



How to Make Great Tasting Coffee

Explore, Learn & Experiment

Course Approach

- Share
- Explore
- Lecture
- Lab

Course Outline

- About Black Point Coffee
- Bean Origins and Flavor Profiles
- Fundamentals of Roasting
- Roasting Flavor Profiles
- Factors that impact coffee freshness
- Tasting Coffee
 - Flavor Wheel
- Coffee Preparation
 - Golden Standard ratios
 - Water
 - Grind
 - Brewing Methods



About Black Point Coffee

Black Point Coffee is a specialty coffee roaster located on Black Point Road in Scarborough Maine.

Our mission is to seek out great coffee growers and share their beans with our customers



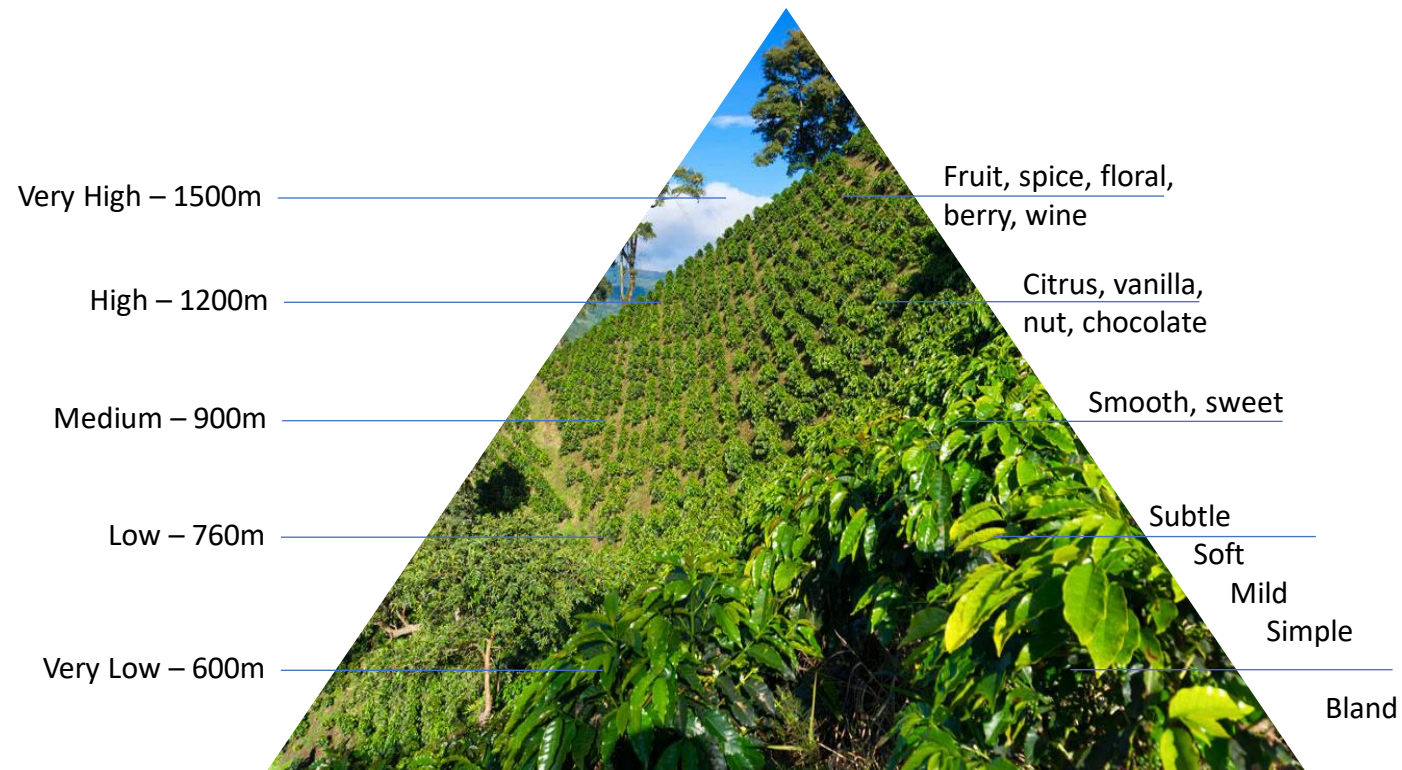
Bean Origins Typical Flavor Profiles

- Arabica beans:
 - Account for 70% of worldwide coffee bean production
 - Long and thin, cooler temperature, more susceptible to disease
 - Greater acidity content that creates a sweet, sugary, and sometimes fruit-like taste
 - Considered a delicacy and cost more to source.
- Robusta beans:
 - Round, much more heat and disease resistant
 - Strong bitter flavor with hints of grains or nuts
 - Not typically sold in US, except for espresso blends
- Elevation
 - The higher the elevation, the more complex the flavor
 - Elevated growing conditions slow the beans' maturation process
 - Hard coffee bean with concentrated flavors
 - Nuttier, hints of chocolate or fruit
 - Lower elevation = low-acid beans, dull, earthy flavors



Effect of Altitude on Flavor

- Correlation between altitude and growing temperature
- Lower temp beans ripen more gradually, more time to develop complex flavors
- Harder, denser beans more consistent roast than low density beans (air pockets)
- Fewer pests & disease



- Ethiopia, Colombia, Kenya, Papua New Guinea, Guatemala

- Costa Rica, Columbia, Sumatra, Nicaragua, Mexico

- Brazil

- Hawaiian Kona

<https://scribblerscoffee.com/blogs/news/the-effect-of-altitude-on-coffee-flavor>

Anatomy of a Coffee Bean



OUTER SKIN

The outer layer on the cherry is taut and thin

GREEN BEAN

Each coffee cherry has two beans inside

PULP

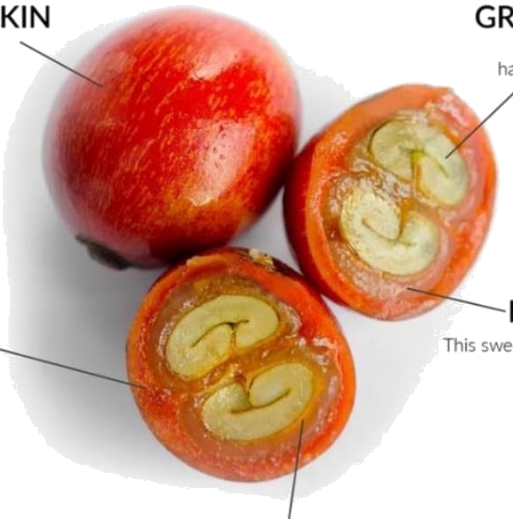
The fruit is mostly water and sugar

MUCILAGE

This sweet sticky substance coats the bean

PARCHMENT

This thin layer is similar to the paper on a peanut



<https://beannbeancoffee.com/blogs/beansider/coffee-processing-methods>

Bean Harvesting Process and Flavor Profiles



WET

SEMI-WASHED

DRY



Washed / Wet

Lots of water used,
all outer layers
removed.

- Strawberry, blueberry and chocolate

Demucilaged

Little water used,
skin and pulp
mechanically removed.

- Flatter flavor

Honey Process

Little water used,
skin removed.
Mucilage/pulp remains.

- Heavier body and sweetness

Natural / Dry Process

No water used,
no outer layers removed
“dried in the fruit”.

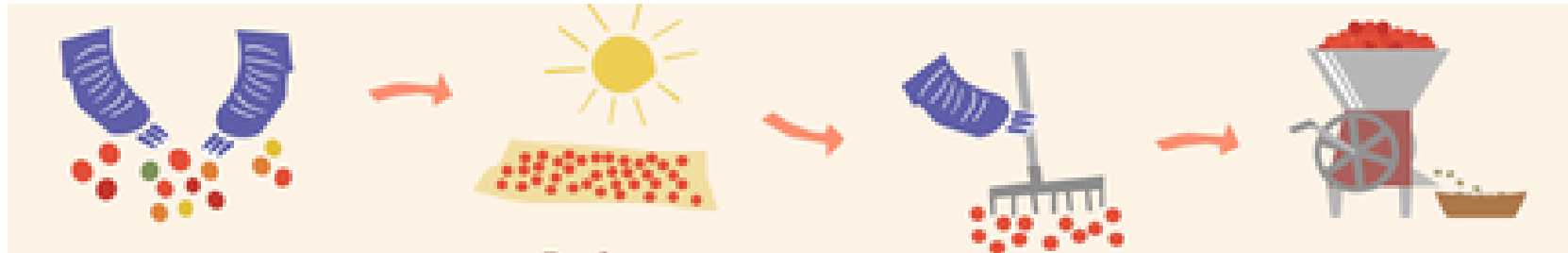
- Fruiter, concentrated

<https://bigislandcoffeeroasters.com/blogs/blog/what-is-a-honey-processed-coffee>

What does Coffee Processing Mean?



Natural Process Coffee cherries dry with seed in the skin, then de-pulped. Results in juicy and syrupy coffee



Sort

Dry

Ferment

De-pulp



Washed Process Coffee seeds removed from cherry, mucilage washed off then dried. Results in clean and crisp tasting coffee



Sort

De-pulp

Wash

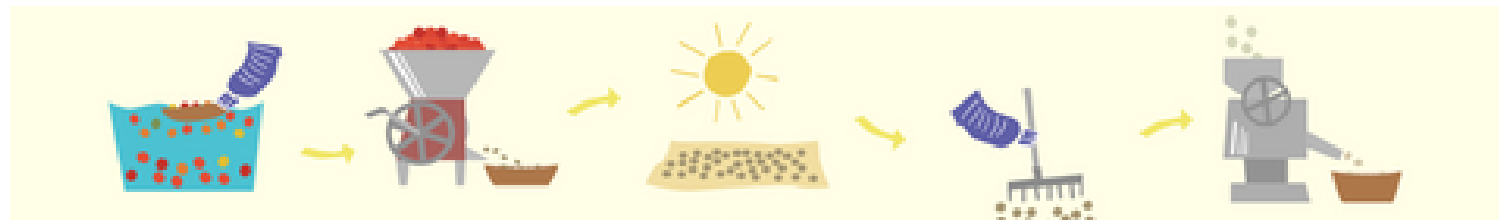
Dry



What does Coffee Processing Mean?



Honey Process Coffee cherries dry with mucilage intact. Results in juicy, syrupy coffee with pronounced acidity (Costa Rica)



Sort

De-pulp

Dry

Ferment

Hulling



Anerobic



- Fermentation is used in most coffee processes to separate the fruit material around the seed.
- Anerobic (oxygen restricted) fermentation slows down the process. Fruit (pineapple, cinnamon or bananas) are added and interesting flavors to develop.

Single Origin vs Multiple Origin (Blends)



Single Origin

- Single region, typically a single farm
- Offer a flavor-forward taste that tells a story of the bean's production and growing region
- Bean taste and availability vary, depending on the season and changing growing conditions
 - Soil nutrients, sunlight exposure, and moisture level
 - No two brews of a single-origin coffee taste the same

Multiple Origin (Blends)

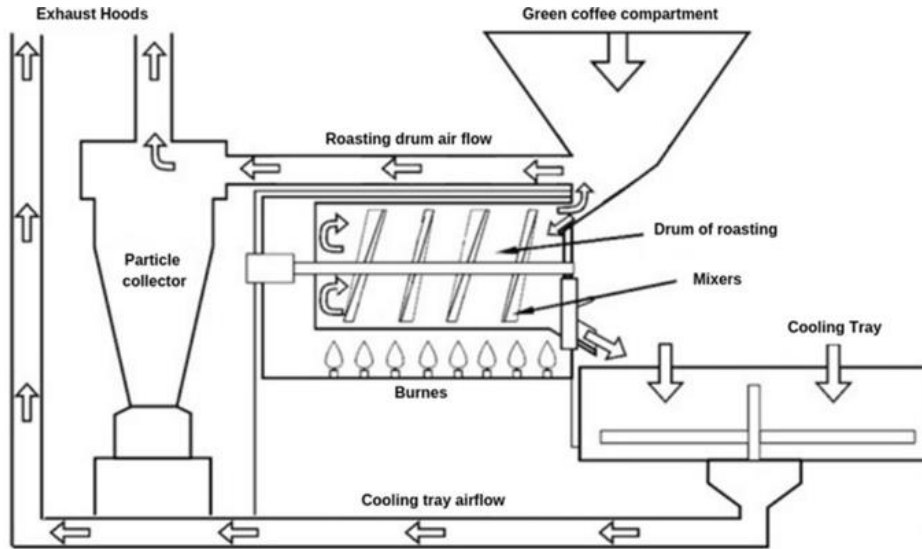
- Combine the best flavors from different bean-producing regions
- Unique and consistent flavor
- Best of each region highlighted in the brew.
- Beans from different farms and regions
- Tailored to contain flavors that complement each other in new ways.
- Easier to reproduce year-round

Bean Origins Typical Flavor Profiles

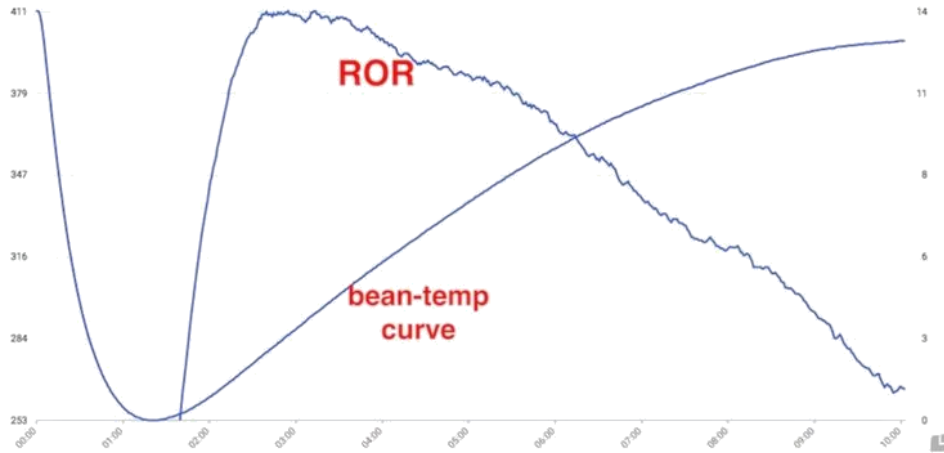


Origin	Flavor Profile
Mexico	Green grapes, chocolate, citrus
Guatemala	Chocolate, apple, cherry, higher elevation, volcanic soil
Honduras	Honey, almond, chocolate, multiple elevations
Nicaragua	Nutty, apple and pear
Brazil	Nutty and chocolate, drying method concentrates flavor
Colombia	Grapefruit, Oak and Brazil nut, full bodied
Peru	Chocolate, honey and black tea, aromatic
Ethiopia	Strawberry, blueberry and chocolate, washed process
Rwanda	Cherries, raspberries, caramel, chocolate
Burundi	Bright acidity, citrus, wild notes
Kenya	Bright, floral, lemon, pepper, blackberry, wine
Papua New Guinea	Cedar, bell pepper, lemony
Sumatra	Spicy, woody, earthy

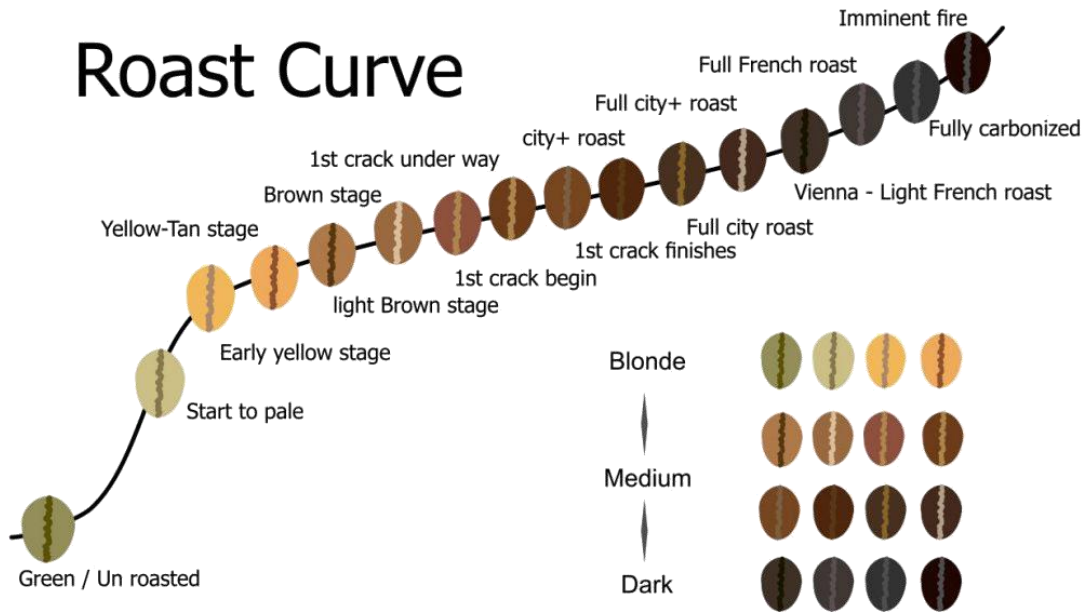
Coffee Roasting



Coffee Roasting



Roast Curve



Stages of Coffee Roasting



Raw Coffee
is loaded into the coffee roaster



Drying
The coffee starts to dry



Yellowing/Maillard
Coffee begins to change colour



Browning
The bean colour will deepen



First Crack
Gasses burst out creating a crack



Development
Coffee is crafted using variables



Second Crack
Oils migrate creating a crack



Drying



Yellowing



First crack



Development



Second crack



Dark roast



Roasting Profiles



LIGHT ROAST

Milder-tasting coffee with low acid, slightly more caffeinated than darker roasts.



MEDIUM ROAST

A balance between retaining the bean's original flavor and adapting some of the roast flavors.



MEDIUM-DARK ROAST

The brew is richer than medium roast but not quite as bold and deep as a dark roast.



DARK ROAST

Makes exceptional espresso, thanks to its bold, deep, and smooth flavor with minimal acid.



Nordic

- Very light
- Favors cup clarity above all else
- No “roast” flavors
- Sacrifice sweetness, body, and juiciness
- Perception of underdeveloped (grass, vegetable broth)

Maximum Juiciness

- Balance of acidity and sweetness
- Sacrifice clarity and body

Fully Developed

- Focus on sweetness and juiciness
- Sacrifice acidity and clarity
- May stray into “roasty” territory
- Suppress acidity too much and the coffee tastes dull
- Examples: Blue Bottle, Onyx

Coffee Bag Label Information



Country
Region
Farm
Altitude
Roast Date
Bean Type

Processing
Bean Varietals
Flavor Profile
Roast Level
Weight

Whole, ground beans, grind type

Valve



Factors that Impact Coffee Freshness

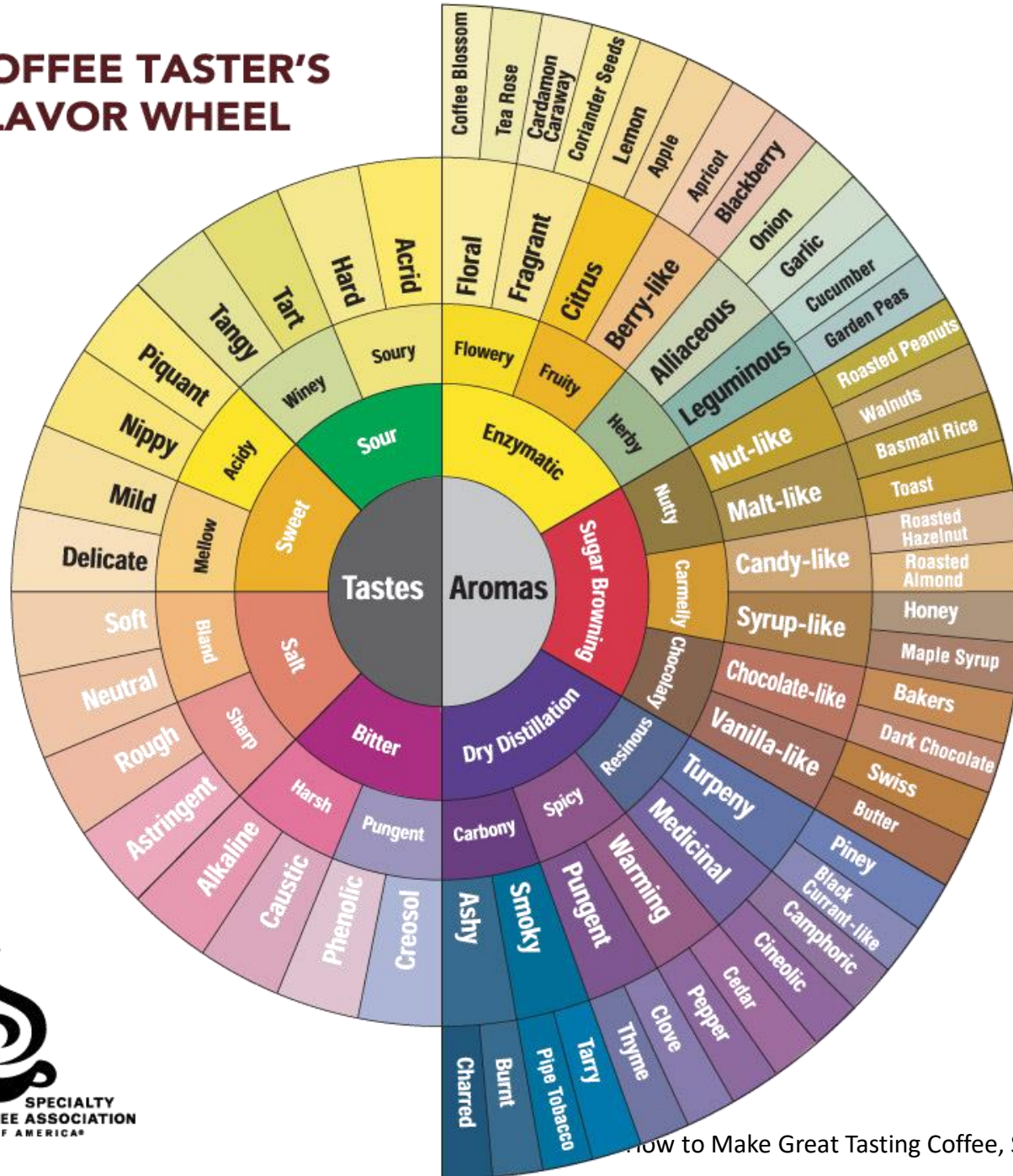


- Freshness of the coffee beans
 - Use 7-21 days after roast date
- Freshness of the grind
 - One hour before going stale
- Coffee Grind Size
 - Too coarse = weak, acidic
 - Too fine = overly bitter
- Water Quality
- Cleanliness of your coffee machine



- Storing Coffee
 - Exposure to Oxygen
 - Air-tight, cool, dark
 - Light, moisture and heat
 - One-way valves
 - Gas-flushed bags
 - Do not store in fridge or freezer
 - Coffee absorbs odors

COFFEE TASTER'S FLAVOR WHEEL



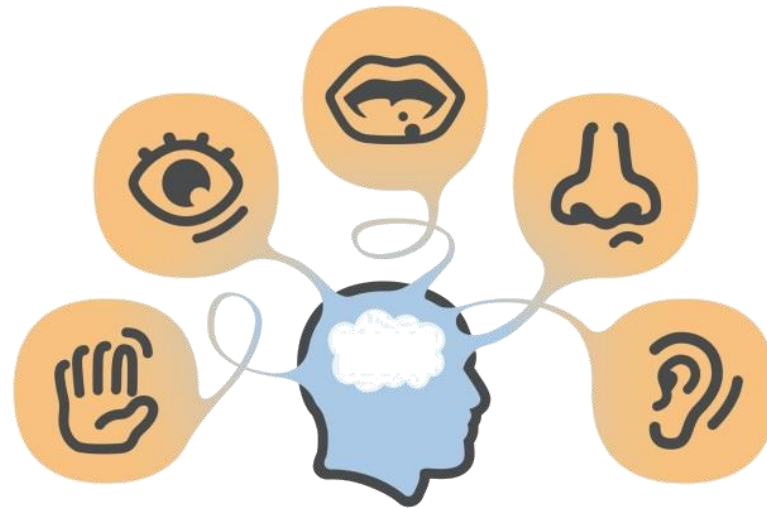
- Start at the Center and work outward
- Smell the coffee and work to the right
- Taste coffee and work to the left
- Work your way out to a specific attribute
- Look at the neighboring attributes
- If they are connected, they are related
- Move back to center and repeat the process



Tasting Coffee Quiz



- What taste typically dominates under-developed coffee?
 - **Sour**, sweet, bitter, umami?
- What taste do we expect from over-developed coffee?
 - Sour, sweet, **bitter**, umami?
- Which of the following could be used as a description of “aroma”?
 - **Chocolate**, washed, rich, heavy
- Which of the following could be used as a description of flavor (flavor wheel)
 - Washed, thick, thin, **Citrus fruit**
- Which of the following is NOT a description of body?
 - **Floral**, creamy, heavy, thick





Coffee Preparation

Channeling

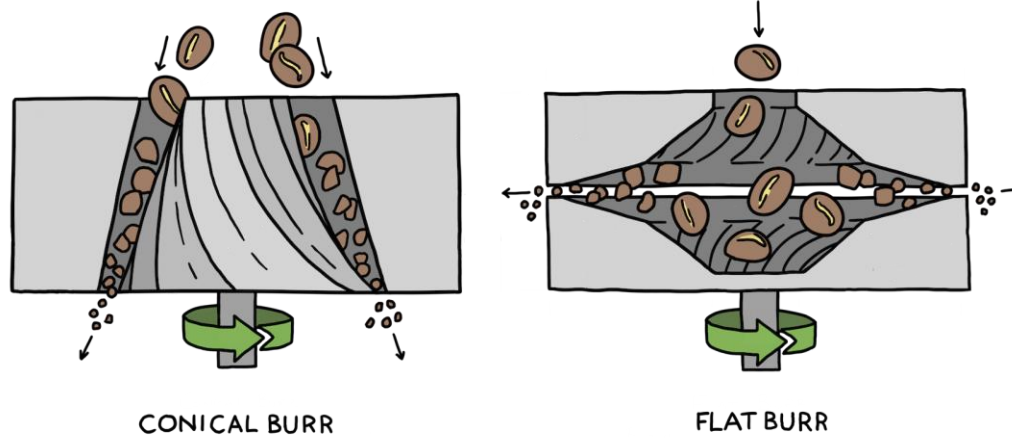


Automatic Drip



Pour-Over

Grinder



Conical Burr Grinder



Both produce great tasting drip coffee

- Flat burrs slightly more consistent and spin faster but generate more heat, make more noise and more expensive
- Conical burrs are quieter, cheaper, produce less waste and heat and used in portable hand grinders
- Espresso grinders require more precision “dialing in” and control due to pressure and slight variations between extraction time for different beans and roasts to achieve desired flavor profile

Do not use Blade Grinders: produce uneven grind size

Golden Cup Standard (SCA)



Coffee-to-Water Ratio:

- 55 g/L \pm 10%, or...
- 1:18
 - 1 gram of coffee to every 18 grams of water
 - 1:15 ratio for stronger coffee (less dilution)
- 2 Tbs. : 6 oz Water
- 11 grams: 200 grams water

Water temperature (at the point of contact with coffee)

- 200°F \pm 5° (195-205)



IMMERSION VS PERCOLATION

Water mixes with coffee grounds, coffee solids dissolve in the water and move from the grounds to the surrounding slurry by diffusion.

IMMERSION BREWING (FRENCH PRESS)

During immersion brewing, upon water contacting the grounds, the concentration of coffee solids in the slurry increases rapidly, and then continues to increase at a progressively slower rate, asymptotically, for the rest of the brew. An example of this is how the color of coffee in a French press hardly looks much darker from a few seconds into the brew until a few minutes later. Another example is how in cupping, brew strength doesn't change much in the time window of 9:00--20:00 in which you likely slurp and spit.

Brew and serve a French press, and you'll notice that the strength of the coffee left behind in the grounds (the "interstitial liquid") is nearly identical to the strength of the coffee in the cup. If you were to squeeze the grounds at the bottom of a French press after decanting, the strength of the liquid that oozes out would be approximately the strength of the liquid in the coffee served, or perhaps slightly stronger.

PERCOLATION BREWING (POUR OVER)

Percolation refers to brews in which liquid extracts coffee solids by passing through the bed of grounds. In a percolation method, during most of the brewing cycle, fresh, clean water is added to the slurry while solids-packed liquid leaves the slurry. That causes the slurry's solids concentration to decrease throughout the brew. So, while the strength of the slurry of a French press is always getting stronger, the strength of a slurry during percolation is always getting weaker. This is important and is the primary reason percolation is a more efficient extraction method than immersion.

- Percolation (drip) is more efficient than immersion at extraction
- During percolation, strong coffee is being removed from the slurry while fresh, clean water (good solvent) is being added, for most of the process.
- The concentration gradient in the slurry is much higher for most of a drip brew vs. an immersion.
- The main driver of percolation's superior extraction ability is the higher concentration gradient during much of the brewing process.

Water

The taste of a coffee is much influenced by the type of water you use. Water is a strong solvent. Therefore, something is always dissolved in it. You don't just have pure H₂O, some molecules makes a big difference to the taste, others play a minor role. But it depends on levels. Like Calcium: some is good – but too much or too little is bad.

Tap Water

The entire state of Maine, experiences relatively soft water with a state average of 12 PPM. Because of this, most residential homes do not experience scale related issues. Portland Maine, the most populous city in the state has a water hardness level of 10 PPM which is considered very soft.

Filtered Water

There are many types of filters, and certain types of filter don't give the same results. The filter only adjust; so the outgoing water depends on the composition of the ingoing water. When you heat up the water, it also changes.

Water directly from the tap or a filter system will contain more bicarbonate (the buffer) than when stored. When the waters sits for a while (like when kept in a bottle) the CO₂ will slowly leave the water.

Water changes when heated.

When boiling the water, CO₂ is driven out. The longer time the water is a boiling point, the more CO₂ is getting out – and the less buffer is left.

Try comparing the same coffee made on:

- 1) water poured right when it reached boiling point versus
 - 2) water kept for 5 minutes at boiling point before pouring
- You will likely find the first was the best, while the water kept for 5 minutes at boiling point made the coffee boring and lifeless.

Make Taste Comparisons

Best way to get the feeling of how the water impacts the taste, is to brew the same coffee with different kinds of water:

Tap water – on its own and with a little citric acid added.

Bottled water – different kinds has different specifications

Filter jug – you can get them with the classic filter (Calcium swapped with Sodium) or the newer who adds Magnesium.

Filter installation – You can ask at a coffee bar if you may fill a container with from their filter. Maybe you can find a cafe that has re-mineralized RO water

To truly compare different waters, it's best to brew it all at once in a cupping. For this you need equipment to heat up the different waters at the same time.

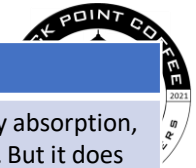
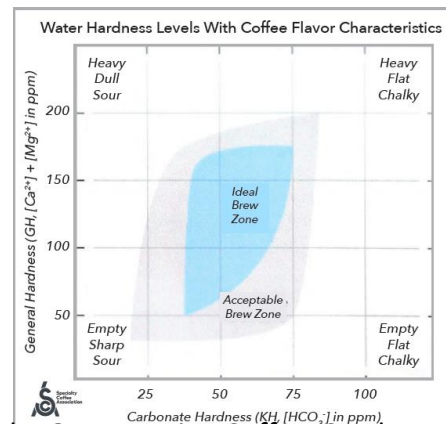
SCA Standards for Minerals

Total Hardness: 50-175 ppm

pH: 7

Hardness Range	Description
0-75	Soft
75-150	Moderately Hard
150-300	Hard
More than 300	Very Hard

City	Water Hardness	pH
Portland	10 PPM	6.7
Lewiston	17 PPM	
Bangor	6 PPM	
Auburn	17 PPM	
Saco	9 PPM	
Augusta	11 PPM	
Poland Spring	40 PPM	7
Crystal Geyser Spring Water	50 PPM (?)	5
New England	14 PPM average	



Water Filters	Description
Activated carbon filter	Captures large molecules by absorption, like chloride and pesticides. But it does not remove Sodium ions, Nitrate, Iron and strong acids. Typically used in combination with Ion exchange filter (Brita Standard Water filter has both)
Ion exchange	Traditionally Calcium ions in the water have been exchanged with Sodium ions, but it can be other ions as well. Captures copper and Zinc, leaves healthy minerals. Note: if you have high Calcium in the ingoing water, you will get high Sodium (=salty taste) in the outgoing water.
Reverse osmosis (RO)	RO is a membrane that holds back a lot of the molecules. The point is to get pure H ₂ O on the other side, but in practice you will get 1-2% of the ingoing water composition in the outgoing. Expensive and takes longer to produce. The pure RO water does not taste good in coffee brewing. Minerals are added back in*. The big advantage is that here you got much more control of the composition.
*Mineral Supplements	Mineral Supplements (like Third Wave Water) are added to distilled or RO water. \$17 pack makes 12 gallons of corrected water. Supplements can be tuned to achieve very specific water profiles.

Water Lab



Identify water from these sources:

- Tap Water, Portland Maine (Sebago Lake)
- Poland Spring
- Summit Spring Water
- Distilled Water
- Distilled Water with Mineral Supplement

Mineral Supplements

- Water with a specific mineral content brings out the most-rounded flavor.
- Water is the catalyst that extracts coffee's flavor
- Coffee grinds are porous. Each pore has different flavor compounds waiting for extraction.
- These compounds can only be broken down and brought into the coffee with certain minerals



COFFEE GRIND CHART



COARSE
(Chunky)



French Press

Cold Brew



MEDIUM-COARSE
(Less Chunky)



Pour Over



MEDIUM
(Sea salt)



Machine Drip

Siphon



FINE
(Table salt)



Moka Pot (Espresso)



EXTRA FINE
(Powdered sugar)



Turkish Coffee Pot

