction in proteins will resonate with elements of malt in craft beers. The malt used in craft beer is kilned to the desired roast color, and the Maillard reaction is what produces that color. The chemical reaction between amino acids and reducing sugars is the same whether it be in baking brioche, roasting a duck breast or kilning malt for beer.

Contrast
Creating a contrasting pairing can often be the most challenging for the palate. In almost every pairing there will be subtle contrasting taste and aroma elements between the craft beer and food. An overall contrasting pairing is one in which the main flavor profile of the dish contrasts against the main flavor profile of the craft beer. Sweet versus sour and bitter versus sweet are common dominant flavors in contrasting pairings. Contrast can either have an enhancing or suppressing effect.

A classic example of an enhancing contrasting effect is an American India Pale Ale with tropical hop notes paired with an intensely hot pepper spiced dish or sauce.

A classic example, of a suppressing contrast effect, is oysters on the half shell paired with a Dry Stout or Porter. The rich, roasty notes of the beer clash pleasantly against the salty brininess of the oyster.

Contrasting flavors can be created by using two elements in the pairing to activate two sensations at the same time.

- Using the classic technique of hot and cold on the palate at the same time.
- Managing the sweetness of a dish to activate bitterness at the same time.
- Using dark malt notes to challenge the palate with moist heat cooking methods on proteins.

The hop bitterness of a classic Pale Ale will contrast against the sweet and rich notes of fat in a classic cream sauce. The hops may come across as almost too bitter, but are balanced by the sweetness of the malt. The hops cut the richness of the sauce off the palate to allow the malt to come through.

Cut
To cut the palate means to use the craft beer to cleanse away the flavors from the dish, thereby resetting the palate back to neutral. A sip of craft beer after each bite should leave the palate feeling refreshed, awakened, and ready for the next bite. For instance, the hops of an IPA might cut the notes of smoke on a grilled salmon, or the alcohol of an Imperial Stout might cut away the richness of chocolate.

Hops, sweetness, alcohol, souring techniques, and carbonation are the key components in craft beer to create a cutting effect on the palate.

- Hops: The bitter strength and astringency of hops can lift fat off the palate.
- Sweetness: A sweet finish can cut away acidic flavors, leaving a pleasant sensation after each bite.
- Alcohol: If the flavor profile of the dish pulls the alcohol forward on the palate, the alcohol will work to cut the flavors off the palate.
- Souring: Sour, tart and funky flavors that pucker the palate and pull into the jaw can cut away sugary and fruity notes.
- Carbonation: The scrubbing effect of carbonation's bubbles helps diffuse the richness of food.

Classic cutting example: Using the carbonation and citrus notes of a Saison to cut away the buttery rich notes of Dungeness crab on the palate. The crab sets up rich and sweet on the palate, while the carbonation of the Saison lifts the craft beer off the palate and wipes away the notes of salt water with crisp, citrusy yeast notes.

Intensity
A common rule of thumb for pairing craft beer with food is to "match strength with strength." In other words, look to pair delicate dishes with lighter craft beers and strongly flavored dishes with more assertive craft beers.

Intensity in craft beer can come in many forms:

- Strength of ABV
- Malt Profile: Deep dark caramel notes, dark roast, increased malt bill
- Hop Impact: Late addition hops can overtake a beer's presence on the palate

- Sweetness: Barrel aging, addition of sugars and/or fruit
- Body: Carbonation level, addition of flavors such as chocolate and/or barrel aging
- Acidity

In the culinary world, richness can be matched by increasing the fat content of dishes and using cooking methods such as grilling, sautéing, braising, or roasting. Seasoning can play a role in toning down the richness of a craft beer, but often times the simpler pairing wins the palate.

EXAMPLES OF FLAVOR GROUPS AND SUGGESTED PAIRINGS:

Rosemary, juniper, pine, spruce
Pairing: American Pale Ale

Brown sugar, butter, caramel, maple syrup, vanilla, coconut, toffee
Pairing: English-Style Barley Wine

Cinnamon, cumin, pepper, cardamom, ginger, clove
Pairing: Robust Porter

Date, fig, raisin
Pairing: Belgian-Style Quadrupel

Pineapple, tangerine, clementine
Pairing: American India Pale Ale (IPA)

Chocolate, truffle, cocoa powder
Pairing: English-Style Milk Stout

Lighter craft beer styles are often paired with more delicate dishes. The key in pairing delicate craft beers and delicate dishes lies in finding harmonies in the subtle notes that can be pulled from the pairing. Highlighting crisp, clean, palate-refreshing dishes with similar craft beers can awaken and prepare the palate for more complex pairings to come.

The best pairings for lighter craft beer styles come from the sum of the entire taste experience. For example: a crisp, clean Kölsch with a salmon tartare on cucumber, where the cucumber connects the salmon to the Kölsch and the Kölsch acts as the pepper to the salmon on the palate.

On the more assertive end of the flavor spectrum, one of the best pairings using the Maillard reaction is a roast duck breast paired with a Brown Ale or Dubbel. In the Brown Ale pairing, the roast of the malt speaks directly to the Maillard reaction of the duck breast, creating a rich and roasty flavor profile. With the Dubbel, the increased sugars and darker roasted malt add a touch of sweetness, bringing out the caramelization of the duck skin and making the pairing almost creamy on the palate.

The Maillard reaction is a non-enzymatic browning that occurs in hot, moist environments. This reaction creates melanoidins, like the char on a beef burger or roasted duck breast, and the roasted flavors of kilned coffee beans and malt. This is different from caramelization, which is a thermal decomposition of sugars. Both processes add flavor and occur in both food and beer.

CraftBeer.com Flavor Triangle

Potential elements one may perceive in a beer.

There are two unique types of intensity that work together when you taste foods and beverages.

1. **Flavor Characteristic Intensity:** how intensely you detect a flavor characteristic.
2. **Hedonic Intensity:** how much you like a flavor characteristic at a given strength (acceptance of a flavor).

Flavor Characteristic Scale

9-Point Hedonic Scale

Each of the Flavor Triangle characteristics are possible to detect in every beer. When tasting a craft beer, it is important to parse out what you do and don't detect.

Perception and intensity are personal and unique to each individual, and are continually modified by experience and circumstance. As you identify what you perceive, you can begin to piece together what interactions (interplay of triangle characteristics) are occurring.

Created via collaboration between Nicole Garneau, PhD and CraftBeer.com.

Download at CraftBeer.com/Triangle

CRAFT BEER & FOOD PAIRING GUIDE

FOOD COMPONENTS	BEER FLAVORS	INTERACTIONS	EXAMPLE DISHES
GRAIN  Farro, Arborio, Wild Rice, Polenta	CLEAN & CRISP  American Amber Lager Bohemian-Style Pilsner	Complementary grain flavors balance hops while remaining light on the palate.	Creamy Risotto
BEANS & LEGUMES  Lentils, Fava, Chickpea, Green Beans	MALTY & SWEET  English-Style Brown Ale German-Style Hefeweizen	Food adds richness to the beer while balancing salt and acidity.	Grilled Halibut with Pole Beans
SHELLFISH  Clams, Scallops, Lobster, Crab	FRUITY & SPICY  Belgian-Style Saison German-Style Hefeweizen	Beer brings out salinity and natural sweetness while cleansing the palate.	Mussels with Garlic, Parsley And Butter
RICH MEATS & ROOT VEGETABLES  Parsnips, Carrots, Beef Strip Loin, Lamb	SOUR, TART & FUNKY  American Brett  Belgian-Style Flanders	Combining these flavors brings out umami and adds earthy notes that rest on the center of the palate.	Grilled Ribeye and Root Vegetables
GAME BIRDS & GRAINS  Duck, Quail, Quinoa, Farro	HOPPY & BITTER  American Pale Ale  American Brown Ale	Complements roastiness (Maillard reaction) while fat coats to neutralize hop bitterness.	Roasted Quail with Farrotto
FATS  Butter, Olive Oil, Duck/Pork Fat, Dairy	HOPPY & BITTER | DARK & ROASTY  American Black Ale  English-Style Brown Porter	Beer cuts through, balances strong flavors and allows for a complex finish.	Cashew Butter and Red Pepper Jelly On Toast
VEGETABLES (GRILLED)  Carrots, Mild Peppers, Onions, Mushrooms	DARK & ROASTY  Irish-Style Dry Stout  German-Style Schwarzbier	Brings out umami and balances sweetness and richness.	Green Chili-Stuffed Portobello
CHEESE  Brie (Fruity & Spicy), Gouda (Malty & Sweet), Aged Cheddar (Hoppy & Bitter), Blue (Dark & Roasty), Mozzarella (Clean & Crisp)	VARIES  Belgian-Style Tripel  English-Style Pale Ale (ESB)	Beer complements the natural flavors and textures while cutting though fat, cleansing the palate.	Brie and Fruit
BRAISED MEATS & CHOCOLATE  Beef Short-Rib, Pork Sholder, <50% Cacao (Malty & Sweet), >55% Cacao (Dark & Roasty)	MALTY & SWEET | DARK & ROASTY  German-Style Bock  Baltic-Style Porter	Highlights the roasted character (Milliard reaction).	Milk Chocolate Bread Pudding
PORK  Sausage, Tenderloin, Terrine	HOPPY & BITTER | FRUITY & SWEET  Imperial India Pale Ale  Belgian-Style Dubbel	The intensity of the pork fat stands up to the strong beer characteristics.	Pork Chops and Apple Relish
CREAMY DESSERTS  Cheesecake, Ice Cream, Creme Brûlée, Mousse Cake	VARIES  British-Style Barley Wine  Belgian-Style Fruit Lambic	Balances richness on the palate so the dessert doesn't finish cloyingly.	Butterscotch Mousse with Dark Chocolate

Download at CraftBeer.com/Pairing-Chart

SECTION FOUR

SECTION 4: CRAFT BEER & CHEESE

Pairing craft beer and cheese is a great and simple way to explore interactions between beer and food. In this section, we explore the basics of pairing craft beer and cheese, and explain how to set up a successful cheese tasting menu.

Cheese is a challenging one-ingredient dish to match with most beverages. The variety of pungent, strong, earthy and creamy flavors in cheese often confuses the palate. Due to its flavor profiles that often mirror artisan cheeses, craft beer can handle just about any cheese.

Artisan cheeses exhibit their own unique flavors with notes of pasture, mold, and the breakdown of fats and proteins through enzymes. Young cheeses may have sweeter notes, while more mature cheeses develop notes of toasted nuts and caramel.

The success of the pairing largely depends on the contrasts and complements that come from the interaction of the beer and the cheese. Examples of these interactions include pairing fatty cheeses with crisp, effervescent craft beers (contrast), or pairing nutty aged cheeses with the roasted malt notes of a stout (complement). The best way to start pairing craft beer with cheese is to evaluate those potential interactions and then work to match the intensity of the artisan cheese with the intensity of a craft beer style.

As with all artisan cheeses, proper storage, preparation and presentation of each cheese is important. Storing cheeses together and/or using the same knife to present them all will commingle the delicate flavors of each cheese and obscure the actual flavor profile of the cheese or the pairing.

General Craft Beer and Cheese Interactions

- Acidity, carbonation and bitterness cut through fat.
- Malt complements creamy, nutty, earthy, caramel flavors; contrasts with salt.
- Carbonation lifts residual fat off the palate.
- Craft beer ingredients (especially carbonation and alcohol) can alter the texture of both the rind and the paste of cheese, and can provide complementary and/or contrasting flavors for each.

Guidelines for getting started

1. Cheese and craft beer both benefit from proper service temperatures. Let cheese warm from cold storage to a temperature of around 55 to 65°F. Similarly, serve the craft beer at the proper temperature.

2. Match intensities. Delicate craft beers often pair well with young cheeses, while stronger flavored craft beers tend to work better with strongly flavored, mature cheeses. Umami is also increased as a cheese ages so keep this in mind as you'll want a more intense beer to match that enhanced savoriness.

3. Look for commonalities (i.e. malt-forward craft beers pair with nutty or sweet cheeses) and contrasting interactions (i.e. hop-forward bitter beers cut through fatty richness).

4. Recognize ancillary sensations and interactions in the pairing; hop-intense craft beers pair well with acidic or salty cheeses.

5. Arrange pairing order from least intense to most intense flavors. Avoid commingling cheeses and use separate utensils for each.

6. Utilize palate balancers with cheese. Toasted baguette, nuts, dried fruits, honey and pickled items all make great additions to craft beer and cheese.

Demonstration Video: Beer & Cheese Pairings
(CraftBeer.com/Cheese-Pairing)

Suggested Craft Beer and Cheese Interactions

CHEESE STYLE	BEER STYLE	DESCRIPTION
Fresh Cheeses	Wheat and Lambic-style beers	Italian-Style Mascarpone, Ricotta and soft Chèvre will match the delicate notes of the beer and neither will overwhelm the palate in the beginning of a meal.
Semi-Soft Cheeses	German styles (Kolsch, Bock) and Pale Ale styles	Fontina, Havarti and milder Blue Cheeses can be enhanced by the carbonation of Kölsch style ales. The gentle notes of grass in the cheese can be brought out by using the malt of a Bock or the hops of a Pale Ale.
Firm/Hard Cheeses	Pilsener, Bock, Brown Ale and Imperial Stout	Cheddars, Swiss or Emmentaler-style cheeses can mimic the Maillard reaction when paired with a beer style such as a Brown Ale. Roasty stouts can add a creaminess to the firm and hard cheeses on the palate.
Blue Cheeses	IPA, Imperial IPA	These strongly flavored cheeses can be successfully balanced with bolder beer styles, including IPAs or Imperial IPAs.
Natural Rind Cheeses	Golden or Blonde Ales, Pale Ales and Barley Wine styles	Lancashire, Stilton, Brie and Camembert all share a rich creamy base that can be refreshed with a Golden, Blond or Pale Ale or intensified the sweetness on the palate with a Barley Wine.
Washed Rind Cheese	Belgian-style Ales	Classic Belgian yeast flavors spur a tighter carbonation as well as bring out delicate sweet notes that can cut through the funk of a washed rind cheeses.

Cheese Style Source: American Cheese Society

Download at (CraftBeer.com/Cheese)

SECTION 4: INTERACTIVE TASTING & PAIRING

In this session of tasting and pairing, five common beer styles will be tasted alongside four common food ingredients. Comparative tasting notes will allow you to quickly form generalizations about common interactions between beer and food and set you up for success when putting together a pairing menu.

The tasting charts will start your palate down the path of learning how to pair ingredients with craft beer styles. Each style is paired with four distinct ingredients, each of which will provoke a unique reaction on your palate. By starting with ingredients on their own, you will begin to develop a sense of how to build a paired plate and understand how an individual ingredient can affect the flavor profile of the craft beer.

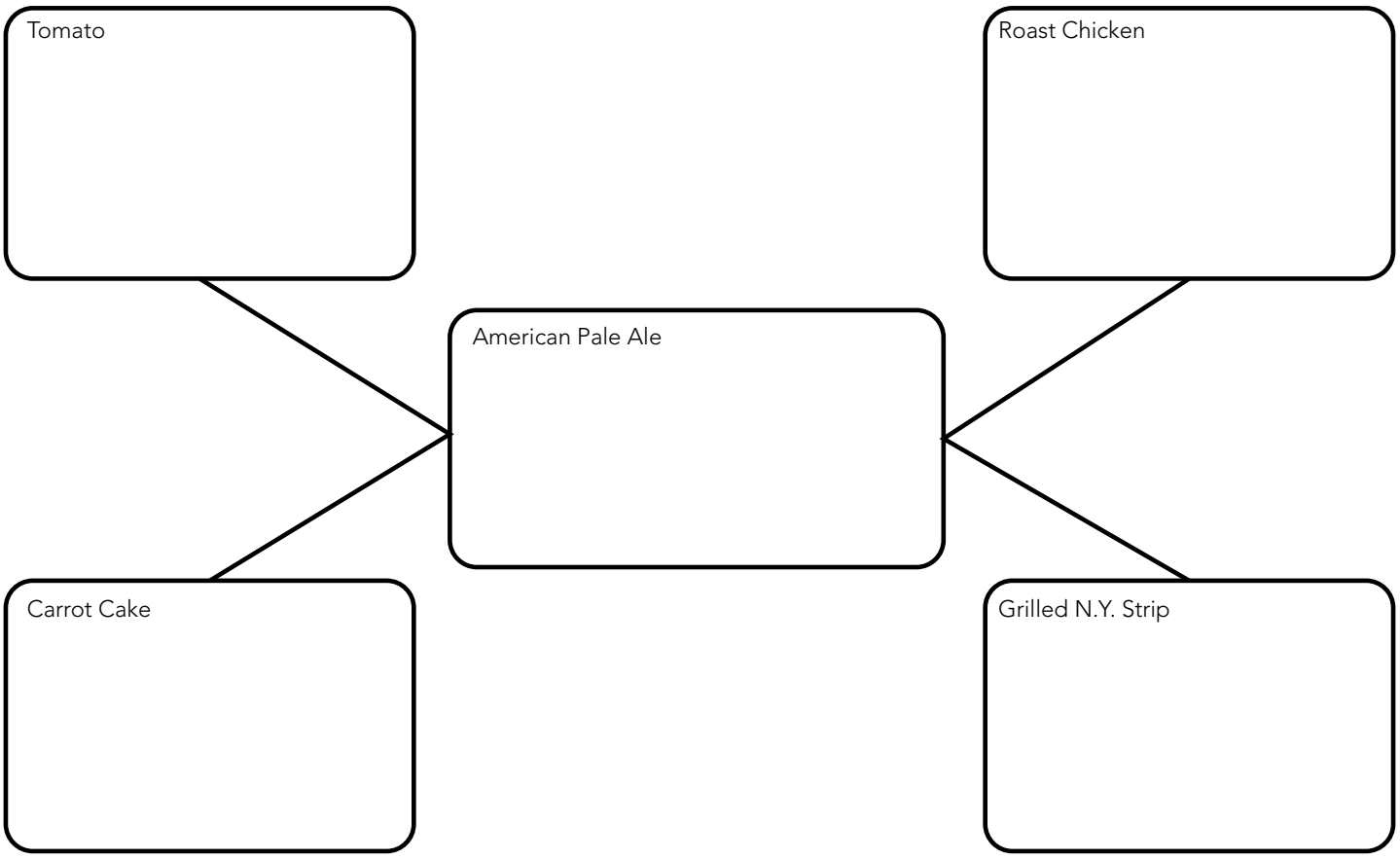
Taste each ingredient separately along with the paired beer style. Write down pairing notes, palate reactions and cooking techniques for each one.

The following five style types will be used in this tasting:

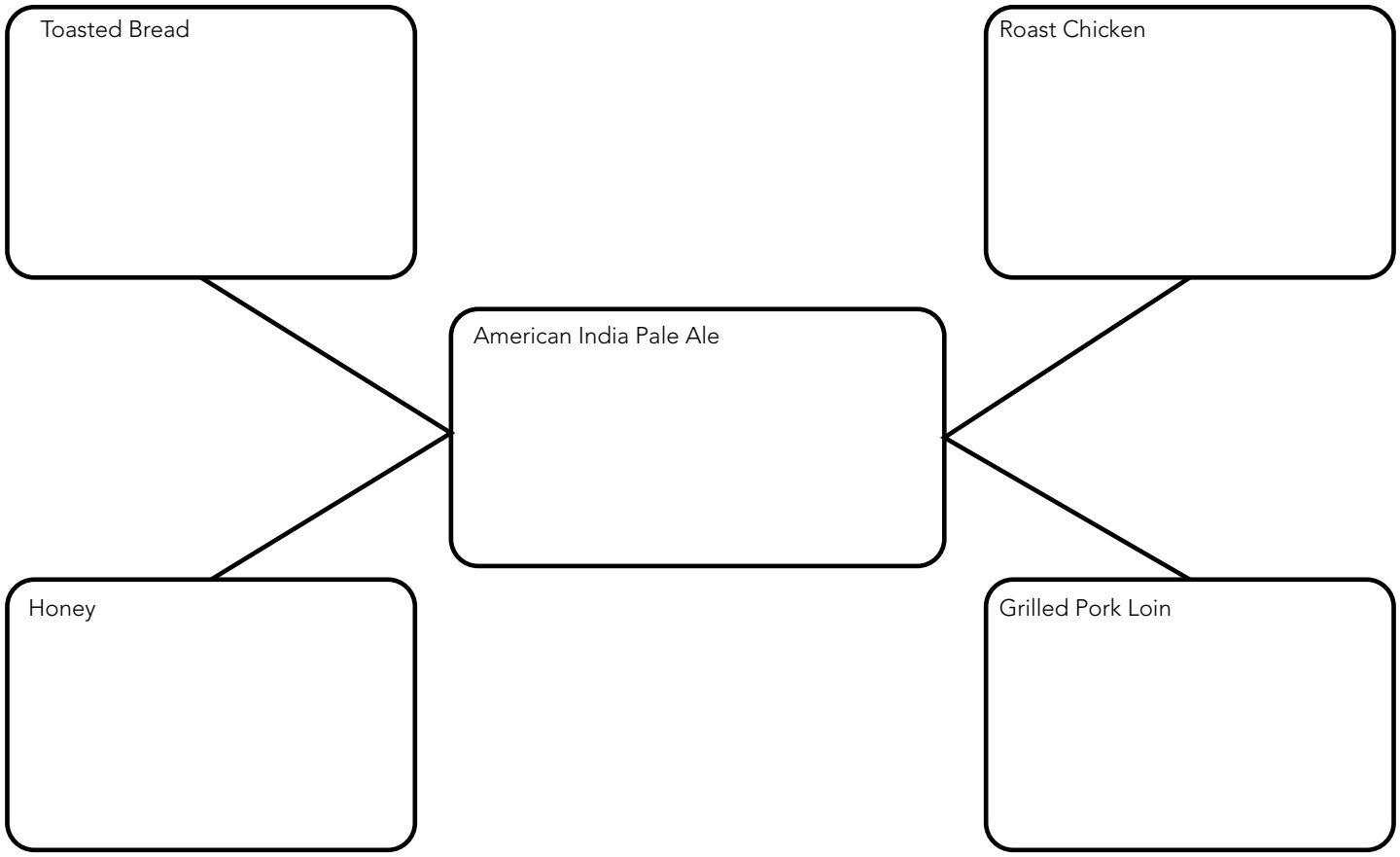
- American Pale Ale
- American India Pale Ale
- American Stout
- Belgian-Style Saison or Farmhouse
- American Brown Ale

Download Interactive Tasting Forms: (CraftBeer.com/Interactive)

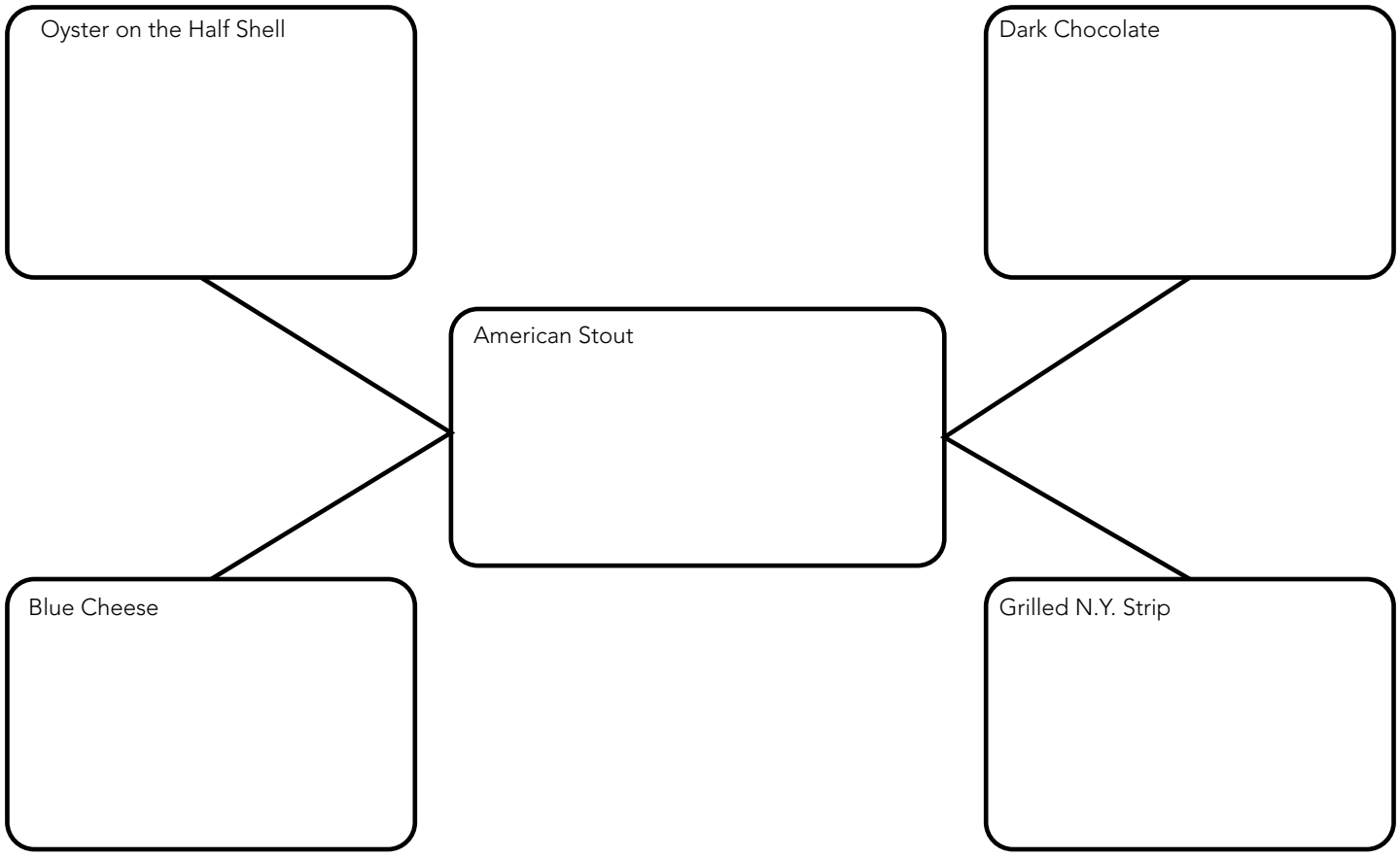
Interactive Tasting Form 1



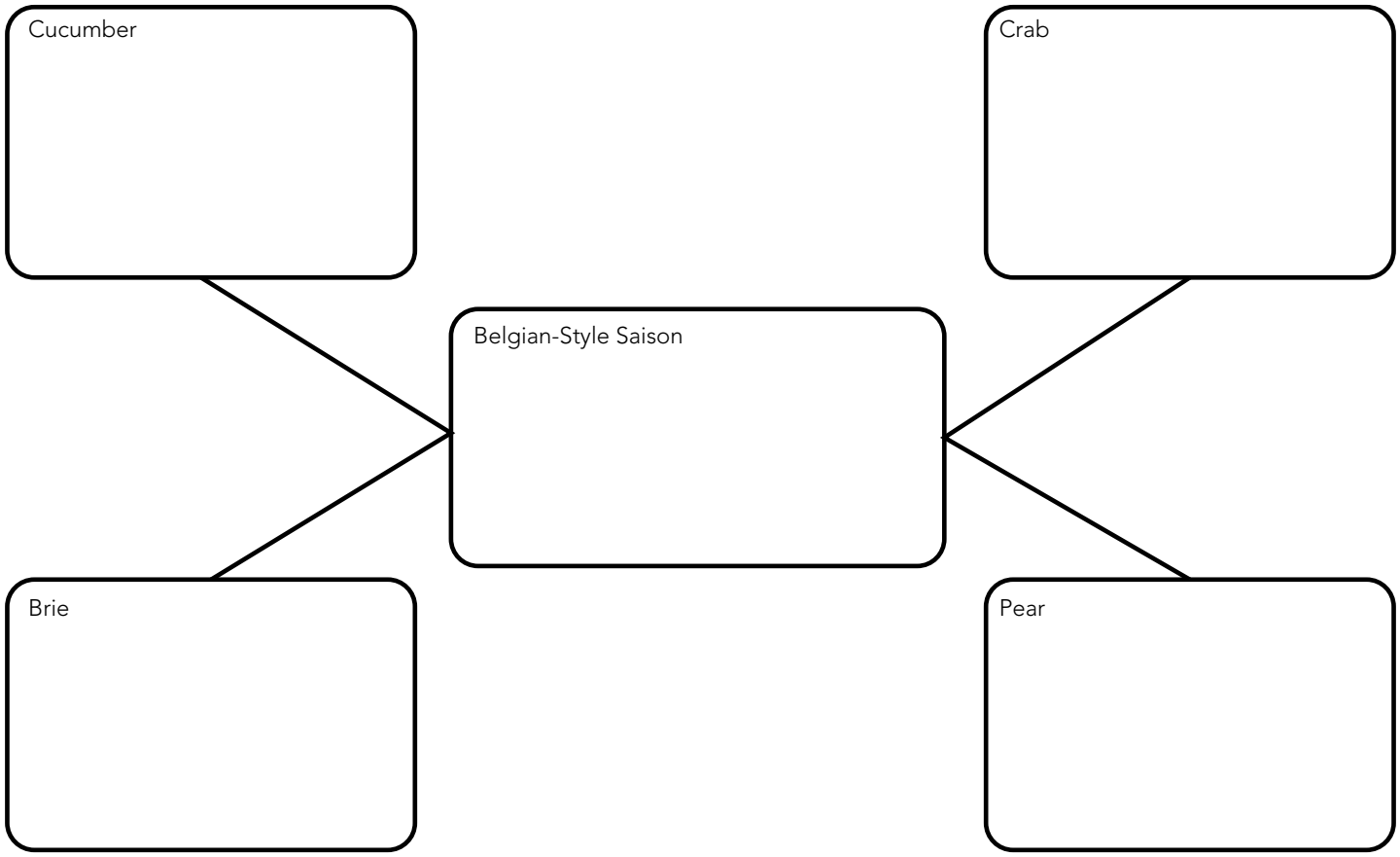
Interactive Tasting Form 2



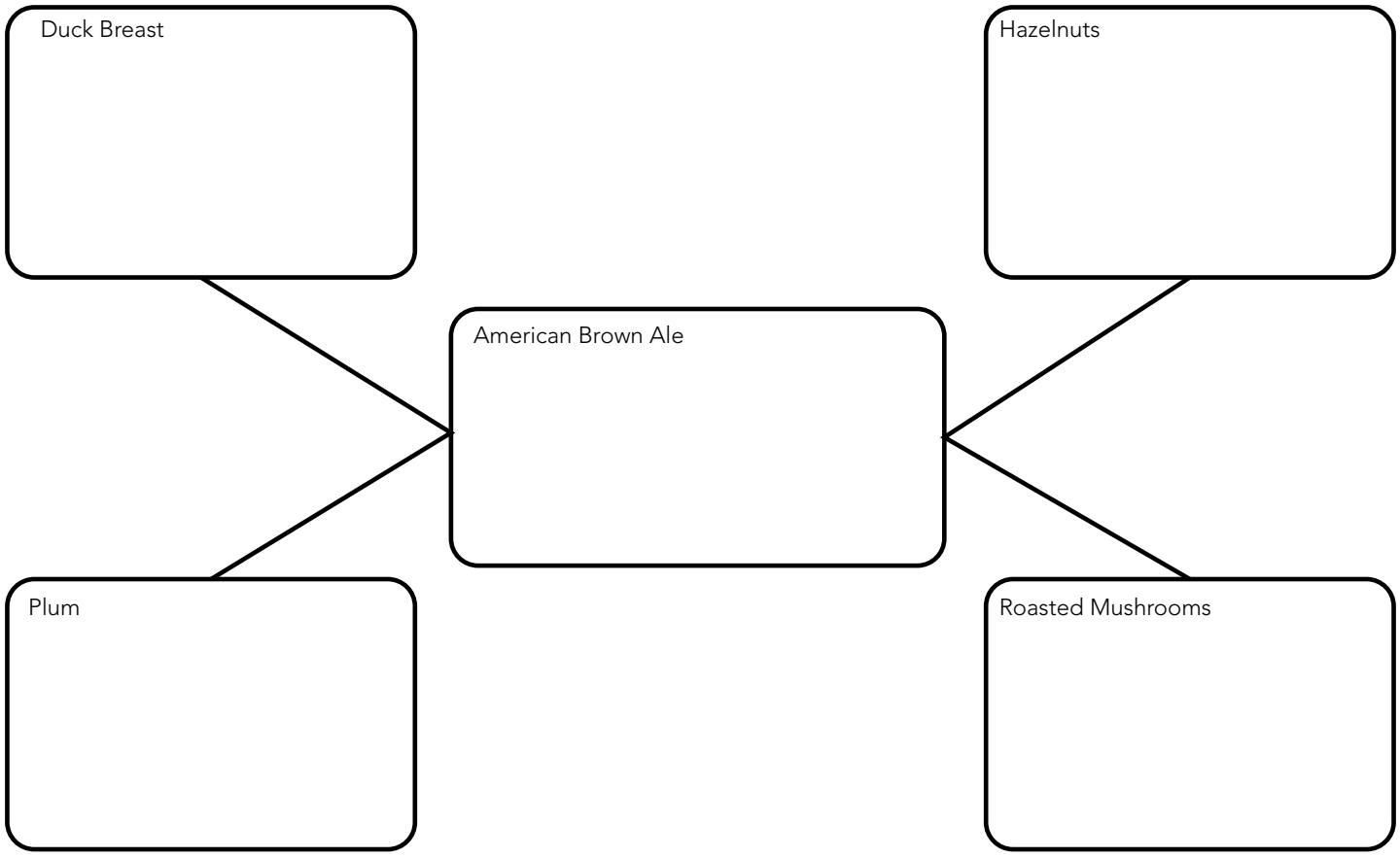
Interactive Tasting Form 3



Interactive Tasting Form 4



Interactive Tasting Form 5



SECTION 4: FRESH, AGED AND CELLARED CRAFT BEER

Learn the basics of aging craft beer—which styles age best, which conditions are most suitable for aging and how to identify common characteristics of stale or oxidized beer. This module also describes how to set up and successfully present a vertical tasting.

Craft beer is a perishable product. As such, it is constantly evolving. From the moment a bottle leaves the brewery to the moment it is served, the beer inside will keep changing.

Sometimes those changes are for the better, which results in a delicious and refined aged beer. But many craft beers are not intended to go through an extended aging process, and so those changes can have negative results. Most notably, specific hop aromatics and flavors will fade and oxidation will take over the flavor of the beer.

The more delicate and lower in ABV the craft beer, the faster those effects dominate the flavor profile. In general, any craft beer less than eight percent ABV is not meant to be aged, with exceptions being sour beer styles and *Brettanamyces* beers.

Storage of packaged beer

No matter the packaging type, all beer should be stored cold. Growlers should be stored in the refrigerator at 38°F.

Get to know the 3-30-300 rule for canned and bottled beer, as suggested by MillerCoors research. According to this rule, storing beer in the following conditions will result in equivalent flavor loss:

1. 3 days in the trunk of a hot car (90°F)
2. 30 days at room temperature (71°F)
3. 300 days in the refrigerator (33°F)

Pay attention to "First in, first out" (FIFO), rotate in new products accordingly, and always check the date code before accepting delivery of fresh craft beer. If you need help reading the date code, ask your distributor or brewery. Craft beers vary on when they are best consumed depending on the beer style, alcohol content and ingredients, as well as the producers' suggestions.

How to tell if a beer is not fresh

- One of the first things to dissipate in a beer that is past its prime is the hop aroma. If the beer exhibits less hop aroma than indicated by tasting notes provided or published on the Internet, it may be old.
- Malt flavors may come across as waxy.
- Foam stability can decrease, and the head of the beer may collapse.
- Unfiltered and unpasteurized beer that has active yeast can over-carbonate and/or eventually show signs of autolysis, which manifests as salami, old meat, burnt rubber, sulfur, or rancid flavors.
- Check the date code on the beer or ask your distributor or brewer.

Characteristics that can occur in staled beer include:

1. E-2-Nonenal
   a. Paper/cardboard flavors.
   b. Occurs from aldehydes that get oxidized from primary alcohols. Oxygen may exist in the head space of the package or may have been introduced to the product before packaging.
2. 2,3-Pentanedione
   a. Honey-like qualities of lighter beers that can occur from oxidation of malt.
3. Melanoidins
   a. Oxidation of melanoidins creates sherry notes or soy sauce flavors.
4. Diacetyl
   a. Byproduct of yeast or lactic acid bacteria. Diacetyl leaks out of the yeast cell wall during fermentation, but yeast scavenge it during later stages of fermentation. It is acceptable at lower levels in some beer styles.
   b. Can be a sign of dirty beer lines. All beer lines should be cleaned every two weeks with a three percent caustic solution at recommended temperatures, and every three months with an acid clean See DraughtQuality.org for details.
5. Metallic flavors
   a. Most noticeable in the collar of foam and can dissipate as the tongue acclimates.

6. Breadlike characteristics
   a. Caused by oxidation during pasteurization.

7. Oxidation of hydrocarbons (hop essential oils)
   a. Can create some desirable flavors and aromas in beer.

8. Color change
   a. Caused by oxidation, like the flesh of a fresh-cut apple, which darkens over time. A similar darkening effect happens to beer.

CraftBeer.com Operator's Guide to Receiving Craft Beer

1. Upon delivery and before the operator accepts the delivery:

   a. Know your distributor's policy on returning beer.

   b. Inventory: Confirm that what was ordered is reflected on the invoice and is what was delivered.

   c. Inspect: Visually inspect the condition of the delivery.

      i. Date coding is legible and within range.

      ii. Crowns, cans and keg valves are free of rust or debris.

      iii. Accept only what was ordered and only what is in proper condition.

      iv. Refuse any improper orders, products or hardware (kegs) with issues

   d. Enter new product into rotation or storage inventory.

      i. Add bottles and cans into rotation or appropriate storage.

      ii. Add kegs to rotation or appropriate storage.

         1. Ensure draught system is clean (See DraughtQuality.org) and has room to store beer cold.

      iii. Store your beer properly.

         1. Store your beer cold unless otherwise advised by the brewer.

2. Taste for quality. If a product is deemed inadequate, an operator's immediate action should be to call the distributor that delivered it. Work with the distributor to remedy the issue. Educated staff should be able to tell if a beer does not taste as intended by the brewer and decide if the beer in question should be sent back.

   - Should the distributor be ineffective in helping remedy the situation, the operator's next call is to the brewery. Alert the brewery and let them know you have already requested assistance from the distributor and what you've asked to be done.

   - Working in partnership with the distributor and brewery to find a solution will likely be your most viable course of action. Know the difference between a beer that is not your preference and a beer that is objectively "off" or of poor quality.

3. Steps for refusing and returning beer:

   a. Pull from draught/inventory immediately.

   b. Keep back-stock refrigerated.

   c. Pull from the menu. Alert staff that product is not available.

   d. Call distributor or brewer.

How to age craft beer

Many establishments are starting to age and cellar certain craft beers. Cellaring is an art that takes diligence and skill. There are many variables to consider, from selecting the right styles for aging to maintaining optimal environmental conditions. When done properly, this process can allow new and unique flavor profiles to develop.

Why age beer?

The investment of time, space and energy into cellaring beers can be valuable to an establishment. While a correctly aged beer can command a premium price, a meticulously curated cellar can pay even more dividends by allowing your establishment to become a destination that offers a unique experience.

Benefits of aging beer:

- Soften or decrease harsh flavor notes
- Allow flavors to blend, resulting in increased complexity
- Reveal flavors that remain constant as others fade
- Create a unique beer experience

Selecting the right beers to age

When craft beer ages it loses hop aromas, becomes less sweet and may take on vinous notes. Rich leather, tobacco, nutty flavors, and sherry- or port-like oxidation are common and often pleasing flavor profiles in aged craft beer.

However, only a select few beer styles are suitable for aging. Patrick Dawson, author of *Vintage Beer*, highlights three groups of beer that are particularly conducive to extended aging. He refers to them as "the three S's":

- Strong: In general, only beers of at least 8 percent ABV should be considered for aging. A few sour and barrel-aged craft beers that are below 8 percent will break this rule and age quite well.

- Sour: Beers made with acid-producing microorganisms, or otherwise soured, tend to age well.

- Smoked: Beers made with smoked malts are packed with flavors that often change in interesting ways over time.

Before aging a specific craft beer, first check with the brewery for its thoughts on length of aging. Proper and deliberate cellaring should result in desirable changes to the beer's flavor; but a beer that isn't stored properly or simply goes past its prime will degrade in flavor and become stale.

After the first six months and then at one-year intervals, taste any cellared beer and document your tasting notes. Once the flavor profile has developed to your liking, put it on the list and start pairing it with your menu.

BEER STYLE	FAVORABLE AGING ATTRIBUTE(S)
British-style Barley Wine	Higher ABV
Smoked Beer	Smoked
American Style Sour	Sour
American Brett	Potentially Higher ABV, Sour and/or Smoked
American Imperial Stout	Higher ABV
Barrel-aged Beers	Potentially Higher ABV, Sour and/or Smoked

Download at (CraftBeer.com/Aging)

Environmental Considerations
While numerous factors go into a properly aged beer, the following are most notable.

- Temperature: A cool and constant temperature of 50 to 55°F is usually recommended for most styles. Cooler temperatures inhibit the effects of oxygen on beer.
- Light: Keeping beer in a dark place is strongly recommended. Hop alpha acids, which provide bitterness, will react and break down when exposed to ultraviolet (UV) light and create "skunky" or "light-struck" flavors.
    - Flavors of sewer drain, skunk or fresh coffee notes may occur in a matter of seconds.
    - Store craft beer away from sunlight and fluorescent lights. Keep bottles in case boxes or a dark room.
    - Lights inside keg boxes can also cause skunking. Consider turning them off or getting a fluorescent lightbulb filter.

Craft beer should generally be stored upright to allow the yeast to settle to the bottom. Even corked bottles of beer are commonly stored upright.

When aging a keg, it can be instructive to simultaneously age several bottles of the same beer for tasting at various points in the aging process. Kegs age differently than bottles and can develop slightly different flavor profiles compared to their smaller friends.

Age at your own risk
While a select few beer styles possess characteristics conducive to aging, the vast majority of beer is meant to be enjoyed as fresh as possible. Any establishment that chooses to offer vintage beers takes on full responsibility for beer that is cellared and served past its normal age range. Do not blame the brewer if a beer is not pleasing when served past its date code or recommended shelf life.

Creating a vertical tasting

Once you have begun cellaring and aging your craft beer, a great marketing and tasting tool is a vertical tasting. If the craft beer you are aging is made regularly or yearly, tasting multiple vintages at once is a way for guests to explore the flavor profiles of the craft beer as it changes over time.

A vertical tasting does not need to be in chronological order. If multiple vintages of a single beer are available, taste each one and consider which years are most suitable to pair next to each other before you set the final order. You may find that one or two need to age longer or should have been served earlier. A vertical tasting requires a minimum of two vintages and should not exceed six vintages in one sitting. Plan to serve two to three ounces per person when tasting.

SECTION 4: DESIGNING A BEER DINNER

All of the concepts outlined in this course converge when planning a beer dinner. This section describes the four main types of beer dinners, provides tools for menu planning, and offers tips to help you set your guests up for the most successful pairing experience possible.

Multi-course paired beer dinners are taking their rightful place in the culinary world. As you drive the guests' palates through multiple courses, you have an opportunity to try a few pairings that break the mold. By starting off with clean, recognizable pairings you can work up to more complex and challenging combinations. The beer dinner is all about the journey, so make sure the pairing experience takes the palate in more than one direction.

Beer and food events take many forms. Here are four main types of craft beer dinners:

1. **Tasting menu:** A three- to five-course dinner with a specific craft beer paired to each dish. When creating the menu, either the dish is decided first and a craft beer is paired to it, or a craft beer is chosen first and the chef creates a dish for that beer. This is the most common tasting menu format for establishments featuring daily tasting menus.

2. **Featured brewery:** A multi-course beer dinner with brewers present to talk to diners about each craft beer. Typical dinners will have three to seven courses, each paired with a craft beer from the featured brewery. These types of dinners are also common at brewpubs and breweries that run their own restaurants.

3. **Regional craft beer dinners:** A multi-course beer dinner focusing on a specific region of the world. While the craft beers will be from that specific region, the menu may still be true to the style of the chef. A typical menu will include three to five craft beers. Common themes group beers by hop style, region, or country of origin, such as Pacific Northwest, East Coast, West Coast, Belgian, German and more.

4. **Collaboration dinners:** These beer dinners feature two or more brewers each contributing beers for pairing. The beers can be similar in style and feature different flavor profiles, or they can contrast and challenge the palate along the way. Collaboration dinners can feature multiple beers poured in smaller quantities, often with two beers paired to the same course. These dinners may also feature unique collaboration beers created by multiple brewers.

Palate quenching vs palate fatigue

When your guests first show up, it is common to whet their appetites with a four- to six-ounce serving of a "welcome beer." This beer helps set the tone for the dinner and creates a buffer of time before serving the first course and paired beer. From there, three to four ounces per sample is commonly served with each course.

Beer dinners should not be evenings of gluttony. Think carefully about the serving portions of your food and the serving size of each beer. You want your guests leaving inspired and refreshed, not tired and overwhelmed.

Often dinners extend past the 10 beer mark, but by then the palate has usually hit its limit. Guests suffering from "palate fatigue" may not be able to fully appreciate the rest of your menu. Beer dinners should be evenings of indulgence, but not over-indulgence—and certainly never gluttony!

Menu planning

For menus that are built around the craft beers you plan to serve, you'll need to begin by organizing a test tasting. If you cannot get the beer in advance and do a test tasting it can lessen your chance for constructing a successful pairing menu.

One approach for a test tasting is to gather up to three palates to taste the selected craft beers. Prepare a list of culinary ingredients available and in season, and gather tasting notes for your chosen beers—these may be found via the Internet (do a brand search for each beer), via the distributor, or via the brewery website itself. Use the CraftBeer.com Brewery Locator (CraftBeer.com/Brewery-Finder) to find the websites of all breweries in the U.S. It is helpful to document the beer's ABV, style, IBU and any special ingredients.

Upon receiving samples of your beers, remember to store them cold in the refrigerator. This will keep them freshest the longest. Taste the beers at the temperature at which they will be served during the dinner.

Tasting order should be based on the intensity of the beers. Start with the beer with the lowest ABV and work your way up to the highest. This may not be the final order for the menu, but since this tasting does not include food it is important not to overwhelm the palate with aggressive flavors before tasting delicate ones.

As you taste the selected beers, write down first thoughts that come to mind. Final dishes may not be obvious right away, but key words and phrases that relate to ingredients and sensations will ultimately drive the final menu. A Menu Development and Tasting Form can be found on page 66.

Once all of the beers have been tasted, use your tasting notes to arrange them in the order they might be served for the final menu. This is when the menu starts to be driven by the paired dishes. You can tailor the ingredients and preparations of your dishes to coax out the different characteristics of the beers you plan to pair with.

One successful approach is to compile the menu in order of the intensity of the pairings and the strength of flavors that will combine on the palate. Most dinners will follow the classic flow of a tasting menu, beginning with smaller dishes, leading into the main course and ending with a dessert.

Traditional set for four-course paired menu.

Table Setting Tips

The number of utensils on the table depends on the number of courses to be served, and the order in which they are placed is determined by the order in which the food is served. Never pre-set more than three courses of glassware and/or flatware. The only exception can be with the dessert flatware. When dessert is a predetermined course in the menu, the flatware can be placed at the top of the place setting. If more utensils are needed than can be pre-set they should be brought during service just before that course is served. The same applies if more glassware is needed.

The dinner fork is always placed to the left of the napkin, the knife and spoon to the right. The distance between the dinner fork and the knife should be wide enough to fit a dinner plate between them. The glassware is placed about one half-inch above the tip of the knife. Each additional glass is set to the left of the first glass and moves at a slight angle up the table.

TAILOR THE INGREDIENTS AND PREPARATIONS OF YOUR DISHES TO COAX OUT THE DIFFERENT CHARACTERISTICS OF THE BEER.

Common four-course tasting menu

Welcome beer (4-6 ounces)

First course: A light appetizer, chilled seafood, charcuterie, or composed salad paired with a clean, one-note craft beer.

Second course: A small course of pasta, shellfish, seafood or light meat, paired with a slightly more complex craft beer. Malt, notes of roast, and hops can become stronger but the finish should remain clean.

Main course: Craft beer is paired to the main ingredient in the dish, with additional flavors in the dish supporting the pairing and adding complexity.

Fourth course: A pastry course, often paired with darker and/or sour craft beers. However, if a "home run" pairing is identified in the tasting, a lighter beer can finish the menu and refresh the palate.

Additional courses can be added, and often a cheese course or intermezzo pairing can bring the menu up to six or seven courses. Remember to pay careful attention to the overall wear and tear of the palate. Do not add courses gratuitously. A general guideline is to not exceed six to eight craft beers.

Presenting the beer dinner

Be ready to describe the different interactions you perceive with each pairing so others can relate your description to their own experience. Prior to serving, talk with your staff and guests about the final theme of the menu and how it was developed. If you are presenting a challenging pairing, talk the guests through it so they understand where the concept came from and what to look for as they taste the pairing. Be open to feedback! Every palate will taste something different and many guests may find new interactions in each course.

Cooking with craft beer

There are differing opinions about cooking with craft beer. While paired beers can be considered ingredients in a beer dinner, it is important to think about the overall intensity of the menu before deciding to cook with beer as well. Many chefs will use craft beer in every course and may even cook with multiple beers in some courses.

Ask yourself, "Does the addition of craft beer to this recipe make the pairing better?" If cooking with beer will elevate the pairing, the answer is yes. If adding beer to the recipe clouds the palate or adds confusing notes to the pairing, it is best to let the dish stand on its own next to the paired beer.

For bitter-forward beers, avoid heating beyond pasteurization temperatures so as not to further concentrate the bitterness of the liquid. Consider adding beer at the end of the recipe, when there is less heat to influence the flavor. This also allows the volatile component of the craft beer to remain.

Tell your guests: When cooking with fermented beverages, some alcohol can remain in the final dish. So when you cook with beer, be sure to disclose that you've used the glorious beverage as an ingredient. Research shows anywhere from a small amount (5 percent) to a large amount (more than 50 percent) of the original alcohol can remain in the dish, depending on cooking method, temperature, time, amount added and other factors.

Glassware

No tasting menu is complete without the proper glassware. Refer back to your tasting notes; the flavor profiles you noted as key to the pairing will determine glassware selection. The most common glass for a beer pairing dinner is a Belgian-Style tulip or curved snifter glass. However, for specific CraftBeer.com recommended glassware, download Beer Glassware Chart: (CraftBeer.com/Glassware).

Tasting Menu of a Four Course Paired Meal

to begin
peached shrimp
confit pheasant
malheur brut, br, malheur, buggenhout, belgium

first
raviolo of winter squash, lacinato kale, farm egg, pumpkin brodo

tank 7, boulevard, kansas city, mo

second
duck breast, rooftop honey glaze, duck fat & arborio rice timbalo, winter chard

gift of the magi, lost abbey, san marcos, ca

to rest
black truffle sformato
2008 smoked porter, alaskan, juneau, ak

third
espresso cremem brulee, vanilla tuile, smoked butter caramel
yeti, great divide brewing company, denver, co

Sample Menu of Six Course Beer Dinner Featuring A Single Brewery

If this menu is difficult to read consider downloading the high resolution version of the CraftBeer.com Beer & Food Course at CraftBeer.com/Culinary

BREWMASTER'S BANQUET

James Beard House | December 15th, 2012

RECEPTION

Beet pickled deviled farm egg, Hop-Pickle relish, spicy greens

Grilled oysters, smoked and candied pork belly, gremolata

Truffled boudin blanc, brioche, mustard

paired with

Cucumber Jinlet

Dogfish Head's signature Jin – distilled with juniper berries, black peppercorns and Cascade hops – is served with lime juice, sugar and a slice of fresh cucumber in this refreshingly off-centered take on a gimlet.

Italian Job

A European twist on a mojito, the Italian Job features Dogfish Head's Brown Honey Rum, Blue Hen Vodka, lemon juice and a syrup made with oregano, thyme, rosemary and basil.

DINNER

FIRST

Liberty farms duck terrine, rye crusted duck confit croquette, poached apple, tarragon

paired with

Beard de Garde

Loosely based on the French Biere de Garde style, this malty farmhouse ale was brewed with a few of James Beard's favorite ingredients: Rambo apples, rye and fresh green peppercorn.

SECOND

Seared scallop, arugula and ricotta agnolotti, piquillo pepper, kumquat

paired with

Namaste

Made with dried organic orange slices, fresh-cut lemongrass and a bit of coriander, this Belgian-style white beer is a perfect complement to the subtle sweetness of shellfish.

THIRD

Spinach wrapped monkfish, dungeness crab, bone marrow risotto

paired with

Noble Rot

Don't let the name – or the botrytis-infected Viognier – fool you. This ambitious blend of beer and wine is part sweet, part sour and all beauty.

FOURTH

Dry aged bison strip loin, salsify, gigante beans, artichoke barigoule

paired with

Bitches Brew

This complex, earthy blend of stout and mead – brewed to celebrate the 40th anniversary of the groundbreaking Miles Davis album – has the backbone to run alongside the richest of red meats.

FIFTH

Hazelnut cocoa nib mille feuille, ricotta mousse, salted caramel ice cream

paired with

World Wide Stout

More in line with a fine port than a beer, this dark, rich and roasty stout is the pitch-perfect swan song to an elegant meal.

Sample Menu of a Collaboration Beer Dinner

This is an example of a collaborative dinner between Sierra Nevada Brewing Co. and Boulevard Brewing Co. The dinner celebrated a collaboration beer brewed by both breweries (served with the first course) and two additional beers from each brewery.

duck confit, rye bread salad, apricot marmalade
terra incognita, boulevard & sierra nevada collaboration

halibut crudo, english pea puree, marinated fava beans, grapefruit
tank 7, boulevard brewing company, kansas city, mo

tagliallini pasta, charred octopus, brocolli di ciccio, 18 month aged ham
ovila saision with mandarin & peppercorn, sierra nevada, chico, ca

fried sweetbreads, cauliflower, bing cherries, red verjus
love child #3, boulevard brewing company, kansas city, mo

buttermilk sorbet, coconut & ricotta macaroons, macadamia nut brittle
hoptimum, sierra nevada brewing company, chico, ca

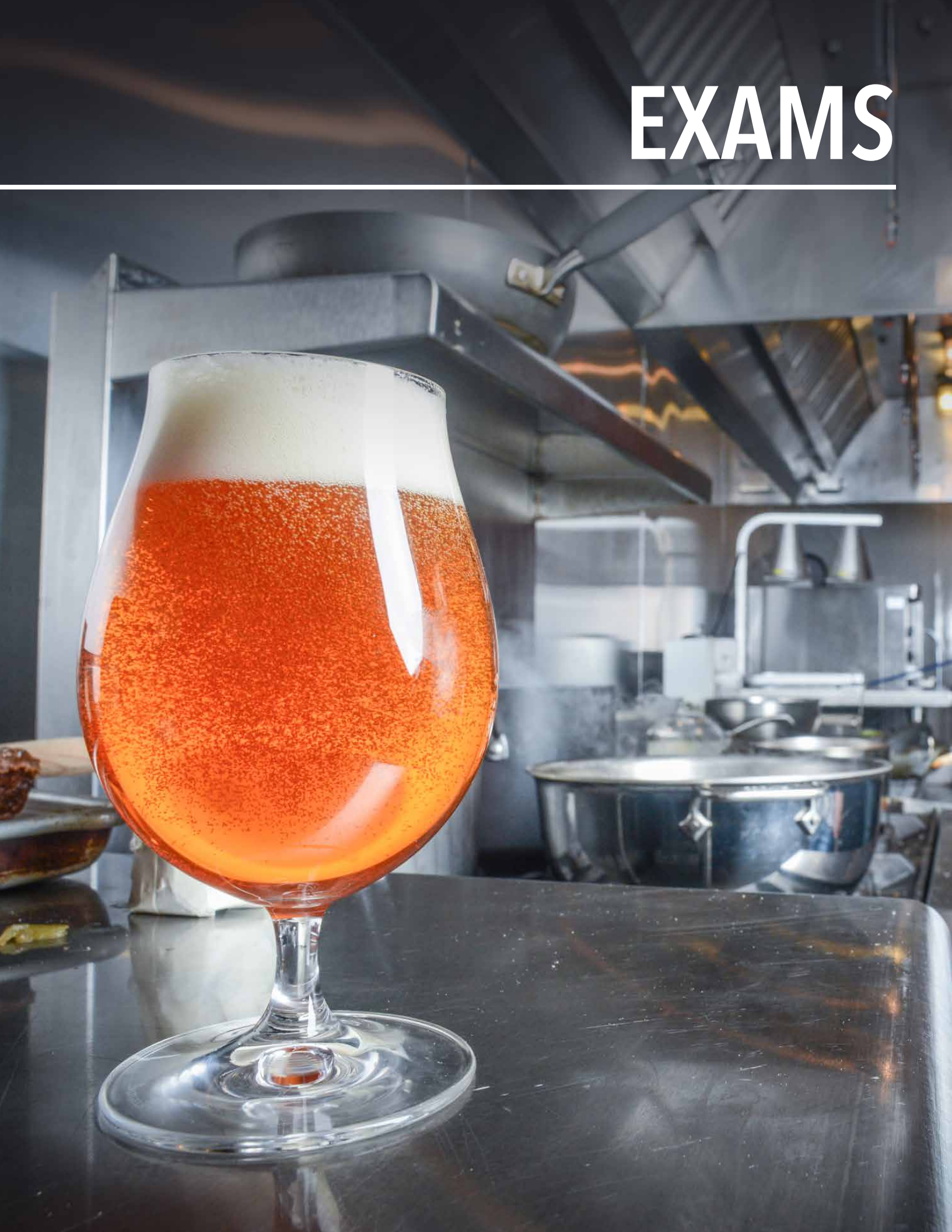
CRAFTBEER.COM

Menu Development and Tasting Form

Brewery:	Beer:
List tasting notes related to the profile of ingredients in the beer (hops, malt, alcohol, carbonation, etc.).	
1	
2	
3	
4	
5	
List culinary flavor profiles (focus on ingredients or flavors that will best highlight components in the beer).	
1	
2	
3	
4	
5	
List additional comments (thoughts, memories, anything the flavor profile of the beer brings up).	
1	
2	
3	
4	
5	

Download at (CraftBeer.com/Menu)

EXAMS



CRAFTBEER.COM BEER & FOOD COURSE EXAM REQUEST

To apply for access to the *CraftBeer.com Beer & Food Course* Exam, you must meet certain criteria:

- You are an accredited educator from a recognized culinary institution, beverage and hospitality program or brewing school within an existing college or institution.

OR

- You are a beer educator teaching the full course and are a current Brewers Association member (brewery, wholesaler, retailer, allied trade, individual or AHA member).
- To receive the exam, we also request you provide your scheduled date for both instructing the course and conducting the exam.

This information will remain confidential, and will only be used for communication with you and for tracking course participation.

To request the CraftBeer.com Beer and Food Course Exam, visit bit.ly/BF_Exam.

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About CraftBeer.com

CraftBeer.com, published by the Brewers Association, was created to communicate the passion, authenticity, excitement, creativity, camaraderie and joy of the craft brewing community. When visiting CraftBeer.com, you can expect to learn about all aspects of the amazing beer being produced by America's small and independent breweries. You'll learn how to further enjoy the beverage in your glass, and about the individuals and processes behind your beer. Plain and simple: CraftBeer.com celebrates the best of American beer.

About the Brewers Association (BA)

The Brewers Association is the national not-for-profit trade group representing the majority of U.S. breweries. The BA organizes events including the World Beer Cup®, Great American Beer Festival®, Craft Brewers Conference & BrewExpo America®, SAVOR: An American Craft Beer & Food Experience and American Craft Beer Week®. Beer lovers are invited to learn more about homebrewing via the BA's American Homebrewers Association®.

RESOURCES & ENDNOTES

CraftBeer.com Beer & Food Course Resources

Flavor Components in Beer: CraftBeer.com/Components

Temperature Tips for Retailers: CraftBeer.com/Temperature

Brewers Association Draught Beer Quality Manual: DraughtQuality.org

Beer Glassware Features: CraftBeer.com/Glassware

Beer Tasting Mat: CraftBeer.com/TastingMat

Beer Tasting Form: CraftBeer.com/TastingForm

What's Wrong with My Beer? CraftBeer.com/WhatsWrong

Craft Beer Flavor Triangle: CraftBeer.com/Triangle

Craft Beer & Cheese Interactions: CraftBeer.com/Cheese

Interactive Tasting Forms: CraftBeer.com/Interactive

Operators Guide to Receiving Craft Beer: CraftBeer.com/Receiving

Barrel Aging Considerations for Retailers: CraftBeer.com/Aging

Menu Development and Tasting Form: CraftBeer.com/Menu

CraftBeer.com Beer & Food Pairing Chart: CraftBeer.com/Pairing-Chart

Brewers Association Resources

Find a U.S. Brewery: CraftBeer.com/Brewery-Finder

The most extensive brewery database on the Internet.

CraftBeer.com Recipe Database: CraftBeer.com/Recipes

The most extensive cooking with craft beer recipe database on the Internet

Beer Schools: CraftBeer.com/Beer-Schools

Database of online classes and schools for beer and brewing education.

U.S. Beer Statistics and Data: BrewersAssociation.org/statistics/National

Books on Beer and Brewing: BrewersAssociation.org/Store

Endnotes

Palmer, John. 2006. *How to Brew: Everything You Need to Know to Brew Beer Right the First Time*, 3rd ed., Boulder, CO: Brewers Publications.

Mosher, Randy. 2004. *Radical Brewing: Recipes, Tales, and World-Altering Meditations in a Glass.* Boulder, CO: Brewers Publications.