Math-in-CTE Lesson Plan

Lesson Title: **Salads** Lesson 01

Occupational Area: Foods II

CTE Concept(s): Salads & Salad Dressings

Math Concepts: Ratios, percentages, fractions, conversions

Lesson Objective: The students will create an aesthetically pleasing salad and a correct ratio vinaigrette.

Supplies Needed: PowerPoint, markers, colored pencils, printer paper

THE "7 ELEMENTS"	TEACHER NOTES (and answer key)
1. Introduce the CTE lesson.	
Today, we are going to talk about classification of salads, nutrients obtained from salads, the arrangement of salads, and salad dressings. What are some of your favorite salads? Salad dressings?	Lead a class discussion about salads and salad dressings, making sure they include a vinaigrette.
Ask: What are your favorite salads? What are your favorite ingredients in salads?	
Activities Prior to Math Portion of Lesson:	
*__PowerPoint__ on classifications of salads	*__PowerPoint__: Go over PowerPoint of different classifications of salads and nutrients obtained from each. Students take notes during PowerPoint.
*__Notes__ on nutrients/arrangements of salads	*__Notes__: Go over some key principles of salad preparation (ex. freshness, color, texture, draining, bite size pieces, prepared right before serving, dressings).
*__Comic strip/picture__ of classifications & arrangements of salads.	*__Activity__ where students fold a piece of paper in fourths. On one side in each box, they draw a picture of each of the classifications of salads (appetizer, accompaniment, main dish, dessert) and write nutrients found in these salads. On reverse side, they draw a comic strip using 4 of the salad-making principles. (Some students are uncomfortable

	making a comic strip, so they CAN just draw a picture, but I offer them extra credit if they make me laugh). I also require them to color it because color is an important part of aesthetics.
2. Assess students' math awareness as it relates to the CTE lesson. Ask: What is a vinaigrette composed of? (different parts make up a whole) Ask: What is a ratio? (comparing 2 parts OR comparing a part to a whole) Ask: What happens to your vinaigrette after it has sat for awhile? Why does this happen? (separates out, oil and water don't mix) Ask: What is an emulsion? (small globules suspended in a liquid solution, in culinary it is where oil is mixed in with water so it doesn't separate out). Ask: How do we create an emulsion? (using an emulsifier or mechanically mixing it together) Ask: What is the definition of whisking? (rapidly whipping to incorporate air, this divides the fat globules).	Talk about how vinaigrette's are composed of 3 parts oil to 1 part vinegar. This creates a ratio between the ingredients. The amounts can change but the ratio needs to stay the same. Talk about how sometimes we mix ingredients that will not combine because 1 is water based and the other is fat based. In a vinaigrette, vinegar is water based and the oil is fat based. Because these ingredients don't mix we need to create an emulsion. An emulsion is a fat and water combination where the oil is suspended in the water so it doesn't separate out. To create this emulsion, we usually use an emulsifier (such as eggs) in our baked goods. But in a vinaigrette, we can only have 2 ingredients oil & vinegar, so we have to mechanically create an emulsion. We do this by SLOWLY adding the oil to the vinegar while constantly whisking.
3. Work through the math example *embedded* in the CTE lesson.	Talk about how a 3:1 ratio is 4 total parts since 3 + 1 = 4. To figure out how much vinegar and oil you will need, you need to divide your total amount you want to create by your

A. How much vinegar and oil will you need to create 1 cup vinaigrette? B. How much vinegar and oil will you need to create 8 tbsp. of vinaigrette?	total parts (4). You then take this number and multiply it by each of the ratios. Equation: $\frac{Total\ Amount}{Total\ Parts} = x$ X (Y:Z) A. 1 cup / 4 = ¼ cup 3 (1/4 cup) : 1 (1/4 cup) = ¾ cup : ¼ cup B. 8 tbsp. / 4 = 2 tbsp. 3 (2 tbsp.) : 1 (2 tbsp.) = 6 tbsp : 2 tbsp.
4. Work through *related, contextual* math-in-CTE examples. A. Let's say you're making a vinaigrette composed of 2 tbsp. vinegar & 6 tbsp. oil. During you're emulsion making, you realize you accidentally added 6 tbsp. of vinegar. How much extra oil will you need to keep the same oil to vinegar ratio? B. How much vinaigrette are you going to create with the new measurements? C. 18 tbsp. and 24 tbsp. are big numbers that convert into larger units of measurements (because who wants to measure out 18 tbsp. of oil?!) How many tablespoons in 1 cup? 16!!!	Lead the class to the following understanding of equal ratios (when 2 fractions reduce to the same fraction). On both sides, the numerator needs to be the same ingredient and the denominator is the other ingredient. A. $\frac{3\ oil}{1\ vinegar} = \frac{x\ oil}{6\ tbsp\ vinegar}$ Cross multiply to solve for x. 18 tbsp. = 1x Divide each side by 1. 18 tbsp. = x So, we need 18 tbsp. oil B. 18 tbsp. oil + 6 tbsp. vinegar = 24 tbsp. vinaigrette C. 16 tbsp. = 1 cup 8 tbsp. = ½ cup 4 tbsp. = ¼ cup

So, 18 / 16 = 1 cup plus 2 tablespoons left over 24/16 = 1 cup plus 8 tablespoons left over We can also go 1 step further by converting the 8 tbsp. into cups. 8/16 is a fraction we can reduce. What is the common factor? 8! So 8/8 = 1 & 16/8 = 2 so the reduced fraction is ½. The total amount of vinaigrette is 1 ½ cup.	
5. Work through *traditional math* examples. *What we just discussed is typical math problems you've seen in Algebra.* A. As an interior designer, you need to determine where you are going to place Wainscoting (chair rail). Your rooms ceiling is 8' high. For an aesthetically pleasing wall, it is best to divide your wall into 3 parts & place your Wainscoting at the first 1/3 level of the wall. How many feet up the wall are you going to place your Wainscoting? B. 3 out of 4 doctors recommend Crest toothpaste. If you are at a doctor convention with 40 doctors, how many doctors will suggest you use Crest toothpaste?	A. Take the total amount 8' and divide it by the total parts 3 8' / 3 = **2.67 feet off the floor** B. $\frac{3}{4} = \frac{x}{40}$ Cross multiply 120 = 4x Divide each side by 4 to solve for x. X = 30
6. Students demonstrate their understanding. You are now going to go back to the lab and create a vinaigrette. You'll need to have 4 tsp. of vinaigrette when finished. You can use a variety of oils (vegetable, canola, olive, etc) and a variety of vinegars (rice, red wine, balsamic, distilled, etc.)	Students will create a vinaigrette. Set out different oils and vinegars for the students to use during the lab. Instruct the students that they are to create their own vinaigrette using 1 tsp. of vinegar. Use vinaigrette for the salad the students will prepare during the lab.

Students will create a vinaigrette using a 3:1 ratio.	
7. Formal assessment. The students created a vinaigrette using 3 tsp. of oil and 1 tsp. vinegar. How does your vinaigrette taste? Did your vinaigrette separate out?	Answers will vary. Hopefully, it will taste great ☺

NOTES: