



# Food Science CDE Training

June 2017

Presented by Food Science CDE Supervisors Sara Roberts, Food Science & Technology Department and Julie Reiling, the Food Processing Center, at the University of Nebraska-Lincoln.



# Overview of the Food Science Contest



# Purpose of Food Science and Technology Contest



1. To promote learning activities related to the food industry, and
2. To assist students in developing practical knowledge of principles used in a team decision-making process.

# Purpose of Food Science and Technology Contest

Students should have an in-depth understanding of food product development and presentation, understanding of basic nutrition principles and food safety issues.





# Overview of the NE Food Science CDE

- Individual Activities – (250 points/Individual)
  1. Objective Test
  2. Food Safety Practicum
  3. Sensory Evaluation Practicum
    - a. Triangle Test
    - b. Aromas
- Team Activities – (400 Points)
  - Product Development Project

# Total Points



x 4 team  
members



Individual Activities  
(250 points/student)

Team Activities (400 Points)

**Total Points Possible per Team = 1400**

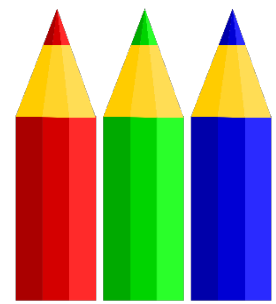


# Overview of the NE Food Science CDE

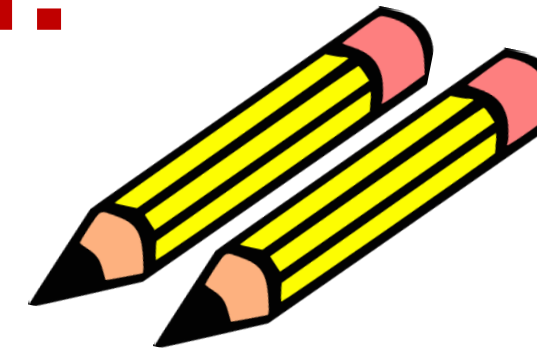
## Changes made for 2017 contest

1. Contests better align with National Food Science CDE
2. Current Rules and Contest Information on Nebraska Food Science CDE webpage  
(<http://alec.unl.edu/agedcde/food-science>)
3. Updated resources and practice tests also on webpage

## Participants Must Bring Their Own:



- Two sharpened No. 2 pencils
- Non-programmable calculator
- Colored pencils recommended
- No electronic media allowed including, but not limited to cell phones and cameras



We will not change contest schedule for any participant. If they need to leave early, they forfeit any remaining tests and associated points.



# Objective Test





# OBJECTIVE TEST (Multiple Choice Exam)

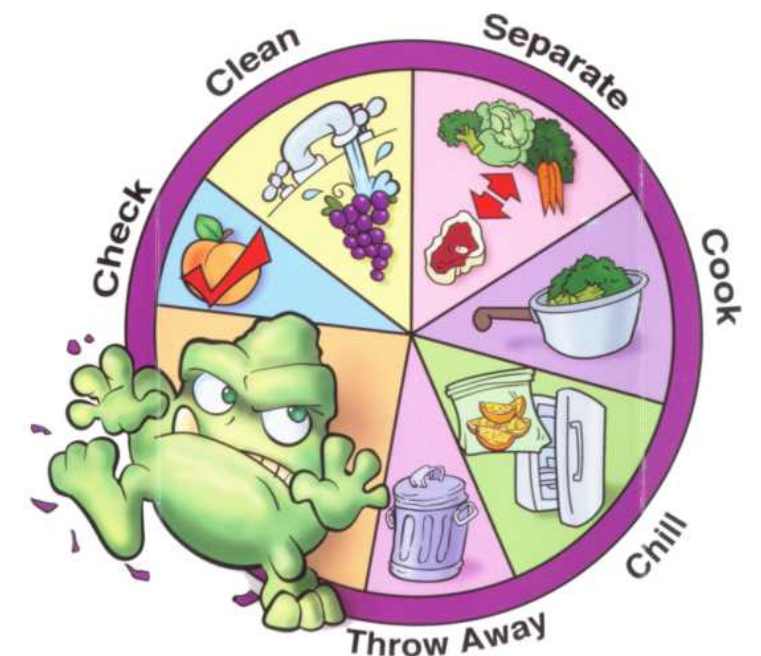
- Covers a variety of food science topics
  - Food Chemistry
  - Food Safety & Microbiology
  - Food Processing & major evolutions in food engineering
  - Nutrition
  - Food Labeling & Regulations





# OBJECTIVE TEST (Multiple Choice Exam)

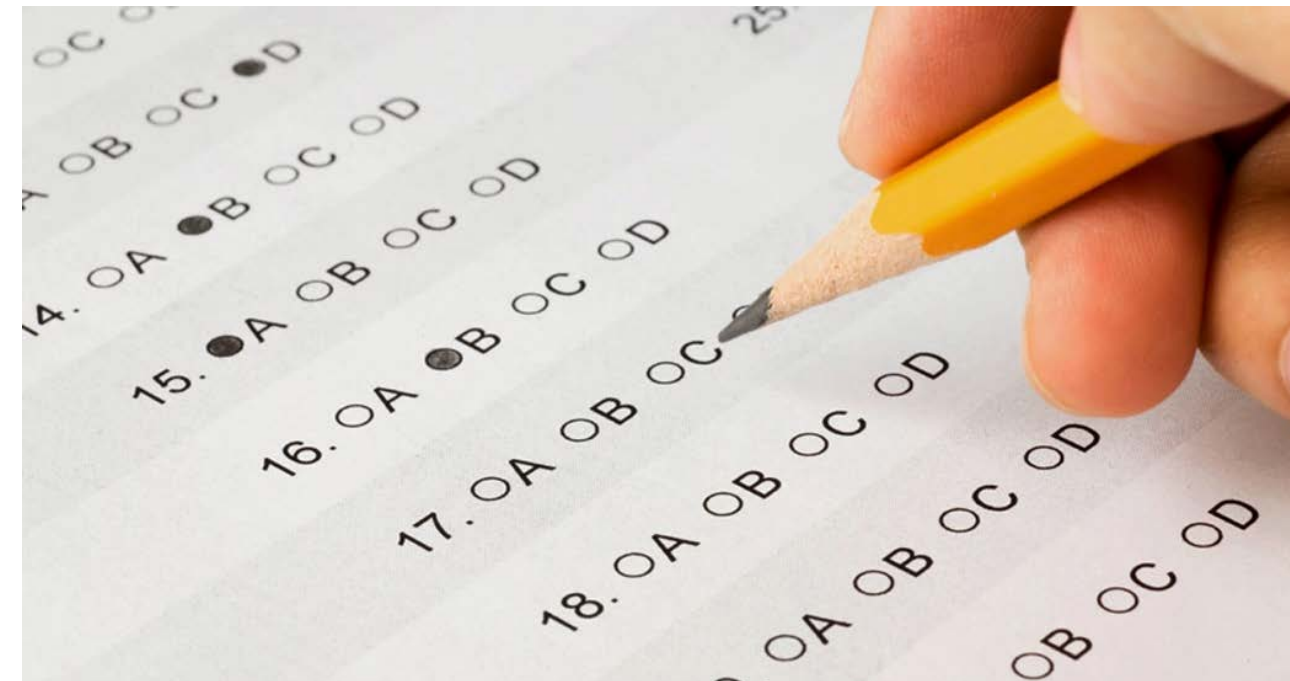
- Foundational Food Science knowledge:
  - Basic cooking knowledge
  - Market trends/observing foods in grocery stores
  - Food economics (costs of production/ingredients)
  - Food components: Fats, Carbs, Proteins, Vitamins and Minerals
- Bacteria in foods/ methods of control





## OBJECTIVE TEST (Written Exam)

- 50 Multiple Choice Questions @ 3 points each (150 total)
- 30 minutes to complete





# OBJECTIVE TEST (Multiple Choice Exam)

## Sample Questions

1. Sucrose is made up of:
  - a. Glucose and Lactose
  - b. Glucose and Fructose
  - c. Glucose and Galactose
  - d. Fructose and Maltose

**Answer: B. Glucose and Fructose**

# OBJECTIVE TEST (Multiple Choice Exam)

## Sample Questions

2. What organism has been associated with fresh, unpasteurized fruit juices?

- a. Salmonella
- b. Clostridium botulinum
- c. Campylobacter
- d. E. Coli

**Answer: D - E. Coli**



# OBJECTIVE TEST (Multiple Choice Exam)

## Sample Questions

3. What is the serving size on the Nutrition Facts Panel based on?
- a. Amount of food nutritionists recommend eating
  - b. Typical amount eaten by consumer in one eating period
  - c. The amount of servings the food manufacturer can evenly fit in the container
  - d. All servings are 30 grams regardless of the type of food

**Answer: B. Typical amount eaten by consumer in one eating period**

# OBJECTIVE TEST (Multiple Choice Exam)

## Sample Questions

4. In cheese making which describes the solid mass?

- a. Curd
- b. Whey
- c. Rennin
- d. Milk

**Answer: A. Curd**



# OBJECTIVE TEST (Multiple Choice Exam)

## Sample Questions

5. What does GRAS stand for?

- a. Grain Report Annual Statistics
- b. Generally Recognized As Safe
- c. General Response Answers Shown
- d. Genetically Repurposed Apple Sticks

**Answer: B. Generally Recognized As Safe**

# OBJECTIVE TEST (Multiple Choice Exam)

## Sample Questions

6. This type of chemical is used to control bacteria, yeast, and mold by inhibiting their growth.

- a. Sequestrant
- b. Emulsifier
- c. Antioxidant
- d. Preservative

**Answer: D. Preservative**



# OBJECTIVE TEST (Written Exam)



## QUESTIONS?



# Food Safety & Quality Test





# FOOD SAFETY & QUALITY PRACTICUM



- Two Parts:
  1. Food Safety pictures
    - Determine if there is a food safety violation in picture
  2. New – Customer Inquiry
    - Students evaluate consumer complaint letters for actual food safety risks
- Food Safety slides + Customer Inquiry Letter @ 5 points each = 50 points for practicum



# FOOD SAFETY & QUALITY PRACTICUM

- PowerPoint presentation containing 5-7 situations
  - Determine if picture contains a Food Safety violation
  - If Yes, identify the problem from the numbered list provided  
*(3 points deducted for incorrect identification)*
- Some pictures may not contain a food safety issue
- USDA Food Safety Inspection Service (FSIS) has informational sheets on their website





Photo 1





# FOOD SAFETY & QUALITY PRACTICUM

## Practice Materials

Photo #1 – The food company should be cited by food inspectors for a sanitation and/or food safety problem?

Yes ✓ b) No \_\_\_\_\_

If yes, list the item number that would best apply from the guidelines:

Item Number #5

*(Toxic items and chemicals shall be stored away from food items)*





Photo 2





# FOOD SAFETY & QUALITY PRACTICUM

## Practice Materials

Photo #2 – The food company should be cited by food inspectors for a sanitation and/or food safety problem?

Yes \_\_\_\_\_ b) No ☒

If yes, list the item number that would best apply from the guidelines:

Item Number \_\_\_\_\_





Photo 3





# FOOD SAFETY & QUALITY PRACTICUM

## Practice Materials

Photo #3 – The food company should be cited by food inspectors for a sanitation and/or food safety problem?

Yes ✓ b) No \_\_\_\_\_

If yes, list the item number that would best apply from the guidelines:

Item Number #2

***Non-food contact surfaces (shelving, racks and any item in the production area that does not directly touch food) shall be free from dirt and food debris and maintained in good repair.***

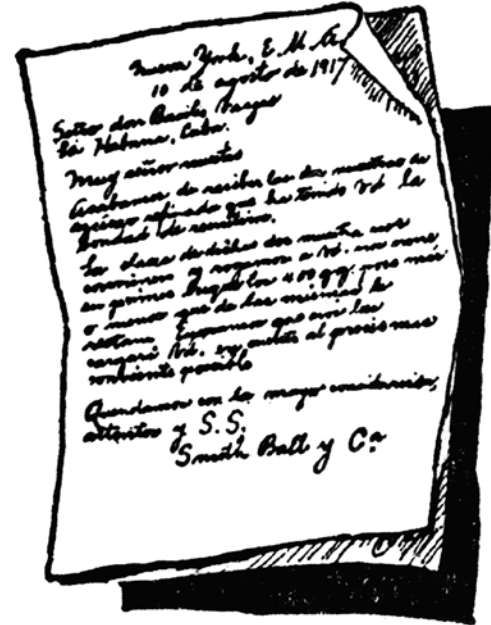




# FOOD SAFETY & QUALITY PRACTICUM

## Part 2: Customer Inquiry

- Up to five consumer inquiries (consumer complaint letters)
- Must decide if complaint is a **food quality** or **food safety** issue
- If **Food Quality** = no additional information is needed
- If **Food Safety** = determine biological, chemical or physical problem (-3 points for incorrect response on safety issue)
- **Real Consumer Complaint Letters:**  
<https://www.consumeraffairs.com/food/>





# FOOD SAFETY & QUALITY PRACTICUM

## Customer Inquiry – Food Safety Issues

- Biological – pathogens (*Listeria*, *E.coli*, *Salmonella*, etc.)
- Physical – foreign materials (metal, wood, insects, etc.)
- Chemical – allergen cross contamination, cleaning solutions





## Consumer Complaint 1

To Whom It May Concern:

Once a month, I treat myself with a container of your Vanilla and Fudge Swirl ice cream. Last night, I opened the lid of my carton and knew it was the wrong flavor of ice cream. I thought I might go ahead and try it. I almost took the first bite when I saw pieces of pecans in my ice cream. I am ALLERGIC to PECANS! I immediately threw out the whole carton of ice cream and my bowl with the ice cream. I didn't want to take any chances! This is very serious issue and you need to let everyone know immediately not to eat your ice cream!

- Jan P., Albany, NY



## Consumer Complaint 1

**Consumer complaint #1 – Is the consumer complaining about a quality or food safety problem?**

a) Quality \_\_\_\_\_ b) Food Safety   X   \_\_\_\_\_

**If food safety, is it biological, chemical, or physical?**

a) Biological \_\_\_\_\_ b) Chemical   X   \_\_\_\_\_ c) Physical \_\_\_\_\_



## Consumer complaint 2

Mr. Poole:

I have been eating your Butter Crisp Ranch Crackers for many years. You used to sell 16oz. boxes that contained at least 160 crackers. I'm very OCD so I count them. There are now around 120 or less. Simple math shows these boxes are 12 oz. each. The last box had 116 crackers! Please correct all future boxes. Do NOT just offer me a few free boxes.

Sincerely,  
Jerry Jones



## Consumer Complaint 2

**Consumer complaint #2 – Is the consumer complaining about a quality or food safety problem?**

a) Quality \_\_\_\_ **X** \_\_\_\_    b) Food Safety \_\_\_\_\_

**If food safety, is it biological, chemical, or physical?**

a) Biological \_\_\_\_\_    b) Chemical \_\_\_\_\_    c) Physical \_\_\_\_\_



## Consumer Complaint 3

Dear Ms. Smith:

Last week, my wife was eating your TastyLean Swedish Meatballs dinner, and on her last bite she bit on to something hard. When she pulled it out, to our surprise it was a Shard of Glass! Pictures included. I'm Furious! If she were to have swallow this, the amount of damage it could have caused would life threatening.

We expect you to repay us for the damage you caused us, and for the four boxes of your TastyLean meatballs in our freezer that we threw away out of fear of cutting our throats on another piece of glass.

I hope you stop all production until you find out how this piece of glass got into my wife's dinner.

Sincerely,  
George G.



## Consumer complaint 3

**Consumer complaint #3 – Is the consumer complaining about a quality or food safety problem?**

a) Quality \_\_\_\_\_ b) Food Safety   X   \_\_\_\_\_

**If food safety, is it biological, chemical, or physical?**

a) Biological \_\_\_\_\_ b) Chemical \_\_\_\_\_ c) Physical   X   \_\_\_\_\_



# Food Safety & Quality



## QUESTIONS?



# Sensory Evaluation Practicum





# Sensory Evaluation Practicum

- 2 Parts
  - Triangle Test (20 points)
    - Two tests, 10 points each
  - Aromas (30 points)
    - Identify 6 aromas, each worth 5 points
    - 3 points may be given if wrong answer but similar (i.e., lemon instead of lime or wintergreen instead of peppermint)





# Sensory Evaluation Practicum

## Triangle Test (20 points)

- Determine which of the 3 items is different

### Triangle Tests compare:

- Low-fat vs. Regular
- Low-salt vs. Regular
- Name brand vs. Generic
- Sugar-free vs. Regular
- Different Flavors but same color





# Sensory Evaluation Practicum

## Aromas

- Aromas updated for 2017 contest
  - Added: Watermelon, Peach, Apple, Coffee and Sage
  - Removed: Almond, Lilac, Pine, Menthol
  - Complete list of aromas available online in contest rules
  - Students will have the list of possible aromas provided to them during the contest





# Sensory Evaluation Practicum



- Aromas
  - Practice tips:
    - Purchase flavor extracts and dried herbs from grocery or craft store
    - AgEd Toolbox makes full aroma kits for this contest at \$150 each. Contact Julie Milligan at [Julie@agedtoolbox.com](mailto:Julie@agedtoolbox.com) or <http://agedtoolbox.com/>.
  - To clear nose between scents, participants can smell their unperfumed skin, such as their arm or crook of their elbow.



# Sensory Evaluation



## QUESTIONS?



# Team Product Development Competition



## **Reminder – Participants Must Bring Their Own:**

- Two sharpened No. 2 pencils
- Non-programmable calculator
- Colored pencils recommended
- No electronic media allowed including, but not limited to cell phones and cameras

**These items are essential for this portion of the contest!**



# TEAM PRODUCT DEVELOPMENT

- The scenario will contain:
  - The need to redesign or create new product for particular market segment
  - List of Ingredients to choose from
  - Ingredient Nutritionals based on 100 grams
  - Worksheets provided to make nutritional calculations



- 60 minutes to complete, 400 points





# TEAM PRODUCT DEVELOPMENT

## Possible Products and Categories:

- Categories: Cereal, snacks, meals, beverages, desserts, condiments
- Platforms: Frozen, refrigerated, shelf-stable, heat and serve
- Markets: Retail, Wholesale, Food Service, Convenience Store





# TEAM PRODUCT DEVELOPMENT

Draw a Principle Display Panel (PDP) with package labeling

Answer Essay questions



Calculate the Nutrition Facts Panel (NFP)

Make an ingredient statement

Properly place elements on Information Panel (IF)

Useful website: [FDA Labeling Nutrition Guidance Document](#)



## TEAM PRODUCT DEVELOPMENT

- Practice Scenario: Peanut Butter Cookie Dough Balls
- Find this practice test on Nebraska Food Science CDE information website under Reference Materials  
(<http://alec.unl.edu/agedcde/food-science>)





# TEAM PRODUCT DEVELOPMENT



- Step 1 – Decided ingredients and amounts
  - Do certain ingredients need to make up the majority of the product?
  - Does a certain ingredient need to be replaced?
  - Determine amounts in easy-to-calculate percentages
- Step 2 – Divide up roles among team members
  - Break apart worksheets to have each team member work on pre-determined section



# TEAM PRODUCT DEVELOPMENT

- The Team will:
  - **Correctly calculate the Nutrition Facts Panel (NFP)**
  - Make an ingredient statement
  - Properly place elements of Information Panel (IF)
  - Draw a Principle Display Panel (PDP) with package design and labeling
  - Correctly answer essay questions





# TEAM PRODUCT DEVELOPMENT

## Nutrition Facts Panel (NFP) Example

- Step 1: Choose Ingredients
  - Reformulate cookie dough mix to be “**natural and gluten-free**”
    - Replace ingredients in *Starting Formula* using those in provided spreadsheet, as necessary
    - Only need to replace ingredients that are not “natural” or that contain gluten





- Step 1: Choose Ingredients  
Starting Formula:

Ingredient
Unsalted Butter
Peanut Butter
White Sugar
Brown Sugar
Eggs
All-purpose Flour
Baking Powder
Salt
Baking Soda





# Ingredient Nutrient Spreadsheet

Food Science CDE Contest 2015 - Product Development Portion										
Nutritional Information (per 100g)										
		Total	Sat.	Trans	Chol	Sodium	Carbs	Fiber	Sugars	Protein
Ingredients	Calories	Fat (g)	Fat (g)	Fat (g)	(mg)	(mg)	(g)	(g)	(g)	(g)
Flour Sources										
All Natural Pastry Flour	364.0	1	0	0	0	2	78	3	0	9
Barley Flour	395.0	7	2	0	0	12	64	31	0	20
Cassava Flour	377.0	1	0	0	0	0	93	7	1	1
Rice Flour, Brown	363.0	3	1	0	0	8	76	5	1	7
Rice Flour, White	366.0	1	0	0	0	0	80	2	0	6
Rye Flour	357.0	1	0	0	0	2	77	8	1	10
Sorghum Flour	361.0	3	0	0	0	4	77	7	2	8
Tapioca Flour	333.0	0	0	0	0	4	87	0	0	1
Other Ingredients										
Baking Powder	51.0	0	0	0	0	7893	24	0	0	0
Baking Soda	0.0	0	0	0	0	27360	0	0	0	0
Whole Eggs	143.0	10	3	0	372	142	1	0	0	13
Peanut Butter A	594.0	50	9	0	0	469	22	6	9	25
Peanut Butter B	554.0	51	11	0	0	474	20	7	9	23
Salt	0.0	0	0	0	0	38758	0	0	0	0
Sugar, Brown	380.0	0	0	0	0	28	98	0	97	0
Sugar, White	387.0	0	0	0	0	1	100	0	100	0
Unsalted Butter	714.0	79	50	0	214	0	0	0	0	0
Ingredient Statements:										
All Natural Pastry Flour: Wheat Flour										
Baking Powder: Calcium Acid Phosphate, Bicarbonate of soda, Corn Starch.										
Peanut Butter A: Roasted Peanuts and Sugar, Contains 2% of Less of: Molasses, Fully Hydrogenated Vegetable Oil (Rapeseed and Soybean), Mono Diglycerides, Salt.										
Peanut Butter B: Roasted Peanuts, Sugar, Palm Oil, Salt.										



# •Step 1: Choose Ingredients

## Starting Formula:

**Peanut Butter Options:**  
**Version A** – includes hydrogenated oils and stabilizers  
**Version B** – contains simpler ingredients



Ingredient
Unsalted Butter
<del>Peanut Butter</del> <b>Peanut Butter B</b>
<del>White Sugar</del> <i>(to simplify formula)</i>
Brown Sugar
Eggs
<del>All-purpose Flour</del> <b>Rice Flour, Brown</b>
<del>Baking Powder</del> <i>(to simplify formula)</i>
Salt
Baking Soda
<b>Tapioca Flour</b>

Gluten can be found in Wheat (All-purpose Flour), Rye and sometimes Barley.



It generally takes a combination of starches to replace wheat in baked goods.



- Step 2: Determine amounts (hint: keep it simple)

## New Formula

Ingredient	%
Unsalted Butter	10
Peanut Butter B	20
Brown Sugar	30
Eggs	10
Rice Flour, Brown	20
Salt	1
Baking Soda	1
Tapioca Flour	8

Make sure the percentages add up to 100%!



- Step 3: Calculate each Ingredients' nutrients based on % used in formula
  - Find nutrition info on **Ingredient Nutrient** spreadsheet
  - Nutrition Information provided on 100 grams of each ingredient
  - Calculate ingredient nutrients on based on same percentage used in ingredient formulation

A green, multi-pointed starburst or explosion shape with a white outline, containing the text 'YEAH ALGEBRA!' in white, bold, sans-serif capital letters.

YEAH  
ALGEBRA!

*FYI: Standard reporting for all food nutrient content by USDA Food Composition Database is based on 100 grams*  
(<https://ndb.nal.usda.gov/ndb/search/list>)



# Ingredient Nutrient Spreadsheet

Food Science CDE Contest 2015 - Product Development Portion										
Nutritional Information (per 100g)										
		Total	Sat.	Trans	Chol	Sodium	Carbs	Fiber	Sugars	Protein
Ingredients	Calories	Fat (g)	Fat (g)	Fat (g)	(mg)	(mg)	(g)	(g)	(g)	(g)
Flour Sources										
All Natural Pastry Flour	364.0	1	0	0	0	2	78	3	0	9
Barley Flour	395.0	7	2	0	0	12	64	31	0	20
Cassava Flour	377.0	1	0	0	0	0	93	7	1	1
Rice Flour, Brown	363.0	3	1	0	0	8	76	5	1	7
Rice Flour, White	366.0	1	0	0	0	0	80	2	0	6
Rye Flour	357.0	1	0	0	0	2	77	8	1	10
Sorghum Flour	361.0	3	0	0	0	4	77	7	2	8
Tapioca Flour	333.0	0	0	0	0	4	87	0	0	1
Other Ingredients										
Baking Powder	51.0	0	0	0	0	7893	24	0	0	0
Baking Soda	0.0	0	0	0	0	27360	0	0	0	0
Whole Eggs	143.0	10	3	0	372	142	1	0	0	13
Peanut Butter A	594.0	50	9	0	0	469	22	6	9	25
Peanut Butter B	554.0	51	11	0	0	474	20	7	9	23
Salt	0.0	0	0	0	0	38758	0	0	0	0
Sugar, Brown	380.0	0	0	0	0	28	98	0	97	0
Sugar, White	387.0	0	0	0	0	1	100	0	100	0
Unsalted Butter	714.0	79	50	0	214	0	0	0	0	0
Ingredient Statements:										
All Natural Pastry Flour: Wheat Flour										
Baking Powder: Calcium Acid Phosphate, Bicarbonate of soda, Corn Starch.										
Peanut Butter A: Roasted Peanuts and Sugar, Contains 2% of Less of: Molasses, Fully Hydrogenated Vegetable Oil (Rapeseed and Soybean), Mono Diglycerides, Salt.										
Peanut Butter B: Raosted Peanuts, Sugar, Palm Oil, Salt.										



- Step 3: Calculate each Ingredients' Nutrients based on % in formula
  - Calculate nutritionals for 10% **Unsalted Butter** using information from Ingredient Nutrient spreadsheet

Example:

- 100 grams of Unsalted Butter has 714 calories
- Our formula contains 10% Unsalted Butter
  - **Calculation:  $714 \times 0.10 = 71.4$**
- So, in 100grams of cookie dough, Unsalted Butter contributes **71.4** calories
- Need to calculate 10% of each nutrient in Unsalted Butter



- Step 3: Calculate each Ingredients' Nutrients based on % in formula
  - Enter information for 10% **Unsalted Butter** into Worksheet

Item Name	Quantity (grams)	Calories (kcal)	Fat (g)	Sat Fat (g)	Trans Fat (g)	Cholest erol (mg)	Sodium (mg)	Carbs (g)	Fiber (g)	Sugar (g)	Protein (g)
Unsalted Butter	10	<b>71.4</b>	7.9	5.0	0.0	21.4	0.0	0.0	0.0	0.0	0.0



## Step 3: Calculate Nutritionals

- Calculate nutritionals for 20% Peanut Butter using information from Ingredient Nutrients spreadsheet

Example:

- 100 grams of Peanut Butter B has 554 calories
- Our cookie dough formula contains 20% of Peanut Butter B
  - **Calculation:  $554 \times 0.20 = 110.8$**

So, in 100 grams of cookie dough, Peanut Butter B contributes **110.8** calories

Item Name	Quantity (grams)	Calories (kcal)	Fat (g)	Sat Fat (g)	Trans Fat (g)	Cholesterol (mg)	Sodium (mg)	Carbs (g)	Fiber (g)	Sugar (g)	Protein (g)
Unsalted Butter	10	71.4	7.9	5	0	21	0	0	0	0	0
Peanut Butter B	20	110.8	10.2	2.2	0.0	0.0	94.8	4.0	1.4	1.8	4.6
Brown Sugar	30										
Eggs	10										
Rice Flour, Brown	20										
Salt	1										
Baking Soda	1										
Tapioca Flour	8										



## Step 4: Calculate Nutritionals

- Calculate remaining ingredients and enter numbers in the worksheet provided
- Avoid rounding numbers more than 1 decimal place on individual ingredients

Item Name	Amount Grams	Calories (kcal)	Fat (g)	Sat Fat (g)	Trans Fat (g)	Cholest erol (mg)	Sodium (mg)	Carbs (g)	Fiber (g)	Sugar (g)	Protein (g)
Unsalted Butter	10	71.4	7.9	5	0	21	0	0	0	0	0
Peanut Butter B	20	110.8	10.2	2.2	0.0	0.0	94.8	4.0	1.4	1.8	4.6
Brown Sugar	30	114	0	0	0	0	8.4	29	0	29	0
Eggs	10	14.3	1.0	0.3	0.0	37.2	14.2	0.1	0.0	0.0	1.3
Rice Flour, Brown	20	72.6	0.6	0.2	0	0	1.6	15	1	0.2	1.4
Salt	1	0.0	0.0	0.0	0.0	0.0	387.6	0.0	0.0	0.0	0.0
Baking Soda	1	0	0	0	0	0	274	0	0	0	0
Tapioca Flour	8	26.6	0.0	0.0	0.0	0.0	0.3	7.0	0.0	0.0	0.1



## Step 4: Calculate Nutritionals

- Add up totals for each column

Item Name	Amount	Calories	Fat	Sat Fat	Trans Fat	Cholesterol	Sodium	Carbs	Fiber	Sugar	Protein
	Grams	(kcal)	(g)	(g)	(g)	(mg)	(mg)	(g)	(g)	(g)	(g)
Unsalted Butter	10	71.4	7.9	5	0	21	0	0	0	0	0
Peanut Butter B	20	110.8	10.2	2.2	0.0	0.0	94.8	4.0	1.4	1.8	4.6
Brown Sugar	30	114	0	0	0	0	8.4	29	0	29	0
Eggs	10	14.3	1.0	0.3	0.0	37.2	14.2	0.1	0.0	0.0	1.3
Rice Flour, Brown	20	72.6	0.6	0.2	0	0	1.6	15	1	0.2	1.4
Salt	1	0.0	0.0	0.0	0.0	0.0	387.6	0.0	0.0	0.0	0.0
Baking Soda	1	0	0	0	0	0	274	0	0	0	0
Tapioca Flour	8	26.6	0.0	0.0	0.0	0.0	0.3	7.0	0.0	0.0	0.1
<b>Totals (100g basis)</b>	<b>100</b>	<b>410</b>	<b>20</b>	<b>7.7</b>	<b>0</b>	<b>59</b>	<b>781</b>	<b>56</b>	<b>2.4</b>	<b>31</b>	<b>7.4</b>



## Step 4: Calculate Nutritionals

- Calculate **Amount Per Serving** based on serving size (given serving size for this product is 50 grams)
- Round numbers to nearest whole number

Item Name	Amount	Calories	Fat	Sat Fat	Trans Fat	Cholesterol	Sodium	Carbs	Fiber	Sugar	Protein
	Grams	(kcal)	(g)	(g)	(g)	(mg)	(mg)	(g)	(g)	(g)	(g)
Unsalted Butter	10	71.4	7.9	5.0	0	21.4	0	0.00	0.0	0	0
Peanut Butter B	20	110.8	10.2	2.2	0.0	0.0	94.8	4.00	1.4	1.8	4.6
Brown Sugar	30	114	0	0.0	0	0	8.4	29.40	0.0	29	0
Eggs	10	14.3	1.0	0.3	0.0	37.2	14.2	0.10	0.0	0.0	1.3
Rice Flour, Brown	20	72.6	0.6	0.2	0	0	1.6	15.20	1.0	0.2	1.4
Salt	1	0.0	0.0	0.0	0.0	0.0	387.6	0.00	0.0	0.0	0.0
Baking Soda	1	0	0	0.0	0	0	274	0.00	0.0	0	0
Tapioca Flour	8	26.6	0.0	0.0	0.0	0.0	0.3	6.96	0.0	0.0	0.1
Totals (100g basis)	100	410	19.7	7.7	0	58.6	781	55.7	2.4	31	7.4
<b>Amount per serving</b>	<b>50</b>	<b>205</b>	<b>10</b>	<b>4</b>	<b>0</b>	<b>29</b>	<b>390</b>	<b>28</b>	<b>1</b>	<b>16</b>	<b>4</b>



## Step 5: Determine %DV ...*Did I hear the word Algebra?*

- Use chart provided on worksheet

Nutrient	DV
Total Fat	65 g
Saturated Fat	20 g
Sodium	2400 mg
Total Carbohydrate	300 g
Dietary Fiber	25 g
Cholesterol	300 mg

% Daily Values are used to guide consumers on the level that each nutrient in the product contributes to their daily diet.

### Example:

- Daily Value (DV) for Total Fat is 65 grams
- One serving of our cookie dough ball has 9.9 grams of Total Fat
- Calculation:  $10 \div 65 = 0.15$** 
  - To make a percentage, multiply by 100 →  **$0.15 \times 100 = 15\%$**
  - Answer: one serving of cookie dough ball contains 15% DV of Total Fat



## Step 5: Determine %DV

- Use chart provided on worksheet

Item Name	Amount	Calories	Fat	Sat Fat	Trans Fat	Cholesterol	Sodium	Carbs	Fiber	Sugar	Protein
	Grams	(kcal)	(g)	(g)	(g)	(mg)	(mg)	(g)	(g)	(g)	(g)
Unsalted Butter	10	71.4	7.9	5.0	0	21.4	0	0.00	0.0	0	0
Peanut Butter B	20	110.8	10.2	2.2	0.0	0.0	94.8	4.00	1.4	1.8	4.6
Brown Sugar	30	114	0	0.0	0	0	8.4	29.40	0.0	29	0
Eggs	10	14.3	1.0	0.3	0.0	37.2	14.2	0.10	0.0	0.0	1.3
Rice Flour, Brown	20	72.6	0.6	0.2	0	0	1.6	15.20	1.0	0.2	1.4
Salt	1	0.0	0.0	0.0	0.0	0.0	387.6	0.00	0.0	0.0	0.0
Baking Soda	1	0	0	0.0	0	0	274	0.00	0.0	0	0
Tapioca Flour	8	26.6	0.0	0.0	0.0	0.0	0.3	6.96	0.0	0.0	0.1
Totals (100g basis)	100	410	19.7	7.7	0	58.6	781	55.7	2.4	31	7.4
Amount per serving	50	205	10	4	0	29	390	28	1	16	4
%DV			15%	20%		10%	16%	9%	4%		



## Step 6: Enter Values into Nutrition Facts Panel

- Round to nearest whole number unless following FDA rounding rules ([FDA guidelines 21 CFR 101.9](#))
- Calories = 205
- Fat (g) = 10
- Sat Fat (g) = 4
- Trans Fat (g) = 0
- Cholesterol (mg) = 30
- Sodium(mg) = 390
- Carbs (g) = 28
- Fiber (g) = 1
- Sugar (g) = 16
- Protein (g) = 4

Fat = 15%  
Sat Fat = 20%  
Cholesterol = 10%  
Sodium = 16%  
Carbs = 9%  
Fiber = 4%

Nutrition Facts			
Serving Size			
Servings Per Container			
Amount Per Serving			
Calories	Calories from Fat		
	% Daily Value*		
Total Fat g			%
Saturated Fat g			%
Trans Fat g			
Cholesterol mg			%
Sodium mg			%
Total Carbohydrate g			%
Dietary Fiber g			%
Sugars g			
Protein g			
Vitamin A %		Vitamin C %	
Calcium %		Iron %	
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:			
	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g
Calories per gram:			
Fat 9 • Carbohydrate 4 • Protein 4			



# Step 7: Enter Information into Nutrition Facts Panel

- Enter **Serving Size**

- 1 cookie dough ball
- Include piece or measurement of serving (1 cookie dough ball)
- Include weight of serving (50 grams)
- Enter **Servings Per Container**
  - May not be given, can make up any number
  - In this scenario, we are told that there are 24 balls of dough.



Nutrition Facts			
Serving Size			
Servings Per Container			
Amount Per Serving			
Calories	Calories from Fat		
	% Daily Value*		
Total Fat g			%
Saturated Fat g			%
Trans Fat g			
Cholesterol mg			%
Sodium mg			%
Total Carbohydrate g			%
Dietary Fiber g			%
Sugars g			
Protein g			
Vitamin A %		Vitamin C %	
Calcium %		Iron %	
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:			
	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g
Calories per gram:			
	Fat 9	Carbohydrate 4	Protein 4



# TEAM PRODUCT DEVELOPMENT

- The Team will:
  - Correctly calculate the Nutrition Facts Panel (NFP)
  - **Make an ingredient statement**
  - Properly place elements of Information Panel (IF)
  - Draw a Principle Display Panel (PDP) with package design and labeling
  - Correctly answer essay questions



- Organize Ingredient List for the Ingredient Statement

Ingredients with  
the same amount  
can be listed  
interchangeably

Ingredient	%
Brown Sugar	30
Peanut Butter B	20
Rice Flour, Brown	20
Unsalted Butter	10
Eggs	10
Tapioca Flour	8
Salt	1
Baking Soda	1

List Ingredients  
from most to least



# TEAM PRODUCT DEVELOPMENT

- Write out Ingredients Statement:

Ingredients: Brown Sugar, Peanut Butter (Roasted Peanuts, Sugar, Palm Oil, Salt), Brown Rice Flour, Butter (milk, cream), Eggs, Tapioca Flour, Salt, Baking Soda.

- If participants forget to include ingredients within another ingredient (i.e., peanut butter), points will be deducted.

**Reminder: Order of ingredients must match percentages in formula.**



# TEAM PRODUCT DEVELOPMENT

- The Team will:
  - ✓ Correctly calculate the Nutrition Facts Panel (NFP)
  - ✓ Make an ingredient statement
- **Properly place elements of Information Panel (IP)**
- Draw a Principle Display Panel (PDP) with package design and labeling
- Correctly answer essay questions



# TEAM PRODUCT DEVELOPMENT

- Information Panel (IP)
  - Nutrition Facts Panel
  - Ingredients
  - Manufacturer Information
    - Company name
    - Full mailing address
- Items must be listed in proper order
- No intervening materials allowed on IP per [FDA regulations](#)





# TEAM PRODUCT DEVELOPMENT

- The Team will:
  - ✓ Correctly calculate the Nutrition Facts Panel (NFP)
  - ✓ Make an ingredient statement
  - ✓ Properly place elements of Information Panel (IP)
- **Draw a Principle Display Panel (PDP) with package design and labeling**
- Correctly answer essay questions



# TEAM PRODUCT DEVELOPMENT

Principle Display Panel (PDP) includes:

- Product Name
  - Be creative and come up with a fun name
- Statement of Identity
  - Must clearly state what the product is
  - Example: Peanut Butter Cookie Dough Balls





# TEAM PRODUCT DEVELOPMENT

## Principle Display Panel (PDP)

- Design an appealing front package
  - Colorful, eye-catching
  - Promote the benefits or uniqueness of the product
  - Suggested statements:
    - Gluten-Free
    - All-Natural Ingredients
    - Ready-to-Bake
- Make sure claims are factual (i.e., this product would not be labeled “Healthy” with the amount of fat and sugar in product)





## TEAM PRODUCT DEVELOPMENT

Principle Display Panel (PDP) includes:

- Net Weight Statement
  - Must put down total weight of product
  - Must include weight in ounces and grams
    - Example: (calculate: 24 balls at 50 grams = 1200 grams  
1200 grams / 28 grams/ounce = 42.8 oz.)
  - NET WT. 42.8 oz. (1200 g) or  
NET WT. 2 lb., 10.8 oz. (1.2 kg)



# TEAM PRODUCT DEVELOPMENT

## Net Weight Conversions:

- 28 grams\* = 1oz
- 454 grams\*\* = 16oz = 1 lb

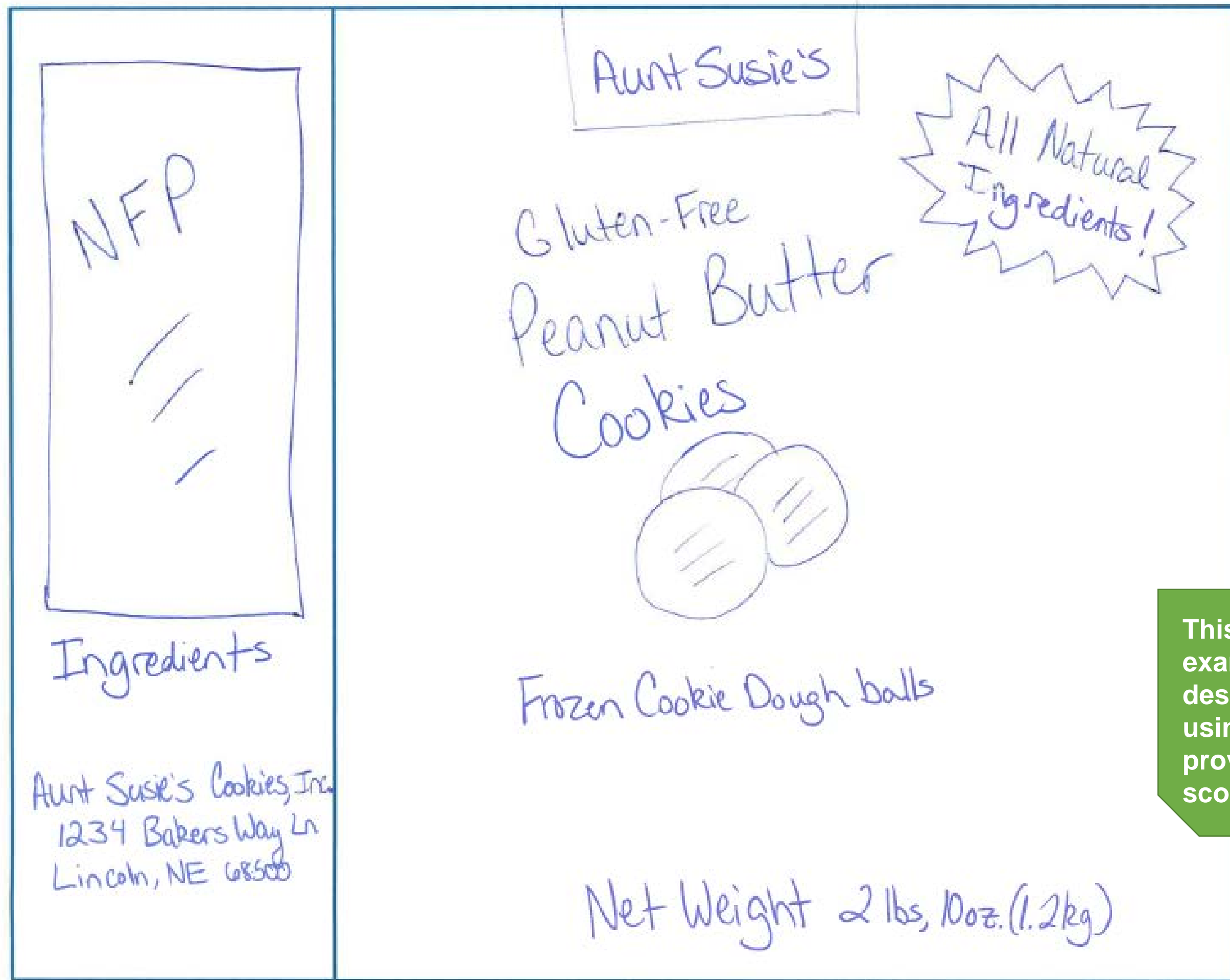
\*Technically, 28.35 grams = 1oz, but for this contest we will round to 28 grams.

\*\*Based on actual grams-to-ounce conversation, 454 grams is more accurate number to use for grams/pound



# Sample Information Panel & Principal Display Panel

This example shows how to draw a box and label "NFP" and where to mark "ingredients" on the Information Panel



Package Design with All Elements from Page 2

This is a very basic example. Adding more design to the PDP and using colored pencils will provide for a higher score.



# TEAM PRODUCT DEVELOPMENT

- The Team will:
  - ✓ Correctly calculate the Nutrition Facts Panel (NFP)
  - ✓ Make an ingredient statement
  - ✓ Properly place elements of Information Panel (IP)
  - ✓ Draw a Principle Display Panel (PDP) with package design and labeling
- **Correctly answer essay questions**



# TEAM PRODUCT DEVELOPMENT

# Essay Questions:

- Questions will vary each year
- Generally topics include:
  - Food Allergens
  - Food Safety issues
  - Current Food Trends

*Questions should not be difficult if students study for Food Safety test and Food Science Exam*





# TEAM PRODUCT DEVELOPMENT



- Helpful Tips:
  - Divide up roles among team members
  - Break apart worksheets to have each team member work on pre-determined section
- Keep ingredients and formulations simple
  - Use as few ingredients as necessary
  - Use easy numbers in formulas (i.e., 5 ingredients at 10%, 10%, 10%, 25%, and 25%)



# TEAM PRODUCT DEVELOPMENT



- Front page of PD packet will show how scoring is divided:
- All required elements correctly placed on the panels (50 pts)
- Appealing PDP/Labels (50 pts)
- Correct Nutrition Facts Panel and Worksheet (125 pts)
- Correct Ingredient Statement (100 pts)
- Essay Questions (75 pts.)



# Product Development



## QUESTIONS?



# Review





# Overview of the CDE

## Individual Activities – (250 points/Individual)

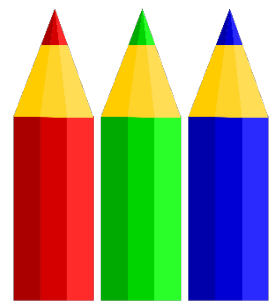
1. Objective Test (150 points)
2. Food Safety Practicum (50 points)
3. Sensory Evaluation Practicum (50 points)
  - a. Triangle Test (20 Points)
  - b. Aromas (30 points)

## Team Activities – (400 Points)

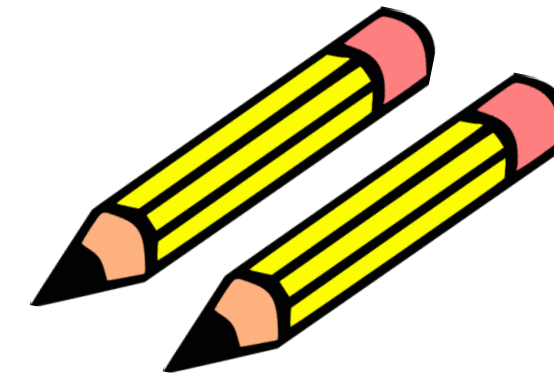
Product Development Project



# Participants Must Bring Their Own:



- Two sharpened No. 2 pencils
- Non-programmable calculator
- Colored pencils recommended
- No electronic media allowed including, but not limited to cell phones and cameras







**Official Rules Available Online:**  
**<http://alec.unl.edu/agedcde/food-science>**





# Thank You!