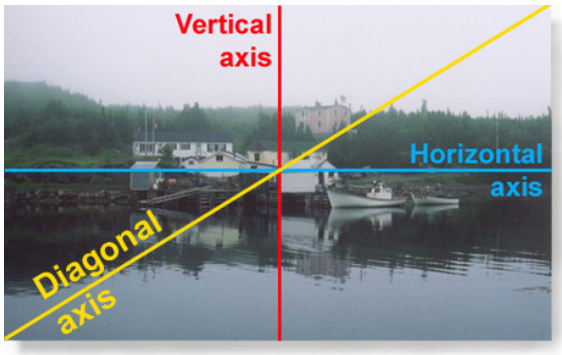
Math-in-CTE Lesson Plan

WRITERS: Donna Denault, Coal City HS and Mark Morrey, Joliet Township HS Lesson Title: **Platter Presentation** Resource: Liya Swift, *Plating and Food Presentation: Symmetrical and Asymmetrical*, The Chef Apprentice School of the Arts at https://www.casaschools.com/plating-and-food-presentation-symmetrical-and-asymmetrical/	Lesson #2 Vocabulary Antipasto Approximate Symmetry Asymmetrical Balance Asymmetry Balance Eye Appeal Line of Symmetry Marinated Radial Balance Symmetrical Balance Symmetry

Occupational Area: Culinary Arts
CTE Concept(s): Garde Manger presentation protocols
Math Concept(s): Lines of Symmetry

Lesson Objective:	Create an antipasto platter using the principles of symmetry.
Learning Standards:	**CC.4.G.3** Draw and identify lines and angles, and classify shapes by properties of their lines and angles. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.
Supplies Needed:	"Food for Thought" Student Journals Graph paper and construction paper Supply table with mirror 4 Small Platters Cutting Boards Wet paper towels (to anchor boards) Dry paper towels Knives (chef, utility, paring) Recipes Work plans *Food Supplies:* 2 lbs. assorted cheeses — 1# cured meats (if possible) 4 roasted red peppers — 2 lg. jars assorted olives 1 doz. hard-cooked eggs — 1 loaf Tuscan bread 1.5 lbs. Whole marinated mushrooms 1 lg. head Broccoli, blanched and marinated Garnishes (parsley, nuts, celery leaves, chives, olive oil)

THE "7 ELEMENTS"	TEACHER NOTES (and answer key)
1. Introduce the CTE lesson. In their "Food For Thoughts" journals, students respond to the following question: *How do culinary professionals artistically arrange food items for an antipasto platter?* Similar to plating foods for a restaurant meal. (Set timer for 5 minutes.) Students make revisions to their journal-writing as the discussion progresses.	Base the Journal Discussion on the following characteristics: **Eye Appeal** is the visual level of attractiveness of a food presentation. Eye appeal includes the following elements: • COLOR: Vibrant, contrasting colors result when foods are cooked & prepared properly. • HEIGHT: Food should sit a bit above the plate, neither too high nor too low. • FOCAL POINT: The eye usually focuses on a platter's *centerpiece*. For example: On an individual plate, the centerpiece is the point or item to which the eye is first drawn––often the highest, largest, &/or most colorful item on a plate. • PROPORTION: Proportion is the relationship (ratio) between the amounts of each food item on the platter. **PLATTERS vs PLATES**: • SIZE: The principle difference between a platter and a plate presentation is size. (Platters are often larger presentations than plates.) • LINE: Platter items can be arranged to create a sense of flow and can be straight or curved lines. • SPACE: Arranging platters must consider *negative space* (empty space). For example: Too little negative space = a crowded appearance and too much negative space = empty appearance.

	• SYMMETRY: Platters can be arranged symmetrically or asymmetrically. Well-executed asymmetrical designs, can be very exciting and creative. • BALANCE: There are three main types of balance: symmetrical, asymmetrical, and radial.
2. Assess students' math awareness as it relates to the CTE lesson. ASK: What is the difference between symmetry and asymmetry? What is a line of symmetry? A **line of symmetry** is an axis (or imaginary line) that passes through the center of an object & divides it evenly into two identical halves. LESSON FOCUS: At the end of this lesson, you will apply plating principles to create an antipasto platter balanced using symmetry or asymmetry. What is symmetry? What is asymmetry? What is the difference between a vertical, horizontal, or diagonal line of symmetry? For example: Think about this lakeshore photograph in terms of **vertical**, **horizontal** and **diagonal axes lines** (midpoints, center lines). Think about the picture's content as having **'visual weight**.' In each type of center line, does one side have something the other side doesn't: maybe a color or a large shape? If so, is that color or shape **counterbalanced** by something on the other side?	Lead a discussion of students' responses to the question to differentiate between symmetry and asymmetry. Then, share the lesson focus and the standard mathematical definitions with culinary examples. **Symmetry** is formal balance achieved by arranging items on either side of a center line: items reside on either side of the line 50-50 (an equal 'weight' on each side of the center line). **Asymmetry** is informal balance; proportions with unequal but pleasing 'weight' on each side of a dividing line. Small shapes (such as olives or peppers) can be balanced by adding with a large shape (tuna steak or chicken breast) to the platter presentation.  (Photo courtesy Little Bay Islands at https://us.search.yahoo.com/yhs/search?hspart=domaindev&hsimp=yhs-st_emea&p=little+bay+islands+images&type=dhm_A0LXK_set_bfr__alt__ddc_srch_searchpulse_net)

ASSESSMENT: Following the discussion, show this series of pictures and ask students to determine which type of symmetry is depicted. [Note: The Platter 2 example is one you may not have discussed or defined: *radial balance*. However, some students will recognize this type of symmetry. Have a short student debate about its type of symmetry.]

A. WINDOW: A **line of symmetry** divides an object into mirror images of the other. For example, this window has symmetrical balance (formal balance).

B. PLATED STEAK: **Approximate symmetry** is observed as slight changes evident on either side of an image's center line: each side of this plated steak is *almost the same*.

C. SKETCH of Al Pittman: **Approximate symmetry**.

Radial balance typically places a heavier object close to the center of the platter (the focal point), then lighter objects are placed a distance away– often in a circular fashion.

Student Math Awareness Assessments

A.

B.

C.

D. PLATTER 1: **Asymmetrical balance** is informal balance and involves no set pattern and the items are NOT mirror images on each side of an imaginary center line. However, the arrangement of items (sizes, colors, etc.) gives a 'feeling of balance.'	D. 
E. PLATTER 2: **Radial balance** is a type of symmetry in which items are arranged in a circle or wheel formation and one can imagine a centerline dividing the image equally. Radial balance is illustrated in this platter of nachos. (NOTE: One could think of "radial tires" and that the tire rims are produced in radial balance.)	E. 

3. Work through the math example embedded in the CTE lesson. **SYMMETRY HUNT:** Send students to the lab for examples of symmetrical objects: furniture, hand tools, cooking and baking equipment, small appliances (formal balance; may be vertical, horizontal, diagonal). The goal is to recognize symmetrical objects. **ASYMMETRY HUNT:** Send students back to the lab to find examples of asymmetrical objects, (informal balance). The goal is to recognize asymmetrical objects. **TASK A:** Have students cut a heart shape from construction paper and decide its lines of symmetry.	**Potential Examples: Symmetry** Double doors, windows Cookie cutters (hearts, circles) Cake pans Flatware spoons and forks Coffee cups, glassware Thermometer **Potential Examples: Asymmetry** Cookie cutters (alphabet F, G, J, Q, a star) A universal restroom sign (male & female) A vase of flowers A chip and dip plate

TASK B: Have students use graph paper to draw any culinary-related picture that shows a vertical line of symmetry.	

4. Work through related, contextual math-in-CTE examples. DISCUSS: Discuss reflection, rotation, and translation symmetry. (Reflection and translation symmetry are demonstrated at the mirrored demonstration table in Step 6.) ARRANGE: On a supply table fitted with a mirror, arrange a platter with small dishes, flowers, and other tableware. (May include food items if appropriate.) DEMONSTRATION: Show students how mathematical reflection balance works. Cover one-half of the platter and rotate to show how the supply table mirror creates **reflection balance**.	**Reflection symmetry** is a type of co-alignment in which one half of any object is the mirror image of the other half. **Rotation symmetry** is any shape that still looks the same after some rotation (turns). For example, a pinwheel or a fidget spinner. **Translation symmetry** is the moving of an object without an specified rotation or reflection. The only element that changes is location. (e.g., honeycombs, wallpaper patterns, quilt patterns, etc.)
5. Work through the *traditional math* examples. A. Give each student a sheet of construction paper. B. Demonstrate 2 types of symmetry, by folding one of your own torn paper rectangles, that each sheet each sheet has both a vertical and horizontal line of symmetry, but not a diagonal line. C. Then, have students create vertical, horizontal, AND diagonal lines of symmetry using a square. NOTE: You can also use other shapes such as circle (rotation), X (translation)	**Student Tasks:** A. Tear the construction paper into 4 equal parts. B. Watch the teacher demonstration. C. Cut a square from one of the equal parts of the torn paper. Fold the square into lines of symmetry: first vertical, then horizontal, and then diagonal.

and reflection (mirror) to show the same principles as shown in Step 4.

6. Students demonstrate their understanding.

DEMONSTRATION A: On a supply table fitted with a mirror, place two small platters and a variety of antipasto ingredients and garnishes. (See supply list for antipasto suggestions.) Then, have students tell you where to place the food items and the garnishes to achieve the following platter balance:

A. First platter: Symmetrical
B. Second platter: Asymmetrical

DEMONSTRATION B: Show students how mathematical reflection symmetry works by covering one-half of each antipasto platter and rotating them to show how the supply table mirror creates **reflection symmetry**.

DEMONSTRATION C: Demonstrate **translation symmetry** by placing one platter in front of a 'customer.' Then, the move the platter around to show *rotation, reflection, and translation*. (If you can move an entire design in one of these ways, and that design appears unchanged, then the design is symmetric.) Do the same with the second asymmetrical platter. Review reflection, rotation, and translation.

DISCUSSION: Lead a discussion of the two platter presentations. What is the most appealing element of each platter to the "eye?" What, if anything would you (students) change about each example to add eye appeal?

Antipasto Platter Practice

Antipasto is the first course (appetizer, hors d'oeurves) of an Italian meal and usually consists of a platter or plate on which are arranged cured meats (salami), fruits, melons, marinated vegetables, cheeses, breads, olives, hard-cooked eggs, and other colorful and tasty, often marimated, foods. Food soaked in a savory, often acidic sauce to add flavor and to tenderize is said to be **marinated**.

7. Formal assessment. **PROFICIENCY TASK:** Arrange an antipasto platter using symmetry and the components of platter arrangements. (See supply list for details. This task could be performed in pairs.)	**Proficiency Task Rubric** include applicable Platter Presentation components as appropriate: Approximate Symmetry Asymmetrical Balance Asymmetry Eye Appeal Line of Symmetry Radial Balance Symmetry
TEST Items (and/or Exit Slip Tasks):	
1. What is "a line of symmetry?"	1. A **line of symmetry** is an axis (or imaginary line) that passes through the center of an object & divides it evenly into two identical halves.
2. Differentiate between symmetry and asymmetry?	2. **Symmetry** is formal balance achieved by arranging items on either side of a center line: items reside on either side of the line 50-50 (an equal 'weight' on each side of the center line). **Asymmetry** is informal balance; proportions with unequal but pleasing 'weight' on each side of a dividing line. Small shapes (such as olives or peppers) can be balanced by adding with a large shape (tuna steak or chicken breast) to the platter presentation.
3. A design is symmetric, and appears unchanged, when you are able to move the entire design in one of these three ways: _____, _____, and _____.	3. Rotation, reflection, translation

4. Next to each picture, determine what line or lines of symmetry each picture displays. List all lines that apply. If the picture displays no symmetry, write "asymmetrical."

Vertical line of symmetry

Horizontal line of symmetry

Diagonal line of symmetry

Asymmetrical

4a. Vertical
4b. Vertical, Horizontal
4c. Asymmetrical
4d. Vertical
4e. Asymmetrical
4f. Asymmetrical
4g. Vertical, Horizontal, Diagonal

4a. _____

4b. _____

4c. _____

4d. _____

4e. _____

4f. _____

4g. _____