

SENSORY ANALYSIS OF ICE CREAM

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Rhino Foods, Inc.



ICE CREAM
TECHNOLOGY
CONFERENCE



How to Enjoy Eating Ice Cream ...



Sensory Analysis

sen·so·ry

/ˈsensərē/ 

adjective

relating to sensation or the physical senses; transmitted or perceived by the senses.
"sensory input"

a·nal·y·sis

/əˈnaləsəs/ 

noun

noun: **analysis**; plural noun: **analyses**

detailed examination of the elements or structure of something, typically as a basis for discussion or interpretation.

"statistical analysis"

synonyms: examination, investigation, inspection, survey, study, scrutiny; [More](#)

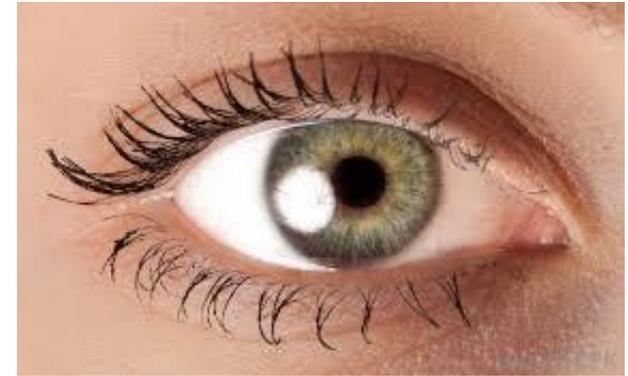
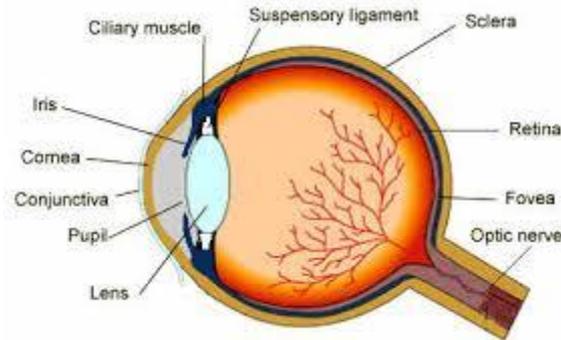
- the process of separating something into its constituent elements.



The Senses

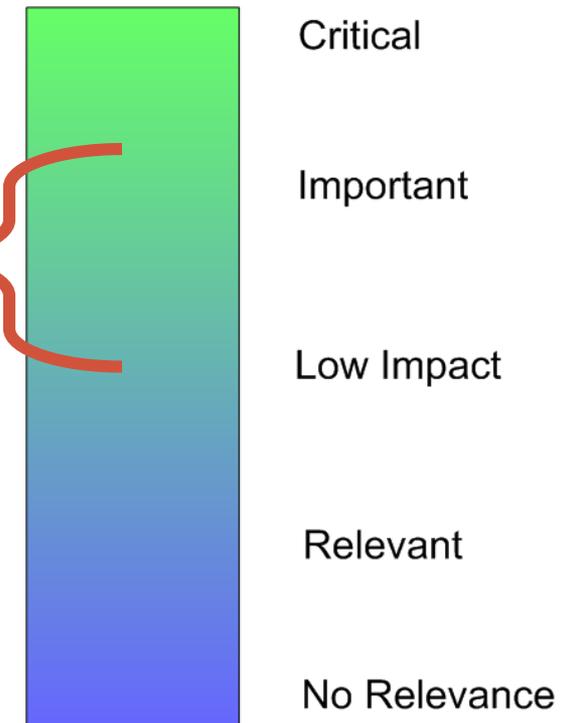


The Sense of Sight



- Appearance:
 - Recognition
 - Appealing
 - Interesting

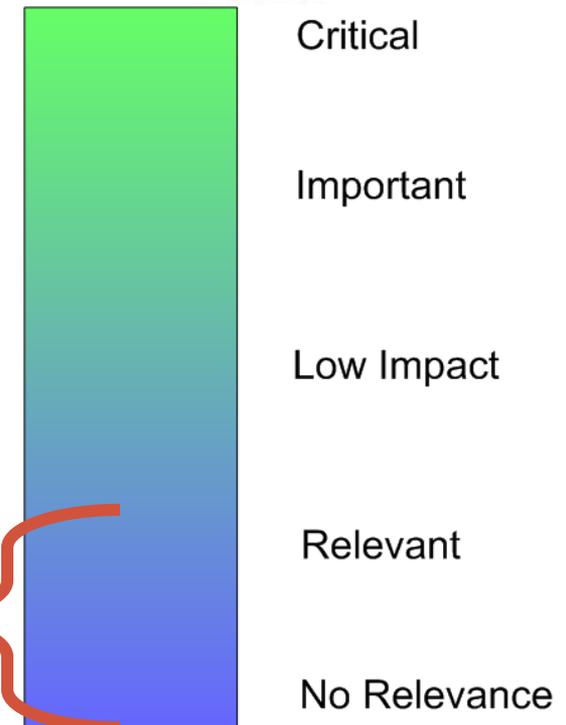
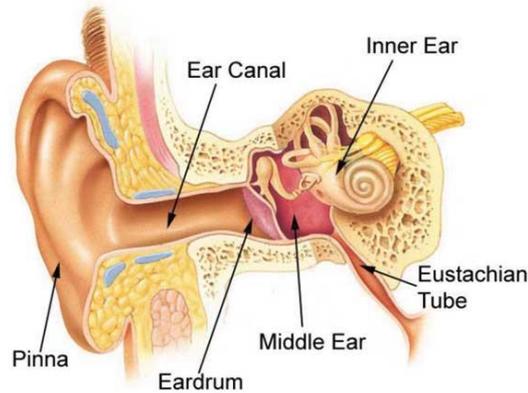
Importance
to Ice Cream



Sense of Hearing

- Sound:

- Recognition
- Crunch Factor
- Interesting

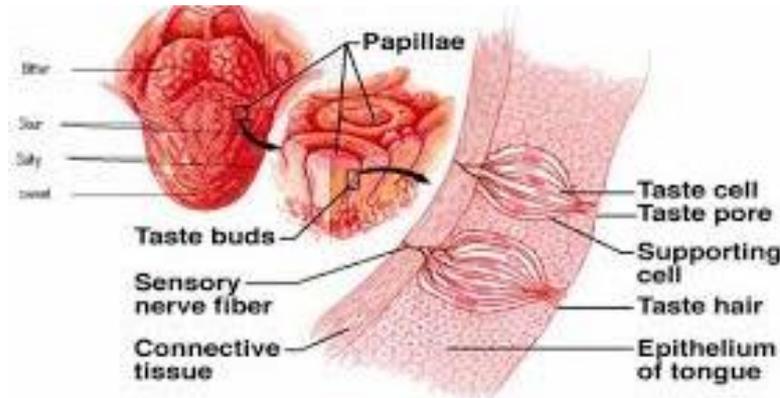


Sense of Taste

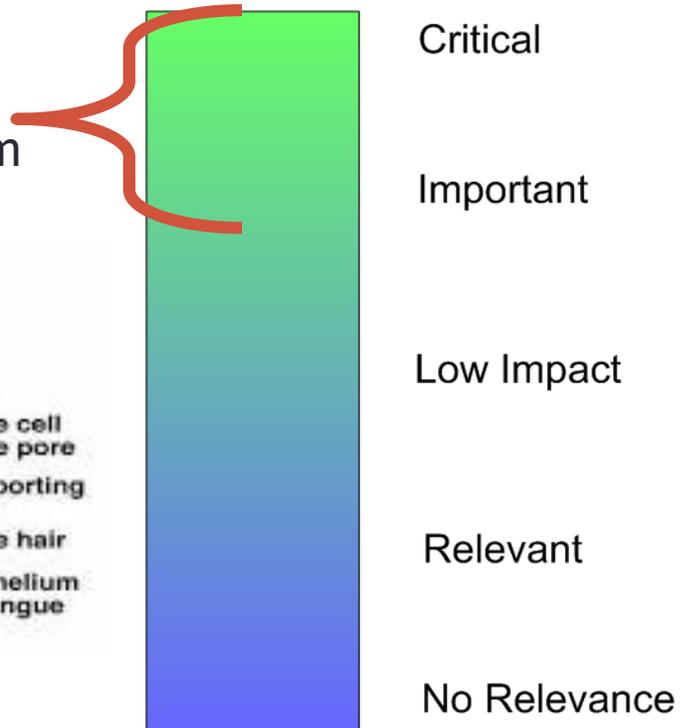
- **Mouth Appeal:**

- Sweet
- Sour
- Bitter
- Salt
- Umami

- **Aftertaste**



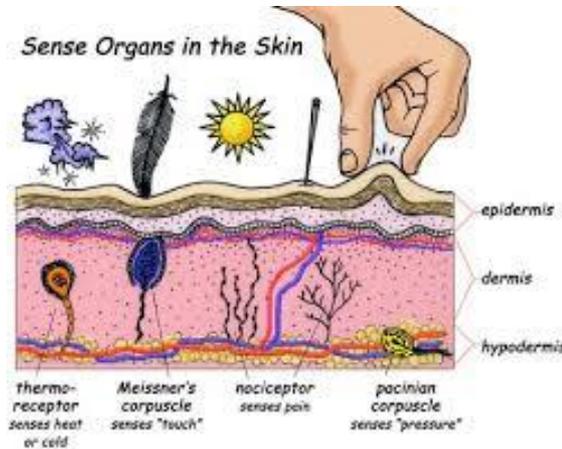
Importance to Ice Cream



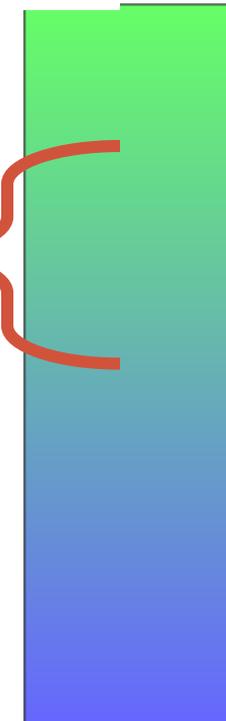
Sense of Touch

- Mouth Feel:

- Temperature
- Fat Melt
- Ice Crystallization
- Density
- Inclusion Texture



Importance to Ice Cream



Critical

Important

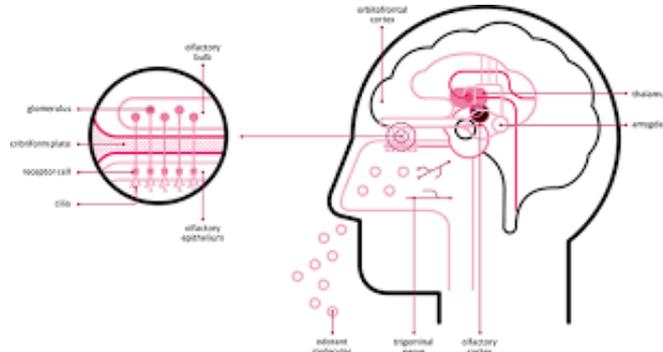
Low Impact

Relevant

No Relevance



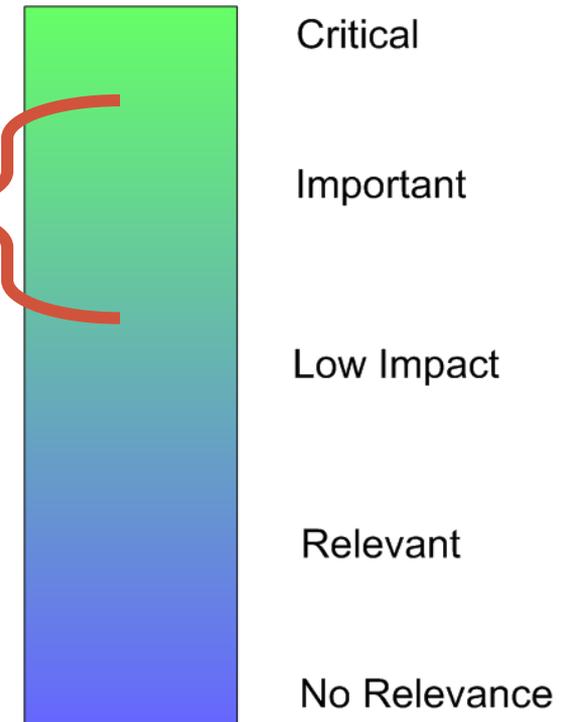
Sense of Smell



• Aroma:

- Last Sense Used for Ice Cream
- Post Melt in Mouth
- Contributes Majority of Flavor
- Impacts Emotions Most

Importance to Ice Cream



Analysis

- **Senses are highly subjective**
 - Personal based on preferences, experiences, and context
 - Conscious vs Subconscious influence on satisfaction
- **Analysis – Objectifying the Subjective**
 - More accurate
 - More reliable
 - More actionable



Sensory Analysis ?



Sensory Analysis ?



Sensory Analysis of Ice Cream

- **Purpose** – Why do we do it?
- **Modes** – Who does it, and what's the difference?
- **Methods** – What are the professional techniques?
- **Scoring & Language** – Objectifying the subjective
- **Attributes vs Defects** – What is good from what is bad?
- **Applications** – When do you do which mode and method?
- **Developing Industry Standards** – What's next?



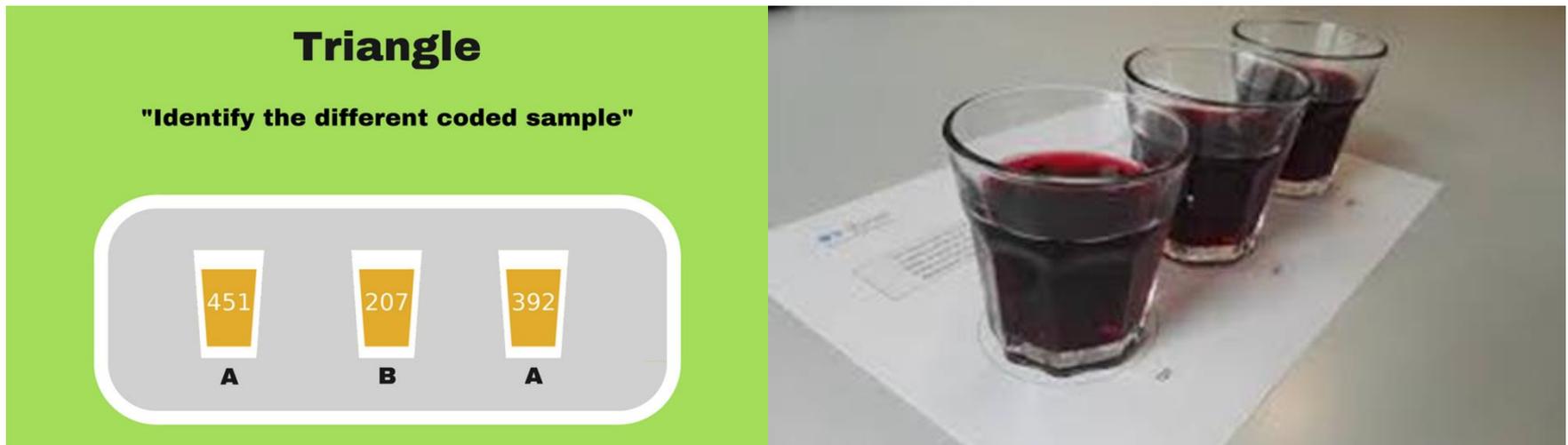
Purposes of Sensory Evaluation

- **Benchmark to Standards** – Ensuring the product meets expectations
- **Competitive/Comparative Analysis** – How good is it relative to others
- **Product Development** – Discovering new standards
- **Cost/Value Optimization** – Can we make it as good for less?



Benchmark to Standards

- Where an identified Standard – *usually represented by a benchmark sample* – is compared to the subject and a determination is made as to whether they match.
- Usually these evaluations are done either with experts or when critical questions arise, they are done “blind.”



Competitive/Comparative Analysis

- Needs to have a defined scope
 - Same product family?
 - Alternative products?
 - Some other attribute: example, “Most Innovative”
- The analysis method should be structured, and “judges” briefed on the context of the evaluation criteria

COMPETITIVE ICE CREAM SENSORY SCORING SHEET

Score each of the 5 attributes -5 to 5, add 50 points to Sum Score

	Appearance	Flavor	Texture	Balance	Overall	Sum Score
_____						_____
_____						_____
_____						_____
_____						_____
_____						_____



Comparative/Competitive Analysis



Product Development

- Does the Product Satisfy Intent?
- Clearly defined use, targeted consumer, meet a market goal
- Product extension or innovation?
- Product brief with descriptions of intended attributes

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**NEW PRODUCT DESIGN
SPECIFICATION OUTLINE**

Product Concept Name: _____ Date: _____

Product Description: _____ Customer: _____

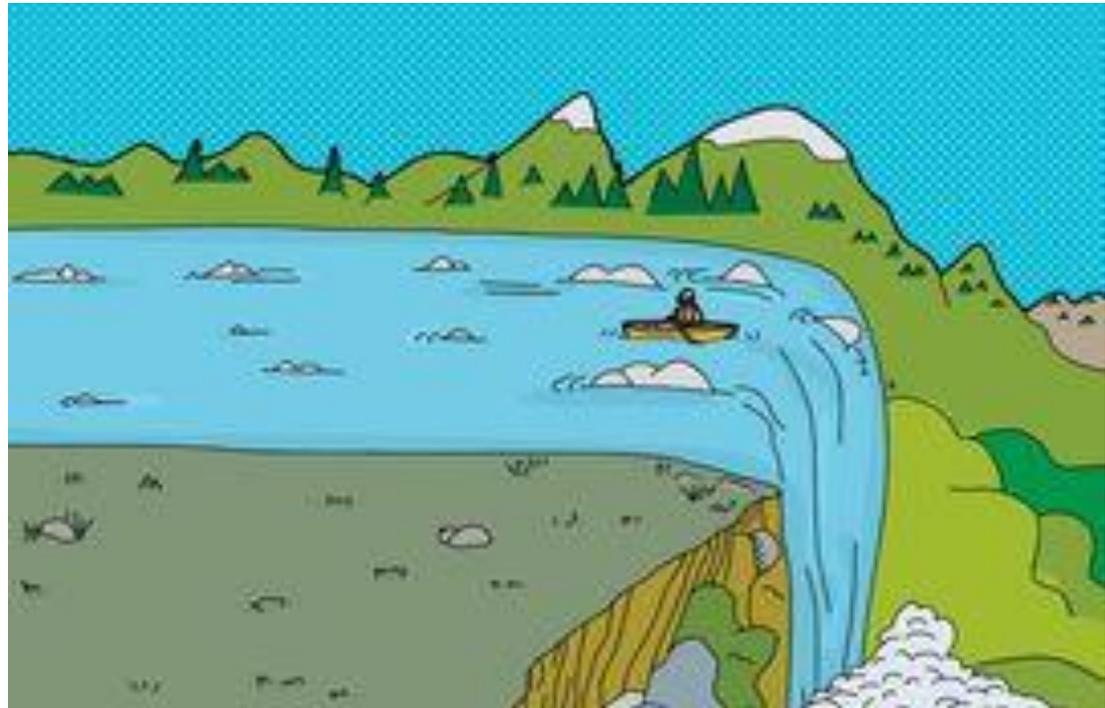
Product Qualities: Extruded Baked Novelty RTE/RTB Powder

Product Family/Type: _____ Intended Consumers: _____



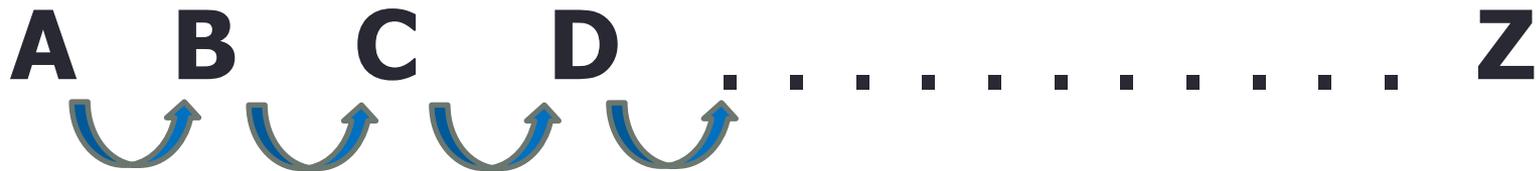
Cost Value/Optimization

- When Finance and Purchasing are Driving the Boat



Cost Value/Optimization

- What lower cost ingredients or less expensive processing can be used that consumers *won't notice* ?
- Burden of Proof on the sensory results



Modes of Sensory Analysis

- **Expert Panelists** – Competencies and Applications
- **Trained Assessors** – Selection, Onboarding & Management of Panels
- **Consumer Intercepts** – Best Use and Limits



Consumer Intercepts

- Market Research Tool
- Matching Products to Psychographics
- Measuring the Market Potential



Trained Assessors

- Selected pool of consumer representatives
- Trained in sensory analysis systems, methods, and language



Expert Panelists

- Sensory Professionals
- Product Experts
- Calibrated regularly



Methods of Sensory Analysis

- Chosen to support the purpose of the analysis:
 - Objectifying the Subjective, Answering the ?'s
- Tools and Space Requirements
- Training & Prerequisites
- Test Design, Scheduling & Preparation
- The Evaluation
- Analysis & Reporting of Results



Tools and Space Requirements

- A pantry full of cups, bowls, scoops, plates, spoons, labels, scoring forms and pens
- The preparation equipment – freezer space, scoops, counter tops
- The Sensory Space – to booth or not to booth?



Training & Prerequisites

- Initial Screening – basic recognition testing
 - Taste solutions – sweet, salt, sour, bitter, umami
 - Aroma samples – citrus, spice, herb, flower, woody, caramel
- Ability to perform procedures
 - Simulations of tests to demonstrate focus, discipline, record keeping
 - Availability when needed and commitment to perform
- Introduction to test protocols – difference, ranking, rating
- Training in descriptors – learning the language, differentiating intensity, identifying bias and preferences
- Practice, practice, practice



Test Design, Scheduling & Preparation

- Use the Scientific Method – Start with a Hypothesis
- The experimental design should be repeatable; controlling variables, detailing important steps, with the aim to yield reliable results
- Scheduling – based on need and assessor availability (...best mid-morning)
- If appropriate, make the samples “blind”
- Have the purpose, plan, test steps, tools and samples ready to go



The Placemat

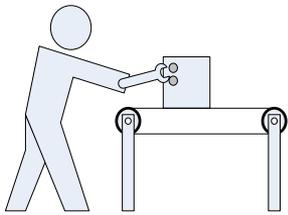
17" ►

11" ▲

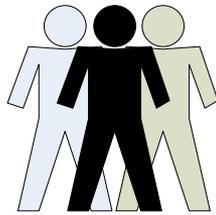


The Evaluation

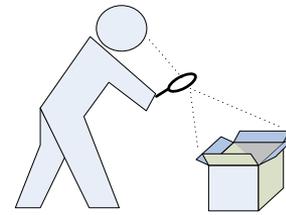
- Focus on the Purpose
- Objectify the Subjective as much as possible
 - Reduce bias – prohibit influence, clarify intent of the test
 - Turn the sensation into measurable data



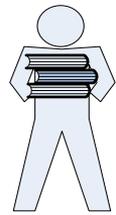
Step 1 – Prepare the Samples



Step 2 – Orient Panelists



Step 3- Do Analysis



Step 4 – Analyze Results



Analysis & Reporting of Results

- Ideally, results are immediate and collaboratively discussed – contributes to full acceptance and calibration
- Everyone's Vote Counts
- Use Statistics When You Have Enough Data
- Make the Result Meaningful – What Decisions Got Made?



Scoring & Language

- The Power of Scores
- Attribute ratings – Preference & Intensity
- Scoring Scales – Ranges & Relativity
- Radar/Spider Graphs
- Descriptive Language
- Calibration of Assessors



The Power of Scores

- Scoring makes the right brain talk to the left brain
 - translating the subjective into the objective
- Creates data that can be analyzed, trended, graphed, and shared



Attribute Ratings – Preference & Intensity

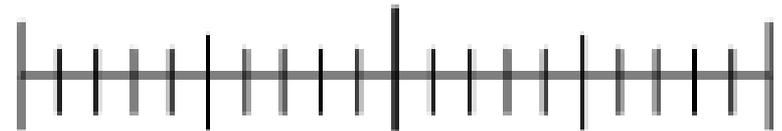
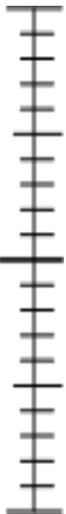
Preference

- Flavor Profile –
 - Fruity
 - Caramel
 - Plain vs Complex
 - Spicy
- Texture
 - Density
 - Crunchy vs Fudgy



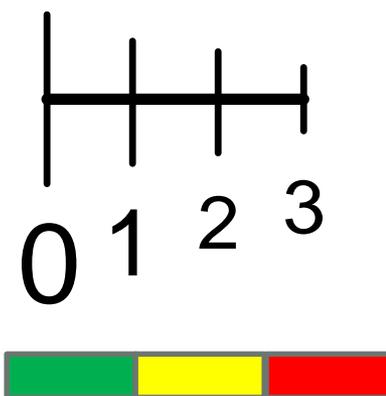
Intensity

- Flavor Profile -
 - Strength of Vanilla Note
 - Chocolate Bitterness
 - Amount of Inclusions
 - Amount of Spice
- Texture
 - Gummy – Chewy – Fudgy – Crunchy

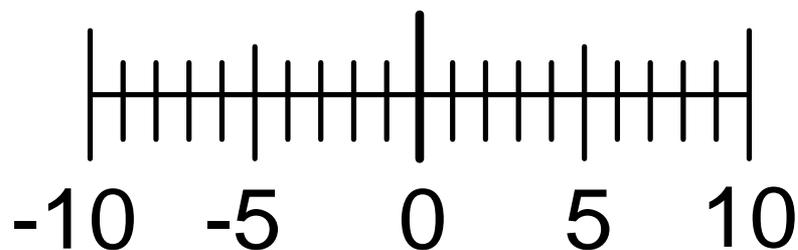
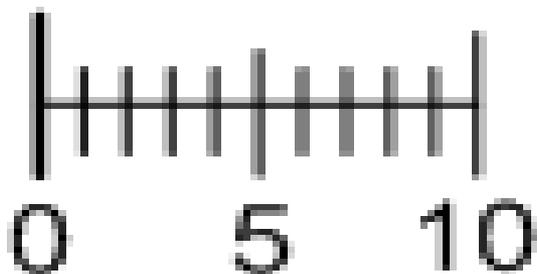


Scoring Scales – Ranges & Relativity

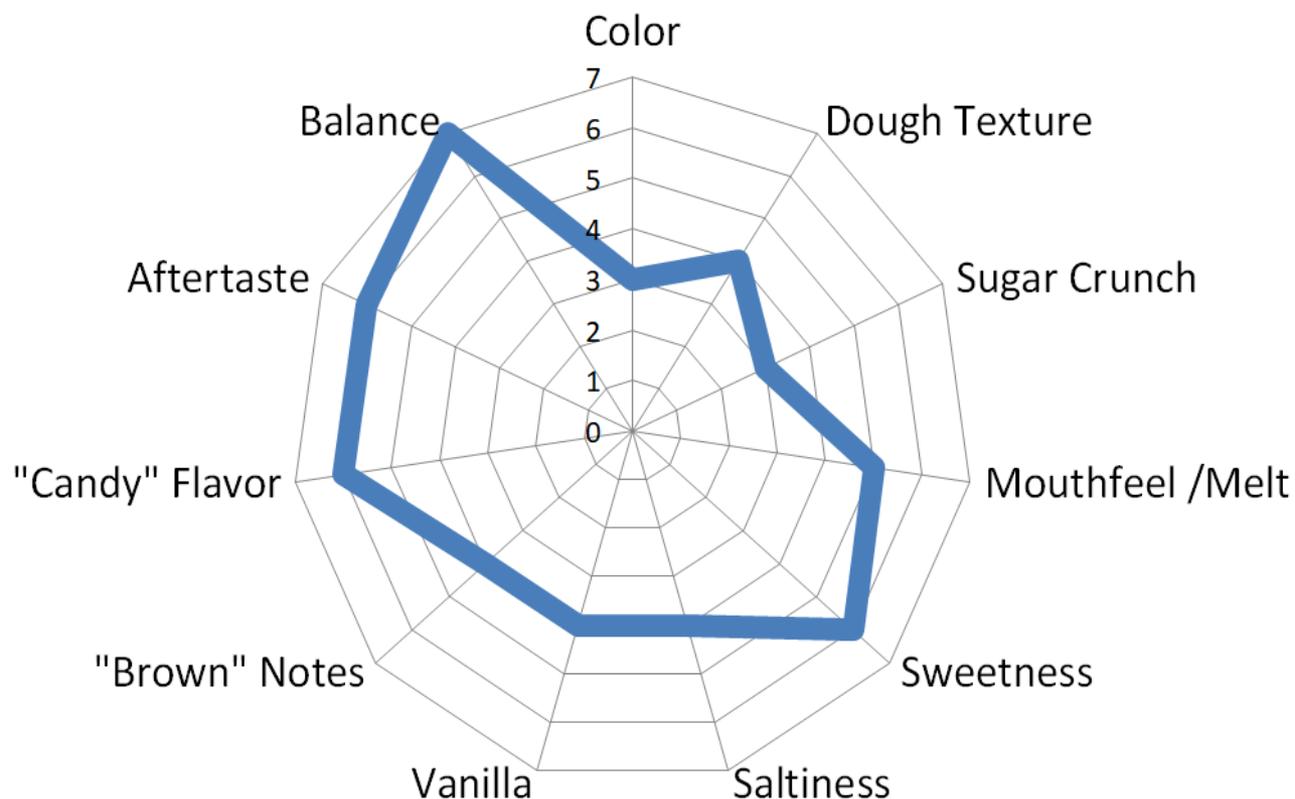
- Benchmark to Standard



- Comparative/Competitive Scoring

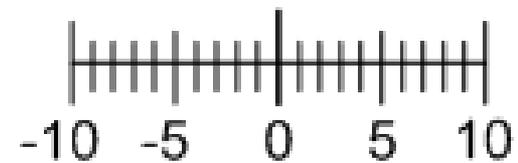
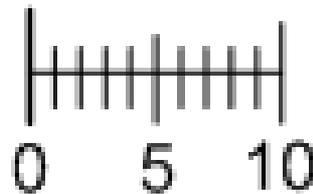
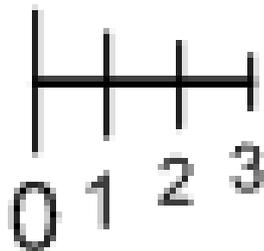


Radar/Spider Graphs – Mapping It



Calibration of Assessors

- Necessary for Benchmark to Standards and other QC purposes
- Calibration – like results between sensory assessors
 - Similar language
 - Consistent Scoring
- Practice, Practice and Practice **Together**



Attributes vs Defects

- Specifications as conformance boundaries
- Traits and Taints
- Objective Measurements
- Subjective Observations



Applications of Sensory Evaluation

- Benchmarking
- Comparative Testing
- Quality Compliance to Standards



Developing Industry Standards

- Universal Scoring Form(s)
- Training of the Industry
- Standard Applications
- Certification Programs
- Consumer & Media Acceptance



Judging the Ice Cream Competition

- The Scoring Sheet
- The Attributes
- Summing it Up and Rankings



The Scoring Sheet

COMPETITIVE ICE CREAM SENSORY SCORING SHEET Score each of the 5 attributes -5 to 5, add 50 points to Sum Score

438	 -10 -5 0 5 10	_____				
	Appearance	Flavor	Texture	Balance	Overall	Sum Score
286	 -10 -5 0 5 10	_____				
	Appearance	Flavor	Texture	Balance	Overall	Sum Score
547	 -10 -5 0 5 10	_____				
	Appearance	Flavor	Texture	Balance	Overall	Sum Score
629	 -10 -5 0 5 10	_____				
	Appearance	Flavor	Texture	Balance	Overall	Sum Score



Use of the Scale

- “0” is ‘Average’ Score, a quality you would generally expect, no better, no worse.
- “10” is once in a lifetime quality, never had better, just totally extraordinary, out of this world, an epiphany.



- “-10” is awful, worst you have ever had, makes you sad for humanity that something like this could even be made.



The Attributes

- Appearance – How does it look? Appetizing, Interesting?
- Flavor – How does it taste and smell? Is it delicious?
- Texture – How does it feel? If it has inclusions, are they a good texture?
- Balance – How is the composition? Is it complex or simple, and if so, is it muddy or elegant?
- Overall – How does the whole package work together. These are bonus points for total execution.



Judging Ice Cream

- What is the Purpose of the Competition?
- Are your scores preference based, and if so, for whom?
- Be a sensory professional:
 - Minimize Bias
 - Focus and Pace Yourself
 - Trust your Senses
 - Be Diligent in Your Scoring



The Scoring Sheet

COMPETITIVE ICE CREAM SENSORY SCORING SHEET

Score each of the 5 attributes -5 to 5, add 50 points to Sum Score

438	+5	+2	-2	+2	1	58	4
286						81	1
547						79	2
629						76	3

