WORLD COFFEE RESEARCH™

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SENSORY LEXICON

Unabridged Definition and References

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「コーヒー・レキシカン」はカンザス州立大学感応分析センターのエドガー・チェインバース四世博士のラボで開発、テキサスA&M大学のロンダ・ミラー・ラボにより検証されました。カップ・オブ・エクセレンス・プログラムの技術ディレクターであるポール・ソンガー氏は、コーヒー・サンプルの手配とワークショップの準備を行い、コーヒー業界アドバイザー・グループからのフィードバックを要請しました。ティム・オコナー氏とPacific Espresso社、La Marzocco社からはコーヒー抽出機器を寄付していただきました。

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INTRODUCTION

Coffee is one of the most chemically complex things we consume, with subtleties of aroma, texture, and flavor rivaled by almost no other food, and it can seem as if its flavors are infinite. But they are not.

Coffee, like anything else we eat or drink, tastes, smells, and feels the way it does because locked inside the coffee bean is a complex molecular and genetic code that determines what we experience. Every flavor, every aroma, every texture originates in a set of chemicals, which in turn are determined by the seed's genes, by how and where the coffee was grown, and by everything it has experienced since leaving the tree (processing, drying, milling, storage, transport, roasting, brewing and so on).

The goal of the World Coffee Research Sensory Lexicon is to use for the first time the tools and technologies of sensory science to understand and name coffee's primary sensory qualities, and to create a replicable way of measuring those qualities.

Just like a dictionary reflects broad, expert agreement about the words that make up a given language, the lexicon contains the tastes, aromas, and textures that exist in coffee as determined by sensory experts and coffee industry leaders.

Why We Need the World Coffee Research Sensory Lexicon

Creating the World Coffee Research Sensory Lexicon—a universal language of coffee's sensory qualities, and a tool for measuring them—is the necessary first step to understanding what causes coffee to taste, smell, and feel the way it does. What are the genes that make a coffee more or less bitter? What are the environmental factors that give a coffee an orange acidity instead of a lime one? Does anything happen to the flavor of a coffee when you use one kind of fertilizer in place of another? Or rain water instead of irrigation? What if you stop the fermentation process at a certain Ph level instead of after a certain amount of time? Or use a particular yeast strain? We know that storing green coffee in one kind of bag versus another can decrease woodiness, but by how much? The list of questions you can pose—and begin to answer—when you have a tool to quantify coffee's tastes and flavors is almost endless.

The lexicon was created by World Coffee Research to enable coffee scientists to conduct research that will make coffee better—starting with the seed itself. For example, in order to breed new varieties of coffee that are not only productive, disease resistant, and climate resilient, but also taste amazing, we need to understand which molecules in a coffee are connected to which flavors, and then understand how those molecules are produced. To do that, you have to have a reliable and repeatable way to measure the flavors and their relative magnitude.

Despite the fact that we have many good tools for evaluating coffee, such as rigorous cupping protocols, none of them is suitable for scientific inquiry. There are three things about the lexicon that are fundamentally different from other sensory evaluation tools:

1. It is descriptive. The World Coffee Research Sensory Lexicon doesn't have categories for "good" and "bad" attributes, nor does it allow for ranking coffee quality. It is purely a descriptive tool, which allows you to say with a high degree of confidence that a coffee tastes or smells like X, Y, or Z.

2. It is quantifiable. The World Coffee Research Sensory Lexicon allows us not only to say that, for example, a given coffee has blueberry in its flavor or aroma, but that it has blueberry at an intensity of 4 on a 15-point scale. This allows us to compare differences among coffees with a significantly higher degree of precision.

3. It is replicable. When the World Coffee Research Sensory Lexicon is used properly by trained sensory professionals the same coffee evaluated by two different people—no matter where they are, what their prior taste experiences is, what culture they originate from, or any other difference among them—will achieve the same intensity score for each attribute. An evaluator in Texas will get "blueberry, flavor: 4" just the same as one in Bangalore.

These three factors allow us to ask and answer scientific questions, like how a given factor X (coffee variety, farm management practice, brewing method, etc.) impacts the flavor of a coffee. Controlling for as many factors other than the X factor as possible, we can submit the coffee samples for evaluation to a group of sensory scientists who have been trained in the use of the lexicon. They can assess the samples, and then analyze what the sensory assessment tells us about the research question. Sensory scientists always work in groups, called panels, to make sure that no one taster skews the results. A typical panel has 5 to 7 tasters, who train for six to nine months to achieve calibration with the lexicon and with each other before they begin evaluating samples.

Non-scientific Uses for the World Coffee Research Sensory Lexicon

When a research question is being posed, coffee samples should evaluated by a trained sensory panel. At the time the World Coffee Research Sensory Lexicon was published, there were two sensory panels trained on its use in the United States. Obviously, scientific questions shade easily into questions that arise daily in the business of coffee. As soon as it was created, we knew there would be interest from the coffee industry about how the lexicon could help their work. And in fact, larger coffee companies already use similar tools in their quality control and R&D work. (Not to mention those in industries other than coffee. There are wine lexicons, beer lexicons, cheese lexicons—even meat and marijuana lexicons.) A coffee roasting company might use the lexicon to determine how a change in the roast profile of a coffee impacts the expression of nutty or chocolate flavors, for example. Coffee buyers might use it to source blend components that will give them a desired, consistent flavor profile. Quality control managers might use it to calibrate their tasters. It can also be used for fun.

Until now, such tools have not been widely available for broad use by the coffee industry. Critically, the World Coffee Research Sensory Lexicon was also developed with the goal of universal standardization in mind. If the industry as a whole—from producers to roasters—can make use of a single lexicon for sensory evaluation, coffee will have for the first time a universal language of flavor. It would be a powerful tool for increasing both quality and value up and down the supply chain.

A Note on What the World Coffee Research Sensory Lexicon is Not

The World Coffee Research Sensory Lexicon is not a replacement for cupping or other sensory tools. Cupping is a very specific and important evaluation process. It is extremely useful for coffee producers, buyers, and others in the coffee business for evaluating coffee defects and coffee quality. The Lexicon can be an additional evaluation tool in the toolbox of coffee sellers and buyers, but it is not a replacement for existing tools.

The World Coffee Research Sensory Lexicon is not truly global. While we aim for the lexicon to be a universal tool for coffee scientists and industry, in its present form, it is not truly global. The references used in the lexicon are only widely available in the Unites States, where the lexicon was developed and where World Coffee Research will do most of its sensory evaluations in the near future. We hope to adapt the lexicon for other places with locally available references and appropriate translations, given adequate funding and partnerships. But this limitation of the lexicon doesn't mean it isn't globally relevant or useful. The research being conducting using the lexicon will be used to study and improve coffee from every part of the world.

The World Coffee Research Sensory Lexicon is not finished. A sensory lexicon, like a dictionary of words, is by nature an evolving document. As new coffee varieties are discovered or developed, and processing, roasting, and preparation methods change or expand, the universal vocabulary for coffee's sensory attributes will necessarily grow. The version of the World Coffee Research Sensory Lexicon you are reading was developed based on the review of 105 Arabica coffee samples—a comprehensive selection, but by no means a definitive or complete one. The scientists who developed the lexicon looked at these samples and named the attributes they found present in them, but they obviously did not evaluate every possible coffee. There is also room to expand the references in the lexicon to include some with higher and lower intensities, and some that might be more widely available than the ones currently listed. For information on how you can contribute to the expansion of the lexicon, see "A Living Document" below.

The World Coffee Research Sensory Lexicon is not a tool for evaluating defective coffees. The present edition of the lexicon was developed using only non-defective coffees. To the extent that a flavor or aroma traditionally considered a defect (for example, Phenol or Musty) is included in the lexicon, it is because the scientists who created the lexicon found some amount of those attributes in the samples they evaluated. Other defects that might have disqualified a coffee from coming to market are not present. It's possible the lexicon will expand in the future to provide more comprehensive coverage of attributes commonly considered to be defects.

Using the World Coffee Research Sensory Lexicon

Blackberry [1]

The sweet, dark, fruity, floral, slightly sour, somewhat woody aromatic associated with blackberries. [2]

REFERENCE	INTENSITY	PREPARATION
Smucker's Blackberry Jam [3]	Flavor: 5.5 [4]	Serve jam in a 1-ounce cup. Cover with a plastic lid. [5]

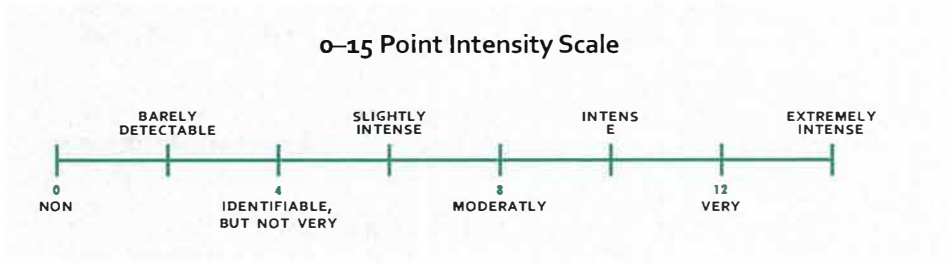
Above is a diagram of a sample lexicon entry. The elements of the lexicon are as follows:

1. Attribute name: This is the descriptive name given to the sensory attribute (taste, smell, or mouthfeel) that sensory scientists determined are present in coffee over the course of developing the lexicon. The first edition of the World Coffee Research Sensory Lexicon contains 110 attributes.

2. Definition: Each attribute has a definition that clarifies and describes what the attribute name means.

3. References: For each attribute, references are provided that serve as the standard against which that attribute is measured. The above example has only one reference. But others might have two or three or even four. For example, the Smoky attribute has three references: three references for aroma (benzyl disulfide, wood ashes, and smoked almonds) and one reference for flavor (smoked almonds). References may be used to evaluate either flavor or aroma (or both), as indicated. Sometime the same reference is used for more than one attribute. For example, roasted peanuts are used as a reference for the attributes Peanut and Roasted.

4. **Intensity score:** Each reference is given an intensity score on a scale of 1 to 15. The intensity score is the critical factor that makes the World Coffee Research Sensory Lexicon not just a descriptive tool but a measurement one—it allows evaluators to measure the amount of a given flavor or aroma attribute ina coffee sample. The intensity score allows evaluators to compare the strength of the attribute in the sample against the strength in the reference(s) and to assign the appropriate score to the sample. For example, Hazelnut has two flavor references. The first is a solution of 1/8 teaspoon of McCormick Imitation Hazelnut Extract in 1 cup of milk, which gives an intensity of 3.5. The second is double strength (1/4 teaspoon in 1 cup milk), which has an assigned intensity score of 6.0. If you are evaluating the intensity of hazelnut flavor in a coffee sample, and it's notably higher than the first reference and a little below the second, it might receive an intensity score of 5.5. The 15-point intensity scale (see above) is use for many kinds of foods in sensory analysis.



5. **Preparation instructions:** Each reference includes instructions for preparation, including serving instructions. For example, it's always preferable to use covered glass snifters for aroma references so that aromas don't contaminate one another on the table. Following the preparation instructions will ensure that each reference represents the correct intensity.

The Way Sensory Scientists Use the World Coffee Research Sensory Lexicon

Sensory panelists brew the roasted coffees they are evaluating using a standard set of instructions and evaluate the samples hot. (Unless, of course, the lexicon is being used to evaluate different brewing methodologies, which case the brewing parameters would vary.) Typically, it takes a trained panel about 15 minutes to evaluate one coffee sample on 35-40 attributes (it would take longer to evaluate more attributes). Because coffee has significant bitterness compared with other food products, panelists usually only evaluate four to six samples in a session (1.5-2 hours) to avoid sensory fatigue. In order to ensure statistical validity of sensory evaluations, each sample coffee is evaluated three times in a blinded process (meaning that panelists are not aware which coffee is which). Before evaluations begin, the panel will have two to three orientation sessions with the sample coffees, during which they ensure that all panelists are calibrated and discuss which attributes are present in the samples and will be evaluated in the formal analysis.

The evaluation of samples is usually silent. Panelists smell each coffee, consulting references as appropriate, and assign aroma intensity scores. They repeat the process for taste and aftertaste. Once all samples are complete, statistical analyses are run to answer the research questions being addressed by the evaluation.

How the World Coffee Research Sensory Lexicon Was Developed

The lexicon was developed in the lab of Edgar Chambers IV, Ph.D., at the Sensory Analysis Center at Kansas State University, one of the world's premier sensory science centers.

The first step in creating the lexicon was to identify the basic attributes present in coffee by consulting the published literature of coffee sensory science. The next step was to create a trained sensory panel for coffee. A group of 10 sensory scientists from Kansas State University spent more than 50 hourstraining with a coffee consultant from Sensory Spectrum with the purpose of increasing their experiencein coffee tasting.

Next, the panelists at the Sensory Analysis Center evaluated a group of 13 coffee samples. They determined every attribute that was detectable in any quantity. Researchers also proposed other terms based on previous experience. Throughout the process, the panelists used a consensus process to determine the attributes, meaning the entire panel had to agree on an attribute before it could be included. Consensus was also required to determine the definitions, references, and intensity scores for references for each attribute.

The evaluation of coffee samples began with aroma, then flavor, aftertaste, and texture and amplitude. For aroma evaluation each panelist lifted a glass snifter of the sample coffee and took 3 to 4 short sniffs to detect the smells that were present. Next, panelists sipped the samples to evaluate flavor, texture and amplitude. And finally, they waited 15 seconds to determine aftertaste. For each group of attributes that was proposed, references were introduced and then modified until each of the participants agreed on them.

The first phase of development led to the detection of 74 attributes, a list that included most of the commonly found characteristics in coffee but also some unique ones found in only one or a few coffee samples. Subsequent sessions were held with additional coffee samples, and the entire lexicon was validated by a second trained sensory panel in the lab of Rhonda Miller at Texas A&M University. Through this process of revision and confirmation, many of the references also evolved. For example, for the term Nutty the reference was changed from a blend of almonds and hazelnuts to a blend of almonds and walnuts, which gave a closer match to the overall nutty character. In total, the panelists spent more than 100 hours evaluating 105 coffee samples from 13 countries to create the final World Coffee Research Sensory Lexicon, which grew to 110 attributes.

The process was also vetted by coffee industry veterans from both large and small companies in a workshop where the full list of attributes were presented and discussed, and the sensory descriptive method demonstrated. Paul Songer, technical director of the Cup of Excellence program, coordinated the preparation of coffee samples and industry workshop.

A Living Document

The World Coffee Research Sensory Lexicon is a living document, and will be updated to include new attributes and references over time. If you believe there is an attribute missing from this lexicon, we invite you to submit it for consideration. We will also consider the submission of new references to replace existing ones.

New attributes for consideration must be submitted with the following:

- The proposed attribute name
- A proposed definition and reference material
- An explanation of how the term is different from similar terms in the lexicon
- A sample of unflavored coffee beans that you believe exhibit the new attribute, processed according to our guidelines

New or revised references for consideration must be submitted with the following:

- The existing attribute term
- The name/brand of your proposed new reference material, which must be reasonably/widely available for purchase in the United States through major chain stores oronline
- An explanation of how the new reference is better than or enhances the existingreferences

Please include a cover letter with your name and contact information (including email and phone number), and information about the coffee sample or reference you are submitting. Address your submission to:

Rhonda Miller
Animal Science
Room 310 Kleberg
2471 Texas A&M University
College Station, TX 77843-
2471

Review process: A trained sensory panel will review submissions and samples. For new attributes, the panel will determine if the proposed attribute exists in the sample, ensure that it doesn't duplicate information in other terms, determine a final definition, and determine an intensity for the reference. For proposed new references, the panel will test the proposed reference against the existing reference and verify that it is an improvement. Only after this verification process will new terms be added to the lexicon.

The Future of Coffee

The lexicon is an essential tool for understanding—and increasing—coffee quality and for ensuring that high-quality coffee exists for generations to come. It will significantly advance the work of coffee scientists, including molecular geneticists, breeders, and agronomists, who are studying how to make coffee more productive and resilient for coffee farmers, better tasting for coffee drinkers, and more valuable for everyone who earns a living from coffee.

The mission of World Coffee Research is:

To grow, protect, and enhance supplies of quality coffee while improving the livelihoods of the families who produce it.

We created the World Coffee Research Sensory Lexicon with that mission in mind. Supporting World Coffee Research enables future innovation in coffee science—and, ultimately, better livelihoods for coffee farmers. If you would like to support our work by becoming a World Coffee Research member, visit worldcoffeeresearch.org.

序文

微妙なアロマ、テクスチャー、フレーバーで他の食品の追随を許さぬコーヒーは、我々が消費するうちでも最も複雑な化合物のひとつである。そしてコーヒーのフレーバーは無限であるかのように思える。しかし実際はそうではない。

他の食品や飲料と同様に、コーヒーには私たちが受け取る独特の味と香りと感触がある。それはコーヒー豆内部に複雑な分子と遺伝子コードが閉じ込められており、我々がコーヒーの中に味わうものをそれらが決定するからである。いずれのフレーバーも、アロマも、テクスチャーも、化学物質の組み合わせで発生する。その化学物質の組み合わせは、種子の遺伝子、コーヒー栽培の場所と方法、収穫後に起こるあらゆること（加工、乾燥、ミリング、輸送、焙煎、その他）によって決定される。

WCR 感応レキシカンの目標は、感応科学のツールと技術を用いて、これまでで初めてコーヒーの根本的な感応属性を理解し、各々に名称を与えて、そうした属性の再現可能な測定方法を創り出すことである。

辞書がある言語を構成する語について、幅広く専門家の合意を反映するのと同様に、コーヒー・レキシカンもコーヒーに存在する味、アロマ、テクスチャーを感応専門家やコーヒー業界リーダーたちの決定によってまとめたものである。

WCR 感応レキシカンの必要性

WCR 感応レキシカンとはコーヒーの感応特性の普遍的な言語であり、特性を測定するツールでもある。レキシカンの製作は、コーヒーの味、香り、感触がなぜそのように、どこから発生するかを理解するための最初のステップである。コーヒーの苦みを左右するのはどんな遺伝子なのか。ライムのような酸味でなくオレンジのような酸味をコーヒーに与えるのはどのような環境因子なのか。ある場所で、あるいは他の場所で特定種類の肥料を使うと、コーヒーの香りに影響するかどうか。雨水と灌漑用水では違いが出るだろうか。一定時間ではなく、一定 PH レベルで発酵プロセスを止めるとどうなるか。特定の酵母株ではどうか。生豆をある種のバッグで保存すると、別のバッグで保存するより woodiness が減少することが知られているが、それはどれほどの減少なのか。コーヒーの香りと味を数量化するツールがあれば、無限に近い疑問のリストを出し、それに答え始めることが可能になる。

本レキシカンは、種子の段階からより良いコーヒーを作ることをめざしてコーヒー科学者が研究を行うことを可能にするため、WCR により製作された。たとえば、生産性が高く、病害に強く、気候変動にも強いだけでなく、素晴らしい味をもつコーヒーの新種をつくり出すためには、コーヒーのどの遺伝子がどのフレーバーと結びつくのかを知る必要がある。そのためには、信頼性の高い再現可能な方法で、まずそのフレーバーが何であるのか、その相対的な強度はどれほどなのかを把握しなければならない。

コーヒーの評価には、カッピング・プロトコル、フレーバー・ホイールなど多くの優れたツールがあるが、そのいずれもが科学的な調査には適していない。コーヒー・レキシカンは 3 点において、これら他の感応評価ツールとは基本的に異なる。

1. **叙述的である**：WCR 感応レキシカンには「良い」属性（attribute）、「悪い」属性というカテゴリーはなく、またコーヒーの品質を格付けするものでもない。レキシカンは純粋に叙述的なツールであり、評価者は確信をもって、コーヒーの味あるいは香りが X、Y、Z のようであると言い切ることができる。

2. **数量化できる**：WCR 感応レキシカンがあれば、たとえばあるコーヒーに「blueberry のようなフレーバーまたはアロマがある」といえるだけではなく、「blueberry の強さは 15 点評価で 4 点である」ということまでできる。これにより、従来と比べかなり高い精度で、異なるコーヒーを比較することができるようになる。

3. **再現性がある**：WCR 感応レキシカンを適切に使用すれば、2 人の人に別々に評価された同一のコーヒーは、2 人がどういう人であろうと、どんな味覚経験をもっていようと、どういう文化圏の人であろうと、その他どんな違いがあろうと、各属性に同じ強度スコアを得るはずである。テキサスの評価者が「blueberry・フレーバー：強度 4」といえば、バンガロールの評価者もまったく同じ結果を出すことになる。

この 3 要因によって、たとえば要因 X（コーヒー品種、農場の実践方法、抽出方法など）がコーヒーのフレーバーに影響するか、といった科学的な質問と回答が可能になる。要因 X 以外の要因を可能な限り制御し、我々はコーヒー・レキシカンの利用方法を学んだ感応科学者のグループにコーヒー・サンプルを提出し、評価を依頼することができるようになる。感応科学者たちは、結果に歪みが出ないよう、常に「パネル」と呼ばれるグループで作業を行う。通常パネルは 5〜7 名で構成され、サンプル評価を開始する前に、レキシカンおよび互いに対するキャリブレーションを達成するため、6 ヵ月から 9 ヵ月のトレーニングを行う。

WCR 感応レキシカンの科学目的以外の利用

調査研究の問題に対しては、コーヒー・サンプルはトレーニングを積んだ感応パネルによって評価される。WCR 感応レキシカンが発表される時には米国に於いてトレーニングを受けたパネルが 2 つある。もちろん科学的問題は、コーヒー・ビジネスの日々の問題になり替わって容易に発生する。レキシカンが完成すれば、コーヒー業界でどのように役立つかという関心がすぐに高まるのは予期していた。実際、ほぼあらゆるカテゴリーの大型食品ビジネスと同様、コーヒー関連の大手では、品質管理と研究開発に、コーヒー・レキシカンと同種のツールをすでに使用している（このことは他の業界では言うまでも無い。ワイン・レキシカン、ビール・レキシカン、チーズ・レキシカン、さらには肉やマリファナのレキシカンまで存在している）。レキシカンは、焙煎企業においては焙煎プロファイルの変更がいかにフレーバーを変えるかという問題に対して使用できる。またコーヒーのバイヤーが望ましい一貫したフレーバー・プロファイルを達成するブレンド成分を購入するのを助け、品質管理マネジャーがテイスターを較正する助けともなる。

現在までコーヒー業界では、幅広い目的で使うこうしたツールはほとんどなかった。重要なのは、WCR 感応レキシカンが普遍的な基準設定となるという目的も考慮して開発されたことである。業界全体が生産者から焙煎企業まで、感応評価用に単一のコーヒー・レキシカンを利用することができれば、今回初めて、コーヒーにフレーバーの世界共通語ができることになる。これは供給チェーン全体で、品質と価値の双方を増強するためのパワフルなツールとなるだろう。

WCR 感応レキシカンが目的としないもの

WCR 感応レキシカンはカッピングやその他の感応ツールを代替するものではない。カッピングは非常に限定的で重要な評価プロセスである。これはコーヒー生産者、バイヤー、その他コーヒー産業に携わる者にとって、コーヒーの欠陥と品質を評価するために非常に大きく役立つ。レキシカンはコーヒー販売者やバイヤーの商売用具において追加的な評価ツールとなるだろうが、既存のツールを代替するものではない。

WCR 感応レキシカンは、真にグローバルなものではない。我々はコーヒー・レキシカンがコーヒー研究者や業界のための普遍的なツールとなることをめざしているが、現在の形態では本当にグローバルであるとはいえない。レキシカンに使われたレファレンスは、レキシカンが開発され、WCR が今後しばらくほとんどの感応評価を行っていく米国でのみ広く利用できる。我々は、適切な資金調達とパートナーシップが得られれば、各所のレファレンスを使って他の地域用にレキシカンを適用していきたいと考えている。しかし、こうした限界があるとはいえ、レキシカンがグローバルに適用できない、あるいは有用ではない、ということではない。レキシカンを利用して行われている調査は、世界のあらゆる地域で生産されるコーヒーを研究し改良するために役立つだろう。

WCR 感応レキシカンは、完成されたものではない。言語の辞書の様にコーヒー・レキシカンはその性質上発展して行くものである。新しいコーヒーの品種が発見されたり開発されたり、また処理方法や焙煎方法や抽出方法が変わったり発展するにつれ、コーヒーに関する感応属性は必然的に発展する。今皆様が読んで居られる WCR 感応レキシカンの本版は 105 のアラビカ・コーヒーのサンプルを基にして開発された。その選択は理解出来るものではあるが、決定的なものでも無く完全なものでもないだろう。本レキシカンを開発した科学者達はこれらのコーヒー・サンプルを評価しその中に存在する属性に名前を付けたが、それがすべての可能性あるコーヒーであったかどうかは判らない。またレキシカンのレファレンスももう少し強度の高いあるいは低いものを加える余地があるし、またもっと広い地域で調達可能かもしれないレファレンスもあるだろう。本レキシカンの発展に寄与だれたい方の為の情報は後で述べる「生きている文書」の項をご参照願いたい。

WCR 感応レキシカンは、欠点のあるコーヒーを評価するツールではない。本版は欠点のないコーヒーを使って開発された。伝統的に欠点とされるフレーバーやアロマ(例えば、フェノールやかび臭)は本レキシカンに含まれているが、これは本レキシカンを作成した科学者達が評価したコーヒーにある程度の属性を見つけたからである。コーヒーが市場に出回る時点で失格とされる他の欠点に関しては存在していない。将来、現在広く欠点とされている属性に関しより理解の出来る形で含まれるように発展される事は可能である。

WCR 感応レキシカンの利用

Blackberry 1

The sweet, dark, fruity, floral, slightly sour, somewhat woody aromatic associated with blackberries. 2

REFERENCE	INTENSITY	PREPARATION
Smucker's Blackberry Jam 3	Flavor: 5.5 4	Serve jam in a 1ounce cup. Cover with a plastic lid. 5

上記はレキシカン項目のサンプル･ダイアグラムである。各要素項目は下記の通り。

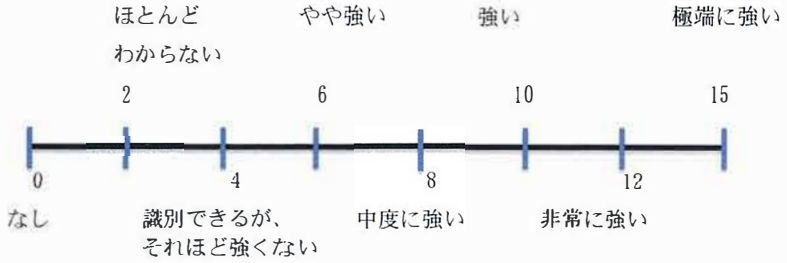
1. **属性名**：感応属性(味、香り、口当たり）に与えられた叙述的名称である。感応科学者達がレキシカンを開発する段階でコーヒーに含まれていると感じ取ったものである。WCR 感応レキシカンの第一版には 110 の属性が含まれている。

2. **定義**：各属性にはその名前が意味するものを明らかにし描写する定義がある。

3. **レファレンス**：各属性にはレファレンスがあり、その属性が計測される基準となる。上記の例は一つのレファレンスしかない。しかし 2 つ 3 つ或いは 4 つのレファレンスがある場合もある。例えば「smoky」の場合、3 つのレファレンスがあり、アロマ用の 3 つ（二硫化ベンジル、木の灰、燻製アーモンド）、フレーバー用にひとつ（燻製アーモンド）となる。つまりレファレンスは、アロマ属性、フレーバー属性、あるいは両方の属性を評価するのに役立つことになる。時には同じレファレンスが複数の属性として使用される。例えば「roasted peanuts」は「Peanut」と「Roasted」の属性として使用される。

4. **強度スコア**：各レファレンスは 1 から 15 までの強度スコアをもつ。この強度スコアは WCR 感応レキシカンを単に叙述的ツールではなくコーヒー・サンプルにおける香・アロマの量を計測する事が可能な計測的ツールとする重要な要素となる。評価者はサンプル中の属性の強度をレファレンス中の強度と比較し、サンプルに適度な強度スコアをつける事を可能とさせる。例えば、Hazelnut は 2 つの香りのレファレンスを持つ。一つは 1 カップのミルクに 1/8 ティスプーンの McCormick Imitation Hazelnut Extract の溶液を入れたもので、3.5 の強度スコアを持つ。もう一つは 1 カップのミルクに 1/4 ティスプーンを入れた 2 倍の強度の物で、強度スコア 6.0 と評価される。もしコーヒー・サンプルから Hazelnut の香りを評価し、明白に一つ目のレファレンスより強く、二つ目より少しだけ低いと評価されれば、それは 5.5 の強度スコアとなるかもしれない。15 段階の強度スケール(下記参照)は、感応分析で異なる種類の食品に使われている。

0～15 点の強度スケール



5. **準備方法**：各レファレンスには提供方法を含む準備に関する指示が含まれている。例えば、アロマのレファレンス用には机上の他のアロマと混じりあわない様に、ガラス蓋のついたスニファーを使用する事が推奨される。準備の指示に従う事によって、各レファレンスが正しい強度を表す事が確実となる。

感応研究者による WCR 感応レキシカンの利用方法

感応パネリストは、評価する焙煎コーヒーを標準的な方法にしたがって抽出し、温かいサンプルを評価する。(勿論、レキシカンが違った抽出方法を評価する事に使われる場合はこの限りではなく、抽出パラメータは変更される。)　通常、訓練されたパネルは 15 分かけて一つのコーヒー・サンプルを評価し、35-40 の属性を感じ取る。(もっと多い属性を評価する場合はさらに長くなる。)　コーヒーは他の食品と比べて重要な苦みを持つので、通常パネリストは感応疲労を回避する為、1 度に 4 つから 6 つのサンプル評価とする(1.5～2 時間)。感応評価の統計的確実性を保証する為、各サンプルはブラインドにより 3 回評価される。(すなわちパネリスト達はどのコーヒーがどのコーヒーかは判らない。)　評価作業が始まる前にサンプル・コーヒーにて 2～3 回のオリエンテーションが開催される。これによりパネリスト達はカリブレイトされ、サンプルにどの属性があり、正式な分析により評価されるかを議論する。

通常評価中は会話はない。パネリスト達はコーヒーを嗅ぎ、確かめる為にレファレンスと比較し、アロマ強度スコアを選ぶ。この評価・後味評価のプロセスを繰り返す。すべてのサンプルの評価が終了したら、統計分析者が評価によって起きた研究上の質問に対し答える。

WCR 感応レキシカンの開発

コーヒー・レキシカンは世界有数の感応科学センターであるカンザス大学感応分析センターのエドガー・チェインバース四世博士のラボで開発された。

まずコーヒーに存在する基本的な属性を識別するために、現在までに発表されているコーヒー感応科学文献を参照し、次にコーヒー感応パネルを編成した。カンザス州立大学から 10 名の感応科学者達がコーヒー評価経験を蓄積する目的で、Sensory Spectrum™社からのコーヒー研修コンサルタントによる 50 時間以上の訓練を受けた。

次に感応分析センターのパネリスト達は 13 のコーヒー・サンプル群を評価した。パネルは感知できる属性を如何なる量でも決定した。研究者たちは以前の経験を活かして他の用語も提案した。レキシカン開発のプロセスを通して、パネリスト達はその属性が採用される為にはすべてのパネルが同意しなければならないというコンセンサス・プロセスを使った。同様のプロセスは、各々の属性のための定義、レファレンス、レファレンスの強度スコアを決定する際にも使われた。

コーヒー・サンプルの評価は、まずアロマで始まり、次にフレーバー、最後に豊かさについて行われた。アロマ評価では、各パネル・メンバーはガラス製カップのガラスカバーを持ち上げ、3 回か 4 回短く匂いを嗅ぎ、コーヒー・サンプルに存在する匂いを検知した。次に彼らはサンプルをひと口飲み、フレーバー、テクスチャー、豊かさを評価した。そして最後に 15 秒間待って、後味の評価を決定した。提案される各属性グループに対し、レファレンスが導入され、各パネル・メンバーが賛成するまで修正が行われた。

最初の段階の後、訓練を受けたパネルが 74 の属性を開発した。これはコーヒーに普通に見出される性質の大部分と、ごく少数のサンプルにしか見いだせないユニークな性質のいくつかを含むリストである。さらに、追加のコーヒー・サンプルに対しセッションが開催され、テキサス A&M 大学のロンダ・ミラー氏のラボにてレキシカン全体が検証された。この見直しと確認のプロセスによりレファランスの多くが発展した。たとえば、「nutty」という語で

は、レファレンスは「アーモンドとヘイゼルナッツのブレンド」から「アーモンドとウォルナットのブレンド」に変更され、「nutty」と言う性格全体によりよくマッチするようになった。パネリスト達は合計すると100時間以上の時間をかけて、13か国から集められた105以上のコーヒー・サンプルを評価し、WCR感応レキシカンの最終版は110の属性の構成となった。

本プロセスはコーヒー業界の大小企業からのコーヒー・ヴェテランの審査を受け、ワークショップに於いてすべての属性が評価され論議され、感応表現方法が説明された。カップ・オブ・エクセレンス・プログラムの技術ディレクターのポール・ソンガー氏が、コーヒー・サンプルの手配とワークショップの準備を行った。

生きている文書
WCR感応レキシカンは生きた進化する文書であり、属性やレファレンスは常新しいものが含まれるように見直されなくてはならない。このレキシカンに欠けている属性があるとお考えならば、検討できるよう、我々にぜひ申し出て頂きたい。また既存のものに替わる新しいレファレンスの提出も検討したいと考えている。

新しい属性の検討を申請する場合は、次のものを提出しなければならない。
・用語
・定義とレファレンス・マテリアルの提案
・新しい用語が、レキシカンにある同様の用語とどう異なるかの説明
・その新しい属性を示すと信じられる香料無添加のコーヒー豆のサンプル
新しいレファレンスの検討を申請する場合は、次のものを提出しなければならない。
・既存の属性用語。
・提案する新しいレファレンス・マテリアルの名称／ブランド。ただし、レファレンスは、主要なチェーンやオンラインを通して米国で無理なく／広く入手可能なものとする。
・新しいレファレンスがいかに既存のものより優れているか、あるいは拡充することになるかの説明。

カバーレターには提出者の名前と連絡先(メールアドレスと電話番号を含む)、及び提出するコーヒーサンプル或いはレファレンスに関する情報が含まれていなければならない。
提出先は下記とする。

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評価プロセス：トレーニングを受けた感応パネルが提出物とサンプルを評価iする。新しい属性について、パネルは提案されている属性がサンプル中に存在するかどうか判断し、それが他の用語の情報と重複しないことを確認し、最終的な定義を決定し、レファレンスのための強度を定める。提案される新しいレファレンスについては、パネルはそれを既存のレファレンスに照らして試験し、既存のものより優れていることを検証する。こうした検証プロセスの後に、初めて新しい用語がレキシカンに追加される。

コーヒーの未来
レキシカンは発展するコーヒーの品質を理解し、次の世代の為の高品質コーヒーが存在する事を保証する為の大切なツールである。コーヒーの生産性を如何に上げコーヒー農家にとって弾力性のあるものにし、コーヒー愛飲家により美味しいコーヒーを提供し、コーヒーによって生活を営んでいる全ての方々にコーヒーをより価値のあるものにする事を研究している分子遺伝学者、繁殖者、農耕学者を含むコーヒー科学者達の作業を進化させる。

WCRの使命
コーヒーを生産している方々の生活を向上しつつ、高品質コーヒーの供給を拡大、保護、強化する。上記の使命を念頭においてWCR感応レキシカンは作成された。WCRを支援頂く事はコーヒー科学における将来の改革を可能にし、究極的にはコーヒー生産者のより良い生活を可能にするWCRに参加し我々の活動を支援頂く為、Worldcoffeereseach.orgをご参照。

WORLD COFFEE RESEARCH™

VERSION 2.0 — 2017

SENSORY LEXICON

Unabridged Definition and References

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Members of the Sensory Lexicon Advisory Group include:

- Lindsey Bolger, *Keurig Green Mountain Coffee*
- Bruce Bria, *Royal Cup Coffee and Tea*
- Gail Vance Civille, *Sensory Spectrum*
- Brent Ginn, *The J.M. Smucker Company*
- Peter Giuliano, *Specialty Coffee Association of America*
- Chris Hallien, *Kraft Foods*
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INTRODUCTION

Coffee is one of the most chemically complex things we consume, with subtleties of aroma, texture, and flavor rivaled by almost no other food, and it can seem as if its flavors are infinite. But they are not.

Coffee, like anything else we eat or drink, tastes, smells, and feels the way it does because locked inside the coffee bean is a complex molecular and genetic code that determines what we experience. Every flavor, every aroma, every texture originates in a set of chemicals, which in turn are determined by the seed's genes, by how and where the coffee was grown, and by everything it has experienced since leaving the tree (processing, drying, milling, storage, transport, roasting, brewing and so on).

The goal of the World Coffee Research Sensory Lexicon is to use for the first time the tools and technologies of sensory science to understand and name coffee's primary sensory qualities, and to create a replicable way of measuring those qualities.

Just like a dictionary reflects broad, expert agreement about the words that make up a given language, the lexicon contains the tastes, aromas, and textures that exist in coffee as determined by sensory experts and coffee industry leaders.

Why We Need the World Coffee Research Sensory Lexicon

Creating the World Coffee Research Sensory Lexicon—a universal language of coffee's sensory qualities, and a tool for measuring them—is the necessary first step to understanding what causes coffee to taste, smell, and feel the way it does. What are the genes that make a coffee more or less bitter? What are the environmental factors that give a coffee an orange acidity instead of a lime one? Does anything happen to the flavor of a coffee when you use one kind of fertilizer in place of another? Or rain water instead of irrigation? What if you stop the fermentation process at a certain Ph level instead of after a certain amount of time? Or use a particular yeast strain? We know that storing green coffee in one kind of bag versus another can decrease woodiness, but by how much? The list of questions you can pose—and begin to answer—when you have a tool to quantify coffee's tastes and flavors is almost endless.

The lexicon was created by World Coffee Research to enable coffee scientists to conduct research that will make coffee better—starting with the seed itself. For example, in order to breed new varieties of coffee that are not only productive, disease resistant, and climate resilient, but also taste amazing, we need to understand which molecules in a coffee are connected to which flavors, and then understand how those molecules are produced. To do that, you have to have a reliable and repeatable way to measure the flavors and their relative magnitude.

Despite the fact that we have many good tools for evaluating coffee, such as rigorous cupping protocols, none of them is suitable for scientific inquiry. There are three things about the lexicon that are fundamentally different from other sensory evaluation tools:

1. It is descriptive. The World Coffee Research Sensory Lexicon doesn't have categories for "good" and "bad" attributes, nor does it allow for ranking coffee quality. It is purely a descriptive tool, which allows you to say with a high degree of confidence that a coffee tastes or smells like X, Y, or Z.

2. It is quantifiable. The World Coffee Research Sensory Lexicon allows us not only to say that, for example, a given coffee has blueberry in its flavor or aroma, but that it has blueberry at an intensity of 4 on a 15-point scale. This allows us to compare differences among coffees with a significantly higher degree of precision.

3. It is replicable. When the World Coffee Research Sensory Lexicon is used properly by trained sensory professionals the same coffee evaluated by two different people—no matter where they are, what their prior taste experiences is, what culture they originate from, or any other difference among them—will achieve the same intensity score for each attribute. An evaluator in Texas will get "blueberry, flavor: 4" just the same as one in Bangalore.

These three factors allow us to ask and answer scientific questions, like how a given factor X (coffee variety, farm management practice, brewing method, etc.) impacts the flavor of a coffee. Controlling for as many factors other than the X factor as possible, we can submit the coffee samples for evaluation to a group of sensory scientists who have been trained in the use of the lexicon. They can assess the samples, and then analyze what the sensory assessment tells us about the research question. Sensory scientists trained on the coffee lexicon typically work in groups, called panels, to make sure that no one taster skews the results. A typical panel has 5 to 7 tasters, who train for six to nine months to achieve calibration with the lexicon and with each other before they begin evaluating samples.

Non-scientific Uses for the World Coffee Research Sensory Lexicon

When a research question is being posed, coffee samples should evaluated by a trained sensory panel. At the time the World Coffee Research Sensory Lexicon was published, there were two sensory panels trained on its use in the United States. Obviously, scientific questions shade easily into questions that arise daily in the business of coffee. As soon as it was created, we knew there would be interest from the coffee industry about how the lexicon could help their work. And in fact, larger coffee companies already use similar tools in their quality control and R&D work. (Not to mention those in industries other than coffee. There are wine lexicons, beer lexicons, cheese lexicons—even meat and marijuana lexicons.) A coffee roasting company might use the lexicon to determine how a change in the roast profile of a coffee impacts the expression of nutty or chocolate flavors, for example. Coffee buyers might use it to source blend components that will give them a desired, consistent flavor profile. Quality control managers might use it to calibrate their tasters. It can also be used for fun.

Until now, such tools have not been widely available for broad use by the coffee industry. Critically, the World Coffee Research Sensory Lexicon was also developed with the goal of universal standardization in mind. If the industry as a whole—from producers to roasters—can make use of a single lexicon for sensory evaluation, coffee will have for the first time a universal language of flavor. It would be a powerful tool for increasing both quality and value up and down the supply chain.

A Note on What the World Coffee Research Sensory Lexicon Is Not

The World Coffee Research Sensory Lexicon is not a replacement for cupping or other sensory tools. Cupping is a very specific and important evaluation process. It is extremely useful for coffee producers, buyers, and others in the coffee business for evaluating coffee defects and coffee quality. The Lexicon can be an additional evaluation tool in the toolbox of coffee sellers and buyers, but it is not a replacement for existing tools.

The World Coffee Research Sensory Lexicon is not truly global. While we aim for the lexicon to be a universal tool for coffee scientists and industry, in its present form, it is not truly global. Many of the references used in the lexicon are only widely available in mass market grocery store chains in the Unites States, where

the lexicon was developed and where World Coffee Research will do most of its sensory evaluations in the near future (for example, Lorna Doone brand cookies or Green Giant brand cut green beans). However, for this second edition of the lexicon published in 2017 an important new set of globally available references was added to the lexicon. FlavorActiV, a global sensory company and supplier to 9 out of 10 of the world's largest beverage companies, has created pharmaceutical grade, shelf-stable, food-safe, flavor references for 24 attributes in the lexicon.

Even though references for some attributes are still not easy to come by outside the US, this limitation of the lexicon doesn't mean it isn't globally relevant or useful. The research being conducting using the lexicon will be used to study and improve coffee from every part of the world.

The World Coffee Research Sensory Lexicon is not finished. A sensory lexicon, like a dictionary of words, is by nature an evolving document. As new coffee varieties are discovered or developed, and processing, roasting, and preparation methods change or expand, the universal vocabulary for coffee's sensory attributes will necessarily grow. The version of the World Coffee Research Sensory Lexicon you are reading was developed based on the review of 105 Arabica coffee samples—a comprehensive selection, but by no means a definitive or complete one. The scientists who developed the lexicon looked at these samples and named the attributes they found present in them, but they obviously did not evaluate every possible coffee. There is also room to expand the references in the lexicon to include some with higher and lower intensities, and some that might be more widely available than the ones currently listed, as in this second edition. For information on how you can contribute to the expansion of the lexicon, see "A Living Document" below.

The World Coffee Research Sensory Lexicon is not a tool for evaluating defective coffees. The lexicon is completely value-neutral. It only describes the flavors and aromas present in coffee and helps to measure their intensity. It doesn't assign a value to those flavors or aromas. To the extent that a flavor or aroma traditionally considered a defect (for example, Phenol or Musty) is included in the lexicon, it is because the scientists who created the lexicon found some amount of those attributes in the samples they evaluated. It's possible the lexicon will expand in the future to provide more comprehensive coverage of attributes commonly considered to be defects.

Blackberry [1]

The sweet, dark, fruity, floral, slightly sour, somewhat woody aromatic associated with blackberries. [2]

REFERENCE	INTENSITY	PREPARATION
Smucker's Blackberry Jam [3]	Flavor: 5.5 [4]	Serve jam in a 1-ounce cup. Cover with a plastic lid. [5]

Using the World Coffee Research Sensory Lexicon

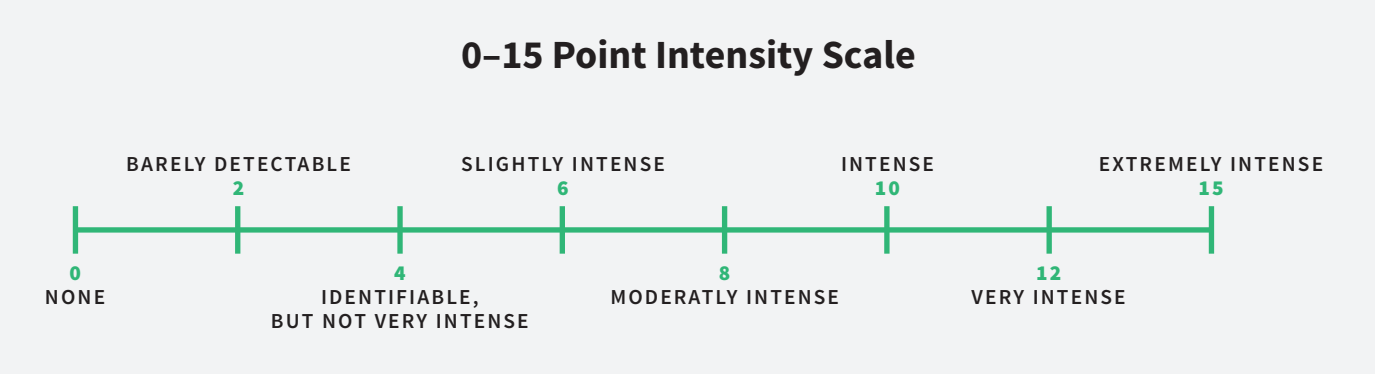
Above is a diagram of a sample lexicon entry. The elements of the lexicon are as follows:

1. Attribute name: This is the descriptive name given to the sensory attribute (taste, smell, or mouthfeel) that sensory scientists determined are present in coffee over the course of developing the lexicon. The first edition of the World Coffee Research Sensory Lexicon contains 110 attributes.

2. Definition: Each attribute has a definition that clarifies and describes what the attribute name means.

3. References: For each attribute, references are provided that serve as the standard against which that attribute is measured. The above example has only one reference. But others might have two or three or even four. For example, the Smoky attribute has three references: three references for aroma (benzyl disulfide, wood ashes, and smoked almonds) and one reference for flavor (smoked almonds). References may be used to evaluate either flavor or aroma (or both), as indicated. Sometime the same reference is used for more than one attribute. For example, roasted peanuts are used as a reference for the attributes Peanut and Roasted.

4. Intensity score: Most references have been given an intensity score on a scale of 1 to 15 and labeled as either an aroma or a flavor reference. The intensity score is the critical factor that makes the World Coffee Research Sensory Lexicon not just a descriptive tool but a measurement one—it allows evaluators to measure the amount of a given flavor or aroma attribute in a coffee sample. The intensity score allows evaluators to compare the strength of the attribute in the sample against the strength in the reference(s) and to assign the appropriate score to the sample. For example, Hazelnut has two flavor references. The



first is a solution of 1/8 teaspoon of McCormick Imitation Hazelnut Extract in 1 cup of milk, which gives an intensity of 3.5. The second is double strength (1/4 teaspoon in 1 cup milk), which has an assigned intensity score of 6.0. If you are evaluating the intensity of hazelnut flavor in a coffee sample, and it's notably higher than the first reference and a little below the second, it might receive an intensity score of 5.5. The 15-point intensity scale (see above) is use for many kinds of foods in sensory analysis.

Some references do not possess an intensity score (for example, FlavorActiV 0920 "sour," a reference for the attribute Sour). In these cases, the reference has been validated and approved for use as a quality representation of the flavor attribute, but has not undergone assessment to determine a *World Coffee Research Sensory Lexicon* intensity score.

5. Preparation instructions: Each reference includes instructions for preparation, including serving instructions. For example, it's always preferable to use covered glass snifters for aroma references so that aromas don't contaminate one another on the table. Following the preparation instructions will ensure that each reference represents the correct intensity. For FlavorActiV references, please follow instructions on flavor standard use, which can be found at https://www.flavoractiv.com/coffee-sensory-solutions/

Steps

- Before evaluations begin, the panel has two to three orientation sessions with the sample coffees, during which they ensure that all panelists are calibrated and discuss which of the lexicon attributes are present in the samples and will be evaluated in the formal analysis.
- The panelists prepare the references for the identified attributes following the preparation instructions outlined in the lexicon.
- Panelists brew the roasted coffees using assigned brewing protocol, storing coffee in a thermally protective container until panelists are ready for the evaluation.
- In the sample analysis, panelists *smell* references labeled aroma, and *taste* references labeled flavor, and then either smell or taste the coffee sample to compare it against the aroma or flavor of the reference.
- Panelists assign each sample an intensity score for each attribute being evaluated.

The Way Sensory Scientists Use the World Coffee Research Sensory Lexicon

Sensory panelists brew the roasted coffees they are evaluating using a standard set of instructions and evaluate the samples hot. (Unless, of course, the lexicon is being used to evaluate different brewing methodologies, which case the brewing parameters would vary.) Typically, it takes a trained panel about 15 minutes to evaluate one coffee sample on 35-40 attributes (it would take longer to evaluate more attributes). Because coffee has significant bitterness compared with other food products, panelists usually only evaluate four to six samples in a session (1.5-2 hours) to avoid sensory fatigue. In order to ensure statistical validity of sensory evaluations, each sample coffee is evaluated three times in a blinded process (meaning that panelists are not aware which coffee is which). Before evaluations begin, the panel will have two to three orientation sessions with the sample coffees, during which they ensure that all panelists are calibrated and discuss which attributes are present in the samples and will be evaluated in the formal analysis.

The evaluation of samples is usually silent. Panelists smell each coffee, consulting references as appropriate, and assign aroma intensity scores. They repeat the process for taste and aftertaste. Once all samples are complete, statistical analyses are run to answer the research questions being addressed by the evaluation.

How the World Coffee Research Sensory Lexicon Was Developed

The lexicon was developed in the lab of Edgar Chambers IV, Ph.D., at the Sensory Analysis Center at Kansas State University, one of the world's premier sensory science centers.

The first step in creating the lexicon was to identify the basic attributes present in coffee by consulting the published literature of coffee sensory science. The next step was to create a trained sensory panel for coffee. A group of 10 sensory scientists from Kansas State University spent more than 50 hours training with a coffee consultant from Sensory Spectrum with the purpose of increasing their experience in coffee tasting.

Next, the panelists at the Sensory Analysis Center evaluated a group of 13 coffee samples. They determined every attribute that was detectable in any quantity. Researchers also proposed other terms based on previous experience. Throughout the process, the panelists used a consensus process to determine the attributes, meaning the entire panel had to agree on an attribute before it could be included. Consensus was also required to determine the definitions, references, and intensity scores for references for each attribute.

The evaluation of coffee samples began with aroma, then flavor, aftertaste, and texture and amplitude. For aroma evaluation each panelist lifted a glass snifter of the sample coffee and took 3 to 4 short sniffs to detect the smells that were present. Next, panelists sipped the samples to evaluate flavor, texture and amplitude. And finally, they waited 15 seconds to determine aftertaste. For each group of attributes that was proposed, references were introduced and then modified until each of the participants agreed on them.

The first phase of development led to the detection of 74 attributes, a list that included most of the commonly found characteristics in coffee but also some unique ones found in only one or a few coffee samples. Subsequent sessions were held with additional coffee samples, and the entire lexicon was validated by a second trained sensory panel in the lab of Rhonda Miller at Texas A&M University. Through this process of revision and confirmation, many of the references also evolved. For example, for the term Nutty the reference was changed from a blend of almonds and hazelnuts to a blend of almonds and walnuts, which gave a closer match to the overall nutty character. In total, the panelists spent more than 100 hours evaluating 105 coffee samples from 13 countries to create the final World Coffee Research Sensory Lexicon, which grew to 110 attributes.

The process was also vetted by coffee industry veterans from both large and small companies in a workshop where the full list of attributes were presented and discussed, and the sensory descriptive

method demonstrated. Paul Songer, technical director of the Cup of Excellence program, coordinated the preparation of coffee samples and industry workshop.

A Living Document

The World Coffee Research Sensory Lexicon is a living document, and will be updated to include new attributes and references over time. If you believe there is an attribute missing from this lexicon, we invite you to submit it for consideration. We will also consider the submission of new references to replace existing ones.

New attributes for consideration must be submitted with the following:

- The proposed attribute name
- A proposed definition and reference material
- An explanation of how the term is different from similar terms in the lexicon
- A sample of unflavored coffee beans that you believe exhibit the new attribute, processed according to our guidelines

New or revised references for consideration must be submitted with the following:

- The existing attribute term
- The name/brand of your proposed new reference material, which must be reasonably/widely available for purchase in the United States through major chain stores or online
- An explanation of how the new reference is better than or enhances the existing references

To submit your suggestions for changes, please send an email to **info@worldcoffeeresearch.org**, with your name and contact information (including email and phone number), and information about the coffee sample or reference you are submitting (see above). We will respond within one week with instructions on how to submit your sample.

Review process: A trained sensory panel will review submissions and samples. For new attributes, the panel will determine if the proposed attribute exists in the sample, ensure that it doesn't duplicate information in other terms, determine a final definition, and determine an intensity for the reference. For proposed new references, the panel will test the proposed reference against the existing reference and verify that it is an improvement. Only after this verification process will new terms be added to the lexicon.

A Note on the Second Edition

The main addition to the second edition of the World Coffee Research Sensory Lexicon is the addition of new, globally available references for 24 attributes: Sour, Bitter, Salty, Apple, Grape, Coconut, Pineapple, Acetic acid, Butyric acid, Isovaleric acid, Fermented, Peapod, Fresh, Papery, Musty/Earthy, Musty/Dusty, Moldy/Damp, Phenolic, Petroleum, Brown Spice, Almond, Vanillin, Floral, and Jasmine.

While non-grocery-store references have been available for coffee *aroma* commercially for many years (primarily from Le Nez du Cafe), shelf-stable, food-safe, globally available references for *flavor* have never been available for coffee before. The references, created by UK-based flavor standards company FlavorActiV, will substantially expand the global applicability of the coffee lexicon. A portion of sales of FlavorActiv products supports World Coffee Research. They can be ordered at https://www.flavoractiv.com/product-category/beverages/coffee-flavour-standards/

The Future of Coffee

The lexicon is an essential tool for understanding—and increasing—coffee quality and for ensuring that high-quality coffee exists for generations to come. It will significantly advance the work of coffee scientists, including molecular geneticists, breeders, and agronomists, who are studying how to make coffee more productive and resilient for coffee farmers, better tasting for coffee drinkers, and more valuable for everyone who earns a living from coffee.

The mission of World Coffee Research is:

To grow, protect, and enhance supplies of quality coffee while improving the livelihoods of the families who produce it.

We created the World Coffee Research Sensory Lexicon with that mission in mind. Supporting World Coffee Research enables future innovation in coffee science—and, ultimately, better livelihoods for coffee farmers. If you would like to support our work by becoming a World Coffee Research member, visit worldcoffeeresearch.org.

WORLD COFFEE RESEARCH

SENSORY LEXICON

SWEET

A fundamental taste factor of which sucrose is typical.

REFERENCE	INTENSITY	PREPARATION
1.0% sucrose solution	Flavor: 1.0	Serve juice in a 1-ounce cup. Cover with a plastic lid.

SOUR

The fundamental taste factor associated with a citric acid solution.

REFERENCE	INTENSITY	PREPARATION
0.015% citric acid solution	Flavor: 1.5	Serve solution in a 1-ounce cup. Cover with a plastic lid.
0.05% citric acid solution	Flavor: 3.5	Serve solution in a 1-ounce cup. Cover with a plastic lid.
FlavorActiV "sour" (citric acid) https://www.flavoractiv.com/product/sour-flavour-standard-2/		Prepare according to FlavorActiV package instructions.

BITTER

The fundamental taste factor associated with a caffeine solution.

REFERENCE	INTENSITY	PREPARATION
0.01% caffeine solution	Flavor: 2.0	Serve solution in a 1-ounce cup. Cover with a plastic lid.
0.02% caffeine solution	Flavor: 3.5	Serve solution in a 1-ounce cup. Cover with a plastic lid.
0.035 % caffeine solution	Flavor: 5.0	Serve solution in a 1-ounce cup. Cover with a plastic lid.
0.05% caffeine solution	Flavor: 6.5	Serve solution in a 1-ounce cup. Cover with a plastic lid.
FlavorActiv “bitter" (iso-alpha-acids) https://www.flavoractiv.com/product/bitter-flavour-standard-sensory-kit/		Prepare according to FlavorActiV package instructions

*A portion of sales of this product support World Coffee Research. This reference has been validated and approved for use as a quality representation of the named flavor attribute, but has not undergone assessment to determine a Sensory Lexicon intensity score.

SALTY

A fundamental taste factor of which sodium chloride is typical.

REFERENCE	INTENSITY	PREPARATION
0.15% sodium chloride solution	Flavor: 1.5	Serve solution in a 1-ounce cup. Cover with a plastic lid.
FlavorActiV “salty" (sodium chloride) https://www.flavoractiv.com/product/salty-flavour-standard/		Prepare according to FlavorActiV package instructions.

*A portion of sales of this product support World Coffee Research. This reference has been validated and approved for use as a quality representation of the named flavor attribute, but has not undergone assessment to determine a Sensory Lexicon intensity score.

FRUITY

A sweet, floral, aromatic blend of a variety of ripe fruits.

REFERENCE	INTENSITY	PREPARATION
Juicy Juice 100% Juice Kiwi Strawberry	Aroma: 3.0	Mix 1 part water and 1 part juice. Place ¼ cup of mixture in a medium snifter. Cover.
	Flavor: 4.0	Serve juice in a 1-ounce cup. Cover with a plastic lid.
Le Nez du Café n.17 “apple”	Aroma: 7.0	Place 1 drop of essence on a cotton ball in a large snifter. Cover.

BERRY

The sweet, sour, floral, sometimes heavy aromatic associated with a variety of berries such as blackberries, raspberries, blueberries, or strawberries.

REFERENCE	INTENSITY	PREPARATION
Private Selection Triple Berry Preserves	Aroma: 10.0	Place 1 teaspoon of jelly in a medium snifter. Cover.
	Flavor: 9.0	Place 1 teaspoon in a 1-ounce cup. Cover with a plastic lid.
Welch’s Unfiltered 100% Juice Blackberry	Flavor: 7.5	Serve juice in a 1-ounce cup. Cover with a plastic lid.

Strawberry

The somewhat sweet, slightly sour, floral, fruity, frequently winey aromatic associated with strawberry.

REFERENCE	INTENSITY	PREPARATION
Dole Whole Strawberries All Natural	Aroma: 13.0	Thaw strawberries in refrigerator overnight. Serve at room temperature in 3.25-ounce cup. Cover with a plastic lid.
	Flavor: 6.0	Thaw strawberries in refrigerator overnight. Serve at room temperature in 3.25-ounce cup. Cover with a plastic lid.

Raspberry

The lightly sweet, fruity, floral, slightly sour and musty aromatic associated with raspberries.

REFERENCE	INTENSITY	PREPARATION
Jell-O Raspberry (dry gelatin powder)	Flavor: 6.5	Served dry powder in a 1-ounce cup. Cover with a plastic lid.

Blueberry

The slightly dark, fruity, sweet, slightly sour, musty, dusty, floral aromatic associated with blueberry.

REFERENCE	INTENSITY	PREPARATION
Oregon Fruit Products Blueberries in Light Syrup (canned)	Aroma: 6.5	Put 1 teaspoon of syrup from canned blueberries in a medium snifter. Cover.
	Flavor: 6.0	Serve blueberries in a 1-ounce cup. Cover with a plastic lid.

Blackberry

The sweet, dark, fruity, floral, slightly sour, somewhat woody aromatic associated with blackberries.

REFERENCE	INTENSITY	PREPARATION
Smucker's Blackberry Jam	Flavor: 5.5	Serve jam in a 1-ounce cup. Cover with a plastic lid.

DRIED FRUIT

An aromatic impression of dark fruit that is sweet and slightly brown and is associated with dried plums and raisins.

REFERENCE	INTENSITY	PREPARATION
Sunsweet Amaz!n Prune Juice	Aroma: 3.0	Mix 1 part juice with 2 parts water. This may be prepared 24 hours in advance and refrigerated. Bring to room temperature for serving. Serve 1 tablespoon in a medium snifter. Cover.
	Flavor: 4.5	Mix 1 part juice with 2 parts water. This may be prepared 24 hours in advance and refrigerated in coded, lidded 1-ounce cups. Bring to room temperature for serving.
Mixture of Sun-Maid Raisins and Sun-Maid Prunes	Aroma: 5.0	Mix 1/4 cup raisins (whole) and 1/4 cup prunes (chopped). Add ¾ cup water and cook in microwave on high for 2 minutes. Filter with a sieve. Place 1 tablespoon of liquid juice in a medium snifter. Cover.

DRIED FRUIT *Cont.*

REFERENCE	INTENSITY	PREPARATION
	Flavor: 6.0	Mix ¼ cup raisins (whole) and ¼ cup prunes (chopped). Add ¾ cup water and cook in microwave on high for 2 minutes. Filter with a sieve. Place the mixture in a blender and mix for 1 minute at medium speed. Serve the paste of raisins and prunes in a 1-ounce cup. Cover with a plastic lid.

Raisin

The concentrated, sweet, somewhat sour, brown, fruity, floral aromatic characteristic of dried grapes.

REFERENCE	INTENSITY	PREPARATION
Sun-Maid Raisins	Aroma: 6.0	Chop 1/2 cup of raisins. Add ¾ cup water and cook in microwave on high for 2 minutes. Filter with a sieve. Place 1 tablespoon of liquid juice in a medium snifter. Cover.
	Flavor: 5.5	Chop 1/2 cup of raisins. Add ¾ cup water and cook in microwave on high for 2 minutes. Filter with a sieve. Serve juice in a 1-ounce cup. Cover with a plastic lid.

Prune

The sweet, slightly brown, floral, musty and overripe aromatic impression of dark fruit associated with dried plums.

REFERENCE	INTENSITY	PREPARATION
Sun-Maid Prunes	Aroma: 4.5	Chop 1/2 cup prunes. Add ¾ cup of water and cook in microwave on high for 2 minutes. Filter with a sieve. Place 1 tablespoon of juice in a medium snifter. Cover.
	Flavor: 5.0	Chop 1/2 cup prunes. Add ¾ cup of water and cook in microwave on high for 2 minutes. Filter with a sieve. Pour juice into a 1-ounce cup. Cover a with plastic lid.

OTHER FRUIT

A sweet, light, fruity, somewhat floral, sour, or green aromatic that may include apples, grapes, peaches, pears, or cherries.

REFERENCE	INTENSITY	PREPARATION
Le Nez du Café n.17 “apple”	Aroma: 7.0	Place 1 drop of essence on a cotton ball in a large snifter. Cover.

Apple

A sweet, light, fruity, somewhat floral aromatic commonly associated with fresh or processed apples.

REFERENCE	INTENSITY	PREPARATION
Le Nez du Café n.17 “apple”	Aroma: 5.0	Place 1 drop of essence on a cotton ball in a large snifter. Cover.
Gerber 2nd Foods Applesauce	Flavor: 6.0	Serve applesauce in a 1-ounce cup. Cover with a plastic lid.
FlavorActiV “apple" (ethyl hexanoate) https://www.flavoractiv.com/product/ethyl-hexanoate-flavour-standard-2/		Prepare according to FlavorActiV package instructions.

Pear

The sweet, slightly floral, musty, woody, fruity aromatic associated with pears.

REFERENCE	INTENSITY	PREPARATION
Jumax Pear Nectar (can)	Flavor: 7.5	Serve juice in a 1-ounce cup. Cover with a plastic lid.

Peach

The floral, perfuming, fruity, sweet, slightly sour aromatic associated with peaches.

REFERENCE	INTENSITY	PREPARATION
Fresh peach pit	Aroma: 8.0	Put clean peach pit in a medium snifter. Cover.
Jell-O Peach (dry gelatin powder)	Flavor: 7.0	Serve dry powder in a 1-ounce cup. Cover with a plastic lid.

Grape

The sweet, fruity, floral, slightly sour, musty aromatic commonly associated with grapes.

REFERENCE	INTENSITY	PREPARATION
Welch’s 100% Juice Unfiltered Concord Grape	Flavor: 5.0	Mix 1 part grape juice with 1 part water. Serve in a 1-ounce cup. Cover with a plastic lid.
FlavorActiV “grape" (methyl anthranilate) https://www.flavoractiv.com/product/grape-flavour-standard/		Prepare according to FlavorActiV package instructions.

*A portion of sales of this product support World Coffee Research. This reference has been validated and approved for use as a quality representation of the named flavor attribute, but has not undergone assessment to determine a Sensory Lexicon intensity score.

Cherry

The sour, fruity, slightly bitter, floral aromatic associated with cherries.

REFERENCE	INTENSITY	PREPARATION
R.W. Knudsen Just Tart Cherry Juice	Flavor: 4.0	Mix 1 part cherry juice with 2 parts water. Serve in a 1-ounce cup. Cover with a plastic lid.

Pomegranate

A sour, sweet fruity aromatic that may be somewhat dark, musty and earthy, reminiscent of dark fruits and root vegetables such as beets and carrots; may also have an astringent mouthfeel.

REFERENCE	INTENSITY	PREPARATION
R.W. Knudsen Organic Just Pomegranate Juice	Aroma: 5.5	Serve 2 tablespoons of juice in a medium snifter. Cover.
	Flavor: 7.5	Serve the juice in a 1-ounce cup. Cover with a plastic lid.

Coconut

The slightly sweet, nutty, somewhat woody aromatic associated with coconut.

REFERENCE	INTENSITY	PREPARATION
Coconut imitation extract	Aroma: 7.5	Place 1 drop of coconut extract on a cotton ball in a medium snifter. Cover.
FlavorActiV “coconut" (whiskey lactone) https://www.flavoractiv.com/product/coconut-flavour-standard/		Prepare according to FlavorActiV package instructions.

Pineapple

The sweet, slightly sharp, fruity aromatic associated with pineapple.

REFERENCE	INTENSITY	PREPARATION
Dole Pineapple Juice (canned)	Aroma: 6.5	Mix 1 part pineapple juice and 1 part water. Serve 1 tablespoon of juice in a medium snifter. Cover.
	Flavor: 6.0	Mix 1 part pineapple juice and 1 part water. Serve juice in a 1-ounce cup. Cover with a plastic lid.

*A portion of sales of this product support World Coffee Research. This reference has been validated and approved for use as a quality representation of the named flavor attribute, but has not undergone assessment to determine a Sensory Lexicon intensity score.

REFERENCE	INTENSITY	PREPARATION
FlavorActiV “pineapple" (ethyl butyrate) https://www.flavoractiv.com/product/ethyl-butyrate-flavour-standard/		Prepare according to FlavorActiV package instructions.

CITRUS FRUIT

A citric, sour, astringent, slightly sweet, peely, and somewhat floral aromatic that may include lemons, limes, grapefruits, or oranges.

REFERENCE	INTENSITY	PREPARATION
Peels of lemon and lime	Aroma: 4.5	Put 0.5 grams lemon peel and 0.5 grams lime peel in a medium snifter. Cover.
Grapefruit peel	Aroma: 7.5	Put 0.25 grams grapefruit peel in a medium snifter. Cover.
Five Alive Citrus (frozen concentrate)	Flavor: 6.5	Prepare the concentrate according to the package directions. Serve prepared juice in 1-ounce cups. Cover with a plastic lid.

Lemon

The citric, sour, astringent, slightly sweet, peely and somewhat floral aromatic associated with lemon.

REFERENCE	INTENSITY	PREPARATION
Fresh lemon juice	Aroma: 5.0	Juice a lemon. Dilute with water, 1 part juice to 4 parts water. Pour ¼ cup in a medium snifter. Cover.
	Flavor: 7.0	Juice a lemon. Dilute with water, 1 part juice to 4 parts water. Serve in a 1-ounce cup. Cover with a plastic lid.
Le Nez du Café n. 15 ‘lemon’	Aroma: 5.5	Place 1 drop of essence on a cotton ball in a large snifter. Cover.

Grapefruit

The citric, sour, bitter, astringent, peely, sharp, slightly sweet aromatic associated with grapefruit.

REFERENCE	INTENSITY	PREPARATION
Ocean Spray 100% White Grapefruit Juice	Flavor: 11.0	Serve juice in a 1-ounce cup. Cover with a plastic lid.
Kroger 100% White Grapefruit Juice	Flavor: 13.5	Serve juice in a 1-ounce cup. Cover with a plastic lid.

Orange

The citric, sweet, floral, slightly sour aromatic associated with oranges, which may include bitter, peely, and astringent notes.

REFERENCE	INTENSITY	PREPARATION
Tropicana Pure Premium Original 100% No Pulp Orange Juice	Flavor:10.0	Serve juice in a 1-ounce cup. Cover with a plastic lid.

Lime

The citric, sour, astringent, bitter, green, peely, sharp and somewhat floral aromatic associated with limes.

REFERENCE	INTENSITY	PREPARATION
Lime peel	Aroma: 6.5	Put 0.25 grams lime peel in a medium snifter. Cover.
ReaLime 100% Lime Juice	Flavor: 7.0	Serve juice in a 1-ounce cup. Cover with a plastic lid.

SOUR

See “Taste Basics,” p. 13

SOUR AROMATICS

An aromatic associated with the impression of a sour product.

REFERENCE	INTENSITY	PREPARATION
Bush’s Pinto Beans (canned)	Aroma: 2.0	Drain beans and rinse with deionized water. Place 1 tablespoon in a medium snifter at room temperature. Cover.

ACETIC ACID

A sour, astringent, slightly pungent aromatic associated with vinegar.

REFERENCE	INTENSITY	PREPARATION
0.5% acetic acid solution	Aroma: 2.0	Serve in a 1-ounce cup. Cover with a plastic lid.
	Flavor: 2.0	Serve in a 1-ounce cup. Cover with a plastic lid.
1.0% acetic acid solution	Aroma: 2.5	Serve in a 1-ounce cup. Cover with a plastic lid.
	Flavor: 3.0	Serve in a 1-ounce cup. Cover with a plastic lid.
2.0% acetic acid solution	Aroma: 3.0	Serve in a 1-ounce cup. Cover with a plastic lid.
	Flavor: 4.5	Serve in a 1-ounce cup. Cover with a plastic lid.
FlavorActiV “acetic” (acetic acid) https://www.flavoractiv.com/product/acetic-acid-flavour-standard/		Prepare according to FlavorActiV package instructions.

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BUTYRIC ACID

A sour, fermented-dairy aromatic associated with certain aged cheeses such as Parmesan.

REFERENCE	INTENSITY	PREPARATION
0.4 µl/l butyric acid solution	Aroma: 2.5	Serve in a 1-ounce cup. Cover with a plastic lid.
	Flavor: 3.0	Serve in a 1-ounce cup. Cover with a plastic lid.
FlavorActiV “butyric" (butyric acid) https://www.flavoractiv.com/product/butyric-acid-flavour-standard/		Prepare according to FlavorActiV package instructions.

ISOVALERIC ACID

A pungent, sour aromatic associated with sweaty, perspiration-generated foot odor and certain aged cheeses such as Romano.

REFERENCE	INTENSITY	PREPARATION
0.2 µl/l isovaleric acid solution	Aroma: 3.0	Serve in a 1-ounce cup. Cover with a plastic lid.
	Flavor: 4.0	Serve in a 1-ounce cup. Cover with a plastic lid.
FlavorActiV “isovaleric (cheese)" (isovaleric acid) https://www.flavoractiv.com/product/isovaleric-acid-flavour-standard/		Prepare according to FlavorActiV package instructions.

CITRIC ACID

A mild, clean, sour aromatic with slight citrus notes accompanied by astringency.

REFERENCE	INTENSITY	PREPARATION
0.025 % citric acid solution	Aroma: 0.0	Serve in a 1-ounce cup. Cover with a plastic lid.
	Flavor: 2.5	Serve in a 1-ounce cup. Cover with a plastic lid.
0.05 % citric acid solution	Aroma: 0.0	Serve in a 1-ounce cup. Cover with a plastic lid.
	Flavor: 3.5	Serve in a 1-ounce cup. Cover with a plastic lid.

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MALIC ACID

A sour, sharp, somewhat fruity aromatic accompanied by astringency.

REFERENCE	INTENSITY	PREPARATION
0.5 g/l malic acid solution	Flavor: 3.0	Serve in a 1-ounce cup. Cover with a plastic lid.
1.0 g/l malic acid solution	Flavor: 5.0	Serve in a 1-ounce cup. Cover with a plastic lid.

ALCOHOL

A colorless, pungent, chemical-like aromatic associated with distilled spirits or grain products.

REFERENCE	INTENSITY	PREPARATION
Absolut Vodka (80 Proof)	Aroma: 5.0	Dilute 16 milliliters of vodka with 64 milliliters of water. Serve in a large snifter. Cover.

WHISKEY

The aromatic associated with distilled products from fermented grain mash.

REFERENCE	INTENSITY	PREPARATION
Jack Daniel's Tennessee Whiskey Old No. 7	Aroma: 5.5	Serve ½ cup whiskey in a large snifter. Cover.

WINEY

The sharp, pungent, somewhat fruity, alcohol-like aromatic associated with wine.

REFERENCE	INTENSITY	PREPARATION
Yellow Tail Cabernet Sauvignon	Aroma: 10.0	Serve ½ cup of wine in a large snifter. Cover.

FERMENTED

The pungent, sweet, slightly sour, sometimes yeasty, alcohol-like aromatic characteristic of fermented fruits or sugar or over-proofed dough.

REFERENCE	INTENSITY	PREPARATION
Guinness Extra Stout beer	Aroma: 5.0	Fill 2-ounce aroma jars approximated 1/3 full. Prepare one jar for every three participants. This may be prepared 24 hours in advance and left at room temperature.

FERMENTED *Cont.*

REFERENCE	INTENSITY	PREPARATION
Fermented grass	Aroma: 7.0	Fill 2-ounce glass jars half full with grass and seal tightly with screw-on lids. Leave in airtight container for 2 weeks to ferment. Serve in jar; prepare one jar for every three panelists.
FlavorActiV "fermented" (ethyl isovalerate) https://www.flavoractiv.com/product/fermented-flavour-standard/		Prepare according to FlavorActiV package instructions.

OVERRIPE/NEAR FERMENTED

The sweet, slightly sour, damp, musty/earthy aromatic characteristic of fruit or vegetable past their optimum ripeness.

REFERENCE	INTENSITY	PREPARATION
Overripe banana	Aroma: 6.5	Freeze an overripe banana. Microwave the frozen banana for 1 minute. Mash the cooked banana. Serve 1 teaspoon of mash in a medium snifter. Cover.
	Flavor: 6.5	Freeze an overripe banana. Microwave the frozen banana for 1 minute. Mash the cooked banana. Place mash in a 1-ounce cup. Cover with a plastic lid.

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OLIVE OIL

A light, oily aromatic which may have buttery, green, peppery, bitter, and sweet notes.

REFERENCE	INTENSITY	PREPARATION
Bertolli Extra Virgin Olive Oil	Aroma: 8.5	Put 1 tablespoon in a medium snifter. Cover.

RAW

An aromatic associated with uncooked products.

REFERENCE	INTENSITY	PREPARATION
Fisher Natural Whole Almonds	Flavor: 3.0	Serve the almonds in a 1-ounce cup. Cover with a plastic lid.

UNDER–RIPE

An aromatic found in green/under-ripe fruit.

REFERENCE	INTENSITY	PREPARATION
Grapefruit peel	Aroma: 7.5	Put 0.25 grams of grapefruit peel in a medium snifter. Cover.

PEAPOD

Green aromatic that is sweet, beany, fresh, raw, and musty/earthy.

REFERENCE	INTENSITY	PREPARATION
Le Nez du Café, no. 3 “garden peas”	Aroma: 7.0	Place 1 drop of essence on a cotton ball in a large snifter. Cover.
FlavorActiV “under-ripe fruit" (acetaldehyde) https://www.flavoractiv.com/product/peapod-flavour-standard/	*	Prepare according to FlavorActiV package instructions.

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GREEN

An aromatic characteristic of fresh, plant-based material. Attributes may include leafy, viney, unripe, grassy, and peapod.

REFERENCE	INTENSITY	PREPARATION
Parsley water	Aroma: 9.0	Rinse and chop 25 grams of fresh parsley. Add 300 milliliters of water. Let sit for 15 minutes. Filter out the parsley. Serve 1 tablespoon of the water in a medium snifter. Cover.
	Flavor: 6.0	Rinse and chop 25 grams of fresh parsley. Add 300 milliliters of water. Let sit for 15 minutes. Filter out the parsley. Serve 2 teaspoons of the water in a 1-ounce cup. Cover with a plastic lid.

FRESH

A green aromatic associated with newly cut grass and leafy plants, characterized by a sweet and pungent character.

REFERENCE	INTENSITY	PREPARATION
Fresh green grass	Aroma: 7.0	Break in half 5 pieces of grass and place into a medium snifter. Cover. Prepare one snifter for every three panelists. Prepare on the day of evaluation so the grass does not ferment and change aroma.
FlavorActiV “freshly cut grass" (cis-3-hexanol) https://www.flavoractiv.com/product/fresh-flavour-standard/	*	Prepare according to FlavorActiV package instructions.

DARK GREEN

The aromatic commonly associated with cooked green vegetables such as spinach, kale, or green beans that may include bitter, sweet, dusty, musty, or earthy elements, and may have a dark, heavy impression.

REFERENCE	INTENSITY	PREPARATION
Green Giant Cut Green Beans (canned, liquid of)	Aroma: 5.0	Place 1 tablespoon of liquid from canned vegetables in a medium snifter. Cover.
	Flavor: 6.0	Serve liquid from canned vegetables in 1-ounce cup. Cover with a plastic lid.
Del Monte Leaf Spinach (canned, liquid of)	Aroma: 7.0	Place 1 tablespoon of liquid from canned vegetables in a medium snifter. Cover.
	Flavor: 6.0	Serve liquid from canned vegetables in 1-ounce cup. Cover with a plastic lid.

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VEGETATIVE

Sharp, slightly pungent aromatic associated with green plant or vegetable matter such as parsley, spinach, or peapod.

REFERENCE	INTENSITY	PREPARATION
Cut Asparagus Spears (canned)	Flavor: 6.0	Drain liquid from can, saving vegetable water. Place approximately 3 pieces of asparagus and 1 tablespoon of liquid into 1-ounce cups. Cover with a plastic lid. This may be prepared 24 hours in advance and refrigerated. Bring to room temperature for serving.

HAY-LIKE

The lightly sweet, dry, dusty aromatic with slight green character associated with dry grasses.

REFERENCE	INTENSITY	PREPARATION
McCormick Parsley Flakes	Aroma: 7.5	Place 1 teaspoon of flakes in a medium snifter. Cover.

HERB-LIKE

The aromatic commonly associated with green herbs that may be characterized as sweet, slightly pungent, and slightly bitter. May or may not include green or brown notes.

REFERENCE	INTENSITY	PREPARATION
Mixture of McCormick Bay Leaves, McCormick Ground Thyme, and McCormick Basil Leaves	Aroma: 6.0	Mix together 0.5 grams of each herb. Break the bay leaves into smaller pieces with your hands first, and then grind all the herbs together using a mortar and pestle. Add 100 milliliters of water. Mix well. Put 5 milliliters of herb water in a medium snifter, and add 200 milliliters of water. Cover.
	Flavor: 5.0	Mix together 0.5 grams of each herb. Break the bay leaves into smaller pieces with your hands first, and then grind all the herbs together using a mortar and pestle. Add 100 milliliters of water. Mix well. Mix 5 milliliters of herb water with 200 milliliters of water and serve in a 1-ounce cup. Cover with a plastic lid.

BEANY

An aromatic characteristic of beans and bean products that contains musty/earthy, musty/dusty, sour aromatic, bitter aromatic, starchy, and green/peapod, nutty or brown elements.

REFERENCE	INTENSITY	PREPARATION
Bush's Pinto Beans (canned)	Aroma: 7.0	Drain beans and rinse with de-ionized water. Place 1 tablespoon in a medium snifter at room temperature. Cover.
	Flavor: 7.5	Drain beans and rinse with de-ionized water. Serve in 1-ounce cups. Cover with a plastic lid.

STALE/PAPERY

STALE

The aromatic characterized by a lack of freshness.

REFERENCE	INTENSITY	PREPARATION
Mama Mary's Gourmet Original Pizza Crust	Aroma: 4.5	Serve cut a 2-inch square of crust and serve in a medium snifter. Cover.
	Flavor: 4.0	Serve cut a 2-inch square and serve in a 3.25-ounce cup. Cover with a plastic lid.

PAPERY

The aromatic associated with white paper cups.

REFERENCE	INTENSITY	PREPARATION
Pure Brew coffee filters	Flavor: 2.5	Submerge a stack of 15 coffee filters in 48 ounces boiling water overnight. Remove filters and place remaining water into 1-ounce cups. Cover with a plastic lid. This may be prepared in 24 hours advance and stored at room temperature.
FlavorActiV "papery" (trans-2-nonenal) https://www.flavoractiv.com/product/papery-flavour-standard-2/		Prepare according to FlavorActiV package instructions.

CARDBOARD

The aromatic associated with cardboard or paper packaging.

REFERENCE	INTENSITY	PREPARATION
Cardboard	Aroma: 7.5	Cut a 2-inch square of cardboard. Place in 1/2 cup water. Serve in a medium snifter. Cover.

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WOODY

The sweet, brown, musty, dark aromatic associated with a bark of a tree.

REFERENCE	INTENSITY	PREPARATION
Diamond Shelled Walnuts	Aroma: 4.0	Chop walnuts. Place 1 tablespoon of chopped walnuts in a medium snifter. Cover.
	Flavor: 4.0	Serve walnuts in a 1-ounce cup. Cover with a plastic lid.
Popsicle sticks	Aroma: 7.5	Break popsicle sticks to fit in sample cups of any size. Cover with a plastic lid. This may be prepared in advance.

MUSTY/EARTHY

The somewhat sweet, heavy aromatic associated with decaying vegetation and damp, black soil.

REFERENCE	INTENSITY	PREPARATION
Miracle-Gro Potting Mix soil	Aroma: 9.0	Fill a 2-ounce glass jar half full with potting soil and seal tightly with screw-on type lid. Prepare one jar for every three panelists.
Le Nez du Café no. 1 “earthy”	Aroma: 12.0	Place 1 drop of essence on a cotton ball in a large snifter. Cover.
FlavorActiV “wet earthy" (2-ethyl fenchol) https://www.flavoractiv.com/product/musty-earthy-coffee-flavour-standard/		Prepare according to FlavorActiV package instructions.

MUSTY/DUSTY

The aromatic associated with dry, closed-air spaces such as attics and closets. May have elements of dry, musty, papery, dry soil, or grain.

REFERENCE	INTENSITY	PREPARATION
Kretschmer Wheat Germ	Aroma: 5.0	Serve 1 tablespoon wheat germ in a medium snifter. Cover.
2, 3, 4 – Trimethoxybenzaldehyde	Aroma: 10.0	Place 0.1 gram in a medium snifter. Cover.

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MUSTY/DUSTY *Cont.*

REFERENCE	INTENSITY	PREPARATION
FlavorActiV “dry earth" (geosmin) https://www.flavoractiv.com/product/musty-dusty-flavour-standard/		Prepare according to FlavorActiV package instructions.

MOLDY/DAMP

The aromatic associated with damp, closed spaces or basements. May be musty, sharp, and slightly green.

REFERENCE	INTENSITY	PREPARATION
2-Ethyl-1-Hexanol 10,000 ppm	Aroma: 6.0	Place 1 drop on a cotton ball and serve in a medium snifter. Cover.
2,3,5,6 – Tetrachloroanisole	Aroma: 10.0	Place 0.1 gram in a medium snifter. Cover.
FlavorActiV “moldy-damp" (2, 4, 6 trichloroanisole) https://www.flavoractiv.com/product/mouldy-damp-flavour-standard/		Prepare according to FlavorActiV package instructions.

PHENOLIC

The aromatic described as damp, musty, and like animal hide. Reminiscent of a tack room.

REFERENCE	INTENSITY	PREPARATION
Phenylacetic acid	Aroma: 6.0	Serve 0.15g of phenylacetic acid in a medium snifter. Cover.
FlavorActiV “medicinal (o-cresol)" (Methyl Phenol) https://www.flavoractiv.com/product/medicinal-flavour-standard/		Prepare according to FlavorActiV package instructions.

ANIMALIC

A combination of the aromatics associated with farm animals and live-animal habitation.

REFERENCE	INTENSITY	PREPARATION
Unflavored gelatin	Aroma: 3.0	Dissolve 1 bag of gelatin (1/4 ounce) in 2 cups distilled water. Place ¼ cup of gelatin water in a medium snifter. Cover.

MEATY/BROTHY

The aromatic associated with boiled meat, soup, or stock, with weak meaty notes.

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BITTER

See “Taste Basics,” p. 14

SALTY

See “Taste Basics,” p. 14

MEDICINAL

A clean, sterile aromatic characteristic of antiseptic-like products such as Band-Aids, alcohol, and iodine.

REFERENCE	INTENSITY	PREPARATION
Iodine	Aroma: 3.0	Serve 1/4 cup iodine in a medium snifter. Cover.
Alcohol	Aroma: 5.0	Serve 1/4 cup alcohol in a medium snifter. Cover.
Le Nez du Café no. 35 “medicinal”	Aroma: 6.0	Place 1 drop of essence on a cotton ball in a large snifter. Cover.
Band-Aid Plastic Strips adhesive bandage	Aroma: 6.0	Place 1 bandage in a medium snifter. Cover.

RUBBER

A dark, heavy, slightly sharp, and pungent aromatic associated with rubber.

REFERENCE	INTENSITY	PREPARATION
A&W Rubber Bands	Aroma: 5.0	Place 10 grams of rubber bands in a medium snifter. Cover.

PETROLEUM

A specific chemical aromatic associated with crude oil and its refined products, which have heavy oil characteristics.

REFERENCE	INTENSITY	PREPARATION
Vaseline petroleum jelly	Aroma: 3.0	Place a teaspoon of jelly in a medium snifter. Cover.
FlavorActiV “diesel/motor fuel" (p-cymene) https://www.flavoractiv.com/product/petroleum-flavour-standard/		Prepare according to FlavorActiV package instructions.

SKUNKY

A combination of aromatics associated with skunks.

REFERENCE	INTENSITY	PREPARATION
Latex balloon	Aroma: 2.5	Place 2 balloons in a 2-ounce glass jar with screw-type lid. This may be prepared several days in advance and stored at room temperature. Prepare one jar for every three panelists.

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TOBACCO

The brown, slightly sweet, slightly pungent aromatic associated with cured tobacco.

REFERENCE	INTENSITY	PREPARATION
Le Nez du Café no. 33 “pipe tobacco”	Aroma: 5.0	Place 1 drop of essence on a cotton ball in a large snifter. Cover.
Camel cigarettes (Turkish and Domestic blend)	Aroma: 7.0	Break cigarette and place 0.1 grams tobacco in a medium snifter. Cover.
Cigar tobacco	Aroma: 10.5	Split cigar into a 2-ounce glass jar with screw-on type lid. Fill jars approximately 1/3 full. Prepare 1 jar for every three panelists.
Unscented pipe tobacco	Aroma: 10.5	Fill a 2-ounce glass jar with screw-on type lid approximately 1/3 full with tobacco and seal tightly. Prepare 1 jar for every three panelists.

PIPE TOBACCO

The brown, sweet, slightly pungent, fruity, floral, spicy aromatic associated with cured tobacco.

REFERENCE	INTENSITY	PREPARATION
Carter Hall Pipe Tobacco	Aroma: 6.5	Put 1 teaspoon of tobacco in a medium snifter. Cover.

ACRID

The sharp, pungent, bitter, acidic aromatic associated with products that are excessively roasted or browned.

REFERENCE	INTENSITY	PREPARATION
Alf’s Natural Nutrition Red Wheat Cereal	Aroma: 3.0	Serve 2 tablespoons cereal in a medium snifter. Cover.
	Flavor: 3.0	Serve 1 tablespoon cereal in a 1-ounce cup. Cover with a plastic lid.
Wright’s Liquid Smoke Mesquite	Aroma: 9.5	Place 1 drop of liquid smoke on a cotton ball in a large snifter. Cover.

ASHY

The dry, dusty, dirty, smoky aromatic associated with the residual of burnt products.

REFERENCE	INTENSITY	PREPARATION
Gerkens 10/12 Midnight Black heavily alkalized cocoa powder	Aroma: 2.5	Put ½ teaspoon of cocoa powder in a medium snifter. Cover.
	Flavor: 3.5	Mix ¼ teaspoon cocoa powder with 100 milliliters water. Serve in a 1-ounce cup. Cover with a plastic lid.
Benzyl disulfide	Aroma: 4.0	Place 0.1 gram of benzyl disulfide in a medium snifter. Cover.
Paper ashes	Aroma: 4.0	Obtain ashes from burned white paper and place in 2-ounce glass jars with screw-on type lids. Fill jars approximately 1/3 full. This may be prepared several days in advance and stored at room temperature, tightly sealed. Prepare one jar for every three panelists.

BURNT

The dark brown impression of an over-cooked or over-roasted product that can be sharp, bitter, and sour.

REFERENCE	INTENSITY	PREPARATION
Benzyl disulfide	Aroma: 4.5	Place 0.1 gram of benzyl disulfide in a medium snifter. Cover.
Raw peanuts, over-roasted/burnt	Flavor: 7.5	Preheat oven to 425°F. Place raw, blanched peanuts in a single layer on a baking sheet lined with parchment paper. Roast for 20 minutes. Peanuts will be burnt. Serve in a 1-ounce cup. Cover with a plastic lid.
Alf's Natural Nutrition Red Wheat Cereal	Aroma: 8.0	Serve 1 tablespoon of cereal in a medium snifter. Cover.
	Flavor: 3.0	Place 1 tablespoon of cereal in a 1-ounce cup. Cover with a plastic lid. Cereal should be tasted two at a time.

SMOKY

An acute, pungent aromatic that is a product of the combustion of wood, leaves, or a non-natural product.

REFERENCE	INTENSITY	PREPARATION
Benzyl disulfide	Aroma: 3.5	Place 0.1 gram of benzyl disulfide in a medium snifter. Cover.
Diamond Smoked Almonds	Aroma: 6.0	Place 5 almonds in a medium snifter. Cover.
	Flavor: 5.0	Place 1 tablespoon of almonds in a 3.25 ounce cup. Cover with a plastic lid.

SMOKY *Cont.*

REFERENCE	INTENSITY	PREPARATION
Wood Ashes	Aroma: 5.0	Obtain ashes from burned wood (from fireplace or outdoor fire pit). Place ashes in 2-ounce glass jars with screw-on type lids. Fill jars approximately 1/3 full. This may be prepared several days in advance and stored at room temperature, tightly sealed. Prepare one jar for every three participants.

ROASTED

Dark brown impression characteristic of products cooked to a high temperature by dry heat. Does not include bitter or burnt notes.

REFERENCE	INTENSITY	PREPARATION
Raw blanched peanuts, lightly roasted	Flavor: 2.5	Preheat oven to 425°F. Place peanuts in a single layer on a baking sheet lined with parchment paper. Roast for 7 minutes. Peanuts will not show any color. Serve in a 1-ounce cup. Cover with a plastic lid.
Raw blanched peanuts, medium-roasted	Flavor: 6.5	Preheat oven to 425°F. Place peanuts in a single layer on a baking sheet lined with parchment paper. Roast for 10 minutes or until peanuts are medium brown in color. Serve in a 1-ounce cup. Cover with a plastic lid.
Raw blanched peanuts, dark-roasted	Flavor: 9.5	Preheat oven to 425°F. Place peanuts in a single layer on a baking sheet lined with parchment paper. Roast for 15 minutes or until peanuts are dark brown in color. Serve in a 1-ounce cup. Cover with a plastic lid.
Raw blanched peanuts, over-roasted/burnt	Flavor: 15.0	Preheat oven to 425°F. Place peanuts in a single layer on a baking sheet lined with parchment paper. Roast for 20 minutes. Peanuts will be burnt. Serve in a 1-ounce cup. Cover with a plastic lid.

BROWN, ROAST

A rich, full, round aromatic impression always characterized as some degree of darkness, generally associated with attributes such as toasted, nutty, roasted, and sweet.

REFERENCE	INTENSITY	PREPARATION
Bush's Pinto Beans (canned)	Aroma: 6.0	Place 1 tablespoon in a medium snifter at room temperature. Cover.
	Flavor: 3.0	Drain beans and rinse with de-ionized water. Serve in a 1-ounce cup. Cover with a plastic lid.
C&H Pure Cane Sugar, Golden Brown	Aroma: 3.0	Place 1 teaspoon of sugar in a medium snifter. Cover.
	Flavor: 7.0	Place 1 teaspoon of sugar in a 1-ounce cup. Cover with a plastic lid.

GRAIN

The light brown, dusty, musty, sweet aromatic associated with grains.

REFERENCE	INTENSITY	PREPARATION
Mixture of General Mills Rice Chex, General Mills Wheaties and Quaker Quick Oats cereals	Aroma: 5.0	Mix together ½ cup of each kind of cereal. Put in a blender and "pulse" blend into small particles. Place 1 tablespoon in a medium snifter. Cover.
	Flavor: 8.0	Mix together ½ cup of each kind of cereal. Put in a blender and "pulse" blend into small particles. Serve 1 teaspoon in a 1-ounce cup. Cover with a plastic lid.

MALT

The light brown, dusty, musty, sweet, sour and or slightly fermented aromatic associated with grains.

REFERENCE	INTENSITY	PREPARATION
Post Grape-Nuts cereal	Aroma: 3.5	Place 1 tablespoon of cereal in a medium snifter. Cover.
	Flavor: 8.0	Serve cereal in a 1-ounce cup. Cover with a plastic lid.

PUNGENT

A sharp, physically penetrating sensation in the nasal cavity.

REFERENCE	INTENSITY	PREPARATION
Majestic Mountain Sage Orange Essential Oil, Brazil	Aroma: 5.0	Mix 1 drop essential oil into 1 tablespoon 3% sucrose solution. Serve in a medium snifter. Cover.

PEPPER

The spicy, pungent, musty, and woody aromatic characteristic of ground black pepper.

REFERENCE	INTENSITY	PREPARATION
McCormick Ground Black Pepper	Aroma: 13.0	Place ½ teaspoon pepper in a medium snifter. Cover.

ANISE

A pungent, sweet, brown, caramelized aromatic that may contain petroleum, medicinal, and floral notes.

REFERENCE	INTENSITY	PREPARATION
Tone's Pure Anise Extract	Aroma: 7.5	Place 1 drop of anise extract on a cotton ball in a large snifter. Cover.

NUTMEG

A wet, brown, woody, pungent, petroleum-like, heavy aromatic with a slightly lemony impression.

REFERENCE	INTENSITY	PREPARATION
McCormick Ground Nutmeg	Aroma: 9.0	Place ¼ teaspoon nutmeg in a covered medium snifter. Cover.

BROWN SPICE

The sweet, brown aromatic associated with spices such as cinnamon, clove, nutmeg, and allspice.

REFERENCE	INTENSITY	PREPARATION
Private Selection Cinnamon Sticks	Aroma: 3.0	Place 1 cinnamon stick in a 2-ounce glass jar with screw-on type lid. Prepare one per every four panelists. May be prepared 24 hours in advance and stored with tightly sealed lid.
Private Selection Nutmeg (whole) and Private Selection Clove (whole)	Aroma: 7.0	Place 1 whole nutmeg and 3 clove buds in a 2-ounce glass jar with screw-on type lid. Prepare one per every four participants. May be prepared 24 hours in advance and stored with tightly sealed lid. (Note: If unable to find whole nutmeg, substitute ¼ teaspoon of ground nutmeg.)
Ground cinnamon, allspice, nutmeg, and clove mixture	Aroma: 10.5	Mix together 0.25 grams ground cinnamon, 0.25 grams ground allspice, 0.25 grams ground nutmeg, and 0.06 grams ground cloves. Serve 1/4 teaspoon of spice mixture in a medium snifter. Cover.
FlavorActiV “phenolic" (4-vinyl guiacol) https://www.flavoractiv.com/product/brown-spice-flavour-standard/		Prepare according to FlavorActiV package instructions.

CINNAMON

A sweet, brown, slightly woody, slightly pungent, spicy aromatic.

REFERENCE	INTENSITY	PREPARATION
McCormick Ground Cinnamon	Aroma: 13.0	Place ¼ teaspoon of cinnamon in a medium snifter. Cover.

CLOVE

A sweet, brown, spicy, pungent, floral, citrus, medicinal, and slightly minty aromatic.

REFERENCE	INTENSITY	PREPARATION
Le Nez du Café no. 7 “clove” n.7	Aroma: 6.5	Place 1 drop of essence on a cotton ball in a large snifter. Cover.

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NUTTY

A slightly sweet, brown, woody, oily, musty, astringent, and bitter aromatic commonly associated with nuts, seeds, beans, and grains.

REFERENCE	INTENSITY	PREPARATION
Le Nez du Café no. 29 “roasted hazelnuts”	Aroma: 7.5	Place 1 drop of essence on a cotton ball in a large snifter. Cover.
Mixture of Diamond Sliced Almonds and Diamond Shelled Walnuts	Flavor: 7.5	Puree the almonds and walnuts separately in blenders for 45 seconds on high speed. Combine equal amounts of the chopped nuts. Serve in 1-ounce cups. Cover with a plastic lid.

ALMOND

A sweet, light brown, woody, and buttery aromatic with floral and fruity notes that may include rose, cherry, and apricot. It is also astringent and may be slightly smoky.

REFERENCE	INTENSITY	PREPARATION
Le Nez du Café no. 27 “roasted almonds”	Aroma: 7.0	Place 1 drop of essence on a cotton ball in a large snifter. Cover.
FlavorActiV “almond" (benzaldehyde) https://www.flavoractiv.com/product/almond-benzaldehyde-flavour-standard/		Prepare according to FlavorActiV package instructions.

HAZELNUT

A woody, brown, sweet, musty/earthy, slightly cedar aromatic. May include floral, beany, oily, astringent, and bitter flavor notes.

REFERENCE	INTENSITY	PREPARATION
Le Nez du Café no. 29 “roasted hazelnuts”	Aroma: 5.5	Place 1 drop of essence on a cotton ball in a large snifter. Cover.

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HAZELNUT *Cont.*

REFERENCE	INTENSITY	PREPARATION
McCormick Imitation Hazelnut Extract, in milk	Flavor: 3.5	Place ⅛ teaspoon of hazelnut extract in 1 cup of whole milk. Cover with a plastic lid.
McCormick Imitation Hazelnut Extract, in milk	Flavor: 6.0	Place ¼ teaspoon of hazelnut extract in 1 cup of whole milk. Cover with a plastic lid.

PEANUTS

A sweet, light brown, oily, somewhat musty/dusty, beany aromatic that may be slightly astringent.

REFERENCE	INTENSITY	PREPARATION
Raw blanched bulk peanuts, roasted	Aroma: 8.5	Preheat oven to 425°F. Place raw, blanched peanuts in a single layer on a baking sheet lined with parchment paper. Roast for 10 minutes or until peanuts are medium brown in color. Chop peanuts and serve 1 tablespoon in a medium snifter. Cover.
	Flavor: 7.5	Preheat oven to 425°F. Place raw, blanched peanuts in a single layer on a baking sheet lined with parchment paper. Roast for 10 minutes or until peanuts are medium brown in color. Serve in a 1-ounce cup. Cover with a plastic lid.

CHOCOLATE

A blend of cocoa, including cocoa butter and dark roast aromatics at varying intensities.

REFERENCE	INTENSITY	PREPARATION
Nestle Toll House Semi-Sweet Chocolate Morsels	Aroma: 8.0	Chop the chocolate chips and place ¼ cup in a medium snifter. Cover.
	Flavor: 7.5	Place 1 teaspoon of chocolate in a 1-ounce cup. Cover with a plastic lid. During the tasting session, taste one chip per sample.

COCOA

A brown, sweet, dusty, musty, often bitter aromatic associated with cocoa bean, powdered cocoa and chocolate bars.

REFERENCE	INTENSITY	PREPARATION
Hershey's Cocoa Powder Natural Unsweetened, in water	Aroma: 7.5	Mix 1/4 teaspoon of cocoa powder with 100 milliliters of water. Serve in a medium snifter. Cover.
	Flavor: 5.0	Mix 1/4 teaspoon of cocoa powder with 100 milliliters of water. Serve in a 1-ounce cup. Cover with a plastic lid.

DARK CHOCOLATE

A high-intensity blend of cocoa and cocoa butter that may include dark roast, spicy, burnt, and musty notes with increased astringency and bitterness.

REFERENCE	INTENSITY	PREPARATION
Lindt Excellence 90% Cocoa Supreme Dark chocolate bar	Aroma: 6.0	Chop the chocolate and put 1 teaspoon in a medium snifter. Cover.
	Flavor: 11.0	Serve three 1/2-inch squares of chocolate in a 1-ounce cup. Cover with a plastic lid.
Dove Promises Silky Smooth Dark Chocolate (individually wrapped bite-sized bars)	Flavor: 8.5	Serve one chocolate in snack-size Ziploc bag.

SWEET

See “Taste Basics,” p. 14

MOLASSES

Dark, caramelized top notes that may include slightly sharp, acrid, and sulfur notes characteristic of molasses.

REFERENCE	INTENSITY	PREPARATION
Grandma’s Original Molasses, unsulphured	Aroma: 6.5	Mix 2 teaspoons of molasses in 250 milliliters of water. Serve ¼ cup in a medium snifter. Cover.
	Flavor: 6.5	Mix 2 teaspoons of molasses in 250 milliliters of water. Serve 1 teaspoon molasses in a 1-ounce cup. Cover with a plastic lid.

MAPLE SYRUP

A woody, sweet, caramelized, brown, slightly green aromatic associated with maple syrup.

REFERENCE	INTENSITY	PREPARATION
Le Nez du Café no. 24 “maple syrup”	Aroma: 7.0	Place 1 drop of essence on a cotton ball in a large snifter. Cover.
Maple Grove Farms Pure Maple Syrup Medium Amber	Flavor: 5.0	Serve 1 teaspoon maple syrup in a 1-ounce cup. Cover with a plastic lid.

BROWN SUGAR

A rich, full, round, sweet aromatic impression characterized by some degree of darkness.

REFERENCE	INTENSITY	PREPARATION
C&H Pure Cane Sugar, Golden Brown	Aroma: 6.0	Place 1 teaspoon brown sugar in a medium snifter. Cover.
	Flavor: 5.0	Mix 2 teaspoons sugar in 1 cup water. Serve in a 1-ounce cup. Cover with a plastic lid.

CARAMELIZED

A round, full-bodied, medium brown, sweet aromatic associated with cooked sugars and other carbohydrates. Does not include burnt or scorched notes.

REFERENCE	INTENSITY	PREPARATION
Le Nez du Café no. 25 “caramel”	Aroma: 8.0	Place 1 drop of essence on a cotton ball in a large snifter. Cover.
C&H Pure Cane Sugar, Golden Brown	Flavor: 2.5	Place 2 teaspoons sugar in 1 cup water. Serve 1 teaspoon in a 1-ounce cup. Cover with a plastic lid.
	Flavor: 4.5	Make 60% solution by dissolving 60 grams brown sugar in 1 liter water. Serve 1 teaspoon in a 1-ounce cup. Cover with a plastic lid.
Caramelized white table cane sugar	Flavor: 7.5	Place 1 cup white table sugar in a heavy saucepan. Cook over low-to-medium heat, stirring constantly with a wooden spoon, until sugar is melted. When it has turned light amber in color, remove from heat and pour onto wax paper. Be very careful—melted sugar is VERY HOT. Let harden. Break cooled, solidified sugar into pieces and store in a labeled airtight container. Serve a few small pieces in a 1-ounce cup. Cover with a plastic lid.

HONEY

Sweet, light brown, slightly spicy aromatic associated with honey.

REFERENCE	INTENSITY	PREPARATION
Busy Bee Pure Clover Honey	Aroma: 6.0	Dissolve 1 tablespoon honey in 250 milliliters of hot water. Serve ¼ cup in a medium snifter. Cover.
	Flavor: 6.5	Dissolve 1 tablespoon honey in 250 milliliters of hot water. Serve in a 1-ounce cup. Cover with a plastic lid.

VANILLA

A woody, slightly chemical aromatic associated with vanilla bean, which may include brown, beany, floral, and spicy notes.

REFERENCE	INTENSITY	PREPARATION
Le Nez du Café no. 10 “vanilla“	Aroma: 2.5	Place 2 drops of Le Nez du Café essence on a cotton ball in a large snifter. Cover.
Spice Islands Bourbon Vanilla Bean	Aroma: 5.5	Place 0.5 gram chopped vanilla beans in a medium snifter. Cover.
McCormick Pure Vanilla Extract, in whole milk	Flavor: 3.0	Stir 1/8 teaspoon of vanilla extract into ½ cup of whole milk. Serve in a 1-ounce cup. Cover with a plastic lid.

VANILLIN

An extremely sweet, non-natural aromatic associated with vanilla, cotton candy, and marshmallows.

REFERENCE	INTENSITY	PREPARATION
Fisher Scientific Vanillin	Aroma: 6.0	Mix 2 grams vanillin powder into 250 milliliters of water. Place in a large snifter. Cover.
FlavorActiV “vanilla" (vanillin) https://www.flavoractiv.com/product/vanilla-flavour-standard/		Prepare according to FlavorActiV package instructions.

SWEET AROMATICS

An aromatic associated with the impression of a sweet substance.

REFERENCE	INTENSITY	PREPARATION
Fisher Scientific Vanillin	Aroma: 5.0	Mix 0.5 grams of vanillin into 250 milliliters of water in a large snifter. Cover.
	Aroma: 7.0	Mix 2 grams of vanillin into 250 milliliters of water in a large snifter. Cover.
Nabisco Lorna Doone cookies	Flavor: 5.0	Serve 2 cookies in a 3.25-ounce cup. Cover with a plastic lid.

OVERALL SWEET

The perception of a combination of sweet taste and aromatics.

REFERENCE	INTENSITY	PREPARATION
Post Shredded Wheat	Flavor: 1.5	Serve 2 tablespoons in a 3.25-ounce cup. Cover with a plastic lid.
General Mills Wheaties	Flavor: 3.0	Serve 2 tablespoons in a 3.25-ounce cup. Cover with a plastic lid.
Nabisco Lorna Doone Cookies	Flavor: 5.0	Serve 2 cookies in a 3.25-ounce cup. Cover with a plastic lid.

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FLORAL

A sweet, light, slightly fragrant aromatic associated with fresh flowers.

REFERENCE	INTENSITY	PREPARATION
Welch's 100% White Grape juice	Aroma: 6.0	Mix 1 part water and 1 part juice. Place ¼ cup of mixture in a medium snifter. Cover.
	Flavor: 5.0	Mix 1 part water and 1 part juice. Serve mixure in a 1-ounce cup. Cover with a plastic lid.
Carnation essence oil	Aroma: 7.5	Place 1 drop of Carnation essence oil on a cotton ball in a large snifter. Cover.
Le Nez du Café n.12 "coffee blossom"	Aroma: 8.0	Place 1 drop of Le Nez du Café essence on a cotton ball in a large snifter. Cover.
FlavorActiV "rose/floral" (geraniol) https://www.flavoractiv.com/product/floral-flavour-standard-2/		Prepare according to FlavorActiV package instructions.

ROSE

A sweet, soft, slightly musty/dusty floral fragrance associated with fresh or dried roses.

REFERENCE	INTENSITY	PREPARATION
Rose water	Aroma: 5.0	Place 2 drops of rose water on a cotton ball in a medium snifter. Cover.

JASMINE

An intense, slightly pungent, sweet, floral aromatic with underlying green, musty/dusty notes.

REFERENCE	INTENSITY	PREPARATION
Jasmine extract	Aroma: 8.5	Place 1 drop of jasmine extract on a cotton ball in a medium snifter. Cover.

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JASMINE *Cont.*

REFERENCE	INTENSITY	PREPARATION
FlavorActiV “indole” https://www.flavoractiv.com/product/jasmine-flavour-standard/	*	Prepare according to FlavorActiV package instructions.

CHAMOMILE

The sweet, slightly floral/fruity, somewhat woody green associated with chamomile.

REFERENCE	INTENSITY	PREPARATION
Celestial Seasonings Chamomile Tea	Aroma: 5.0	Place 1 tea bag in 1 cup of boiling water. Brew for 5 minutes. Let cool. Serve 1/4 cup of the brewed tea in a medium snifter. Cover.
	Flavor: 5.0	Place 1 tea bag in 1 cup of boiling water. Brew for 5 minutes. Let cool. Serve brewed tea in a 1-ounce cup. Cover with a plastic lid.

BLACK TEA

A somewhat brown, musty, dried plant and dried bark aromatic associated with the oxidization of tea leaves.

REFERENCE	INTENSITY	PREPARATION
Lipton Black Tea	Aroma: 8.0	Cut open 1 tea bag. Pour the tea leaves into medium snifters. Place 1 teaspoon of hot water over leaves immediately before serving.
	Flavor: 7.0	Place 1 tea bag in 1 cup of boiling water. Brew for 5 minutes. Let cool. Serve brewed tea in a 1-ounce cup. Cover with a plastic lid.

AMPLITUDE

Amplitude measures the overall impression of a product judged on the following aspects: overall impact, blended (the extent to which the flavors and aromas of the product blend together), longevity, and body/fullness. The amplitude reflects the degree to which the characteristics of the product adhere together.

OVERALL IMPACT

The maximum overall sensory impression.

REFERENCE	INTENSITY	PREPARATION
Gevalia Kaffe Traditional Roast, ground	Flavor: 7.5	Begin brewing 1 hour before test.Use 30 grams ground coffee and 48 ounces deionized water and an autodrip coffee maker that meets SCAA Certified Brewer standards. Brew. Transfer coffee to clean, insulated airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.
Folgers Classic Roast Coffee, ground	Flavor: 9.0	Begin brewing 1 hour before test.Use 30 grams ground coffee and 48 ounces deionized water and an autodrip coffee maker that meets SCAA Certified Brewer standards. Brew. Transfer coffee to clean, insulated airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.
Folgers Classic Roast, instant coffee crystals	Flavor: 12.0	Begin preparing 1/2 hour before the test. Weigh 30 grams of instant coffee and add to 48 ounces deionized water at 165°F. Mix well. Transfer to clean, insulated coffee airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.

BLENDED

The melding of individual sensory notes such that the products present a unified overall sensory experience as opposed to spikes or individual notes.

REFERENCE	INTENSITY	PREPARATION
Folgers Classic Roast, instant coffee crystals	Flavor: 3.0	Begin preparing 1/2 hour before the test. Weigh 30 grams of instant coffee and add to 48 ounces deionized water at 165°F. Mix well. Transfer to clean, insulated coffee airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.

BLENDED *Cont.*

REFERENCE	INTENSITY	PREPARATION
Folgers Classic Roast Coffee, ground	Flavor: 6.0	Begin brewing 1 hour before test.Use 30 grams ground coffee and 48 ounces deionized water and an autodrip coffee maker that meets SCAA Certified Brewer standards. Brew. Transfer coffee to clean, insulated airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.
Gevalia Kaffe Traditional Roast, ground	Flavor: 10.0	Begin brewing 1 hour before test.Use 30 grams ground coffee and 48 ounces deionized water and an autodrip coffee maker that meets SCAA Certified Brewer standards. Brew. Transfer coffee to clean, insulated airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.

LONGEVITY

The time that the full, integrated sensory experience sustains itself in the mouth and after swallowing.

REFERENCE	INTENSITY	PREPARATION
Gevalia Kaffe Traditional Roast, ground	Flavor: 7.5	Begin brewing 1 hour before test.Use 30 grams ground coffee and 48 ounces deionized water and an autodrip coffee maker that meets SCAA Certified Home Brewer standards. Brew. Transfer coffee to clean, insulated airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.
Folgers Classic Roast Coffee, ground	Flavor: 9.0	Begin brewing 1 hour before test.Use 30 grams ground coffee and 48 ounces deionized water and an autodrip coffee maker that meets SCAA Certified Home Brewer standards. Brew. Transfer coffee to clean, insulated airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.
Folgers Classic Roast, instant coffee crystals	Flavor: 12.0	Begin preparing 1/2 hour before the test. Weigh 30 grams of instant coffee and add to 48 ounces deionized water at 165°F. Mix well. Transfer to clean, insulated coffee airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.

FULLNESS

The foundation of flavor notes that gives substance to the product. The perception of robust flavor that is rounded with body.

REFERENCE	INTENSITY	PREPARATION
Folgers Classic Roast, instant coffee crystals	Flavor: 5.0	Begin preparing 1/2 hour before the test. Weigh 30 grams of instant coffee and add to 48 ounces deionized water at 165°F. Mix well. Transfer to clean, insulated coffee airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.

FULLNESS *Cont.*

REFERENCE	INTENSITY	PREPARATION
Folgers Classic Roast Coffee, ground	Flavor: 7.5	Begin brewing 1 hour before test.Use 30 grams ground coffee and 48 ounces deionized water and an autodrip coffee maker that meets SCAA Certified Home Brewer standards. Brew. Transfer coffee to clean, insulated airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.
Gevalia Kaffe Traditional Roast, ground	Flavor: 10.0	Begin brewing 1 hour before test.Use 30 grams ground coffee and 48 ounces deionized water and an autodrip coffee maker that meets SCAA Certified Home Brewer standards. Brew. Transfer coffee to clean, insulated airpot (140°F) in the evaluation room. Put empty 4-ounce Styrofoam cups (with lids) on tray. Serve cup 2/3 full.

MOUTH DRYING

A drying, puckering, or tingling sensation on the surface and/or edge of the tongue and mouth.

REFERENCE	INTENSITY	PREPARATION
0.05% alum solution	Flavor: 2.5	Serve in a 1-ounce cup. Cover with a plastic lid.
0.07% alum solution	Flavor: 3.5	Serve in a 1-ounce cup. Cover with a plastic lid.

THICKNESS

The thick feel of the beverage as you press your tongue through it.

REFERENCE	INTENSITY	PREPARATION
5% sucrose solution	Flavor: 2.0	Serve in a 1-ounce cup. Cover with a plastic lid.
Campbell's Tomato Juice	Flavor: 4.0	Serve in a 1-ounce cup. Cover with a plastic lid.

METALLIC

An aromatic and mouthfeel associated with tin cans or aluminum foil.

REFERENCE	INTENSITY	PREPARATION
0.10% potassium chloride solution	Flavor: 1.5	Serve in a 1-ounce cup. Cover with a plastic lid.

OILY

The amount of fat/oily film left on surfaces of mouth after swallowing or expectorating.

REFERENCE	INTENSITY	PREPARATION
Horizon Organic Low-Fat (1%) ultrapasteurized milk	Flavor: 3.0	Serve in a 1-ounce cup. Cover with a plastic lid.
Kroger Half & Half	Flavor: 6.0	Serve in a 1-ounce cup. Cover with a plastic lid.

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