270, Wilson, Dee Ann
Food for Thought: Hands-on and Edible Geometry Using Formulas

Opening Activity

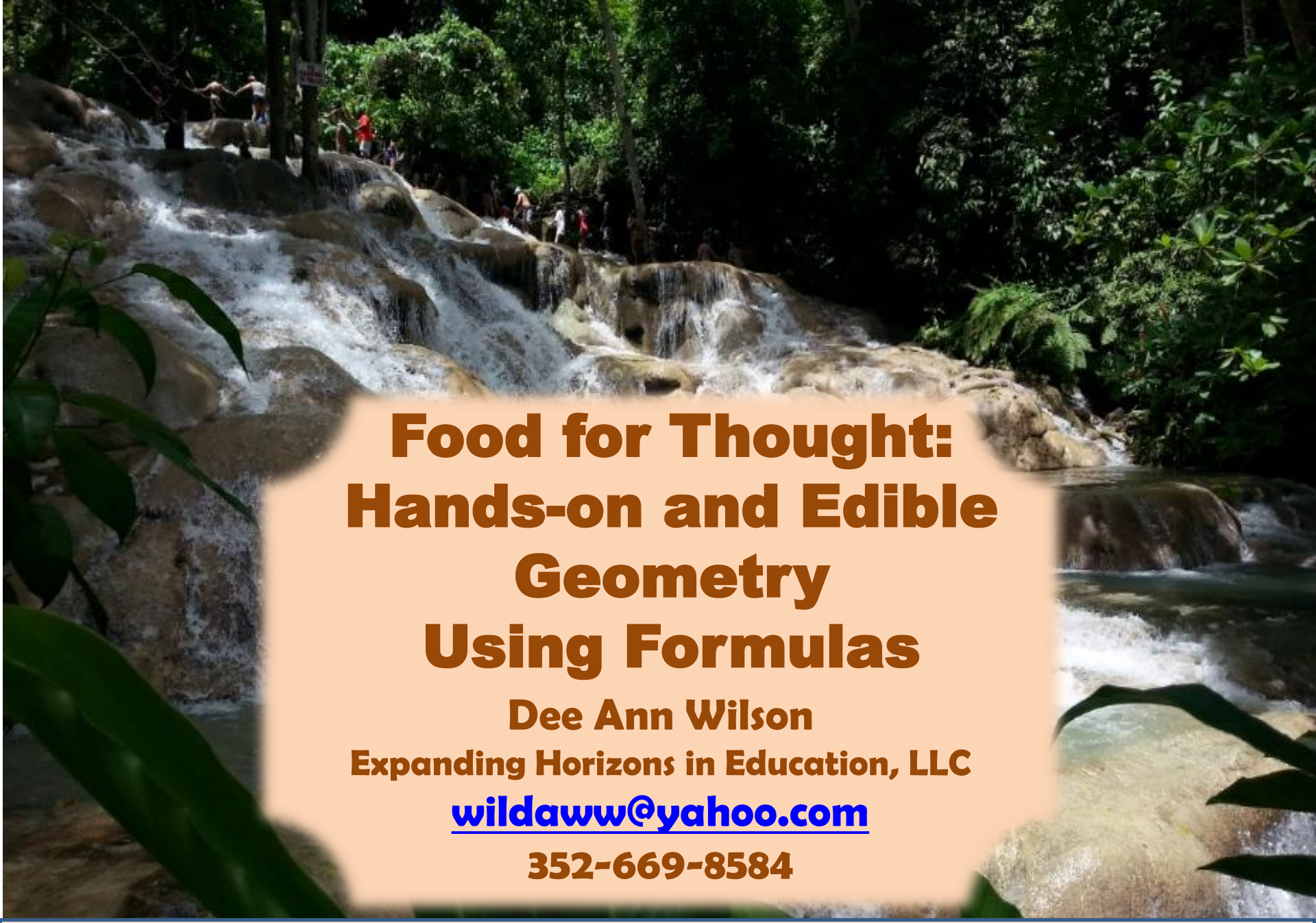
π *from Pies*

7.G.2.4 and 912.G-GMD.1.1

Protocol – Group of 2 or 4 using Group Roles

Materials - moon pie, string, ruler, scissors, and calculator per group

- Cutting Manager – Cut the string the length of the diameter and the length around the pie
- Measurement Manager – Measure in cm the distance of the diameter and the circumference
- Comparison Manager – Lay the diameter string beside the circumference string and count the number of times it fits
- Calculation Manager – Divide the circumference by the diameter and list your quotient on chart paper- when all have listed, average the quotients
- Split the pie between group members and enjoy



Food for Thought: Hands-on and Edible Geometry Using Formulas

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Call to Attention

Circle Folding

7.G.1.2 , 7.G.2.6 , and .912.G-MG.1.1

Protocol – Work Individually

Materials: paper circle, ruler, and note paper

- **Give each student a cutout paper circle**
- **Students follow teacher using script on the Futures Channel *Circle Folding* Teaching Guidelines coordinated with slide below**
- **Students need to take notes of shapes they form and record measurements if you want them to later find areas or volumes**
- **As a follow-up activity use a circle map for student processing**

Circle Folding

7.G.1.2 , 7.G.2.6 , and 912.G-MG.1.1

Hands-on

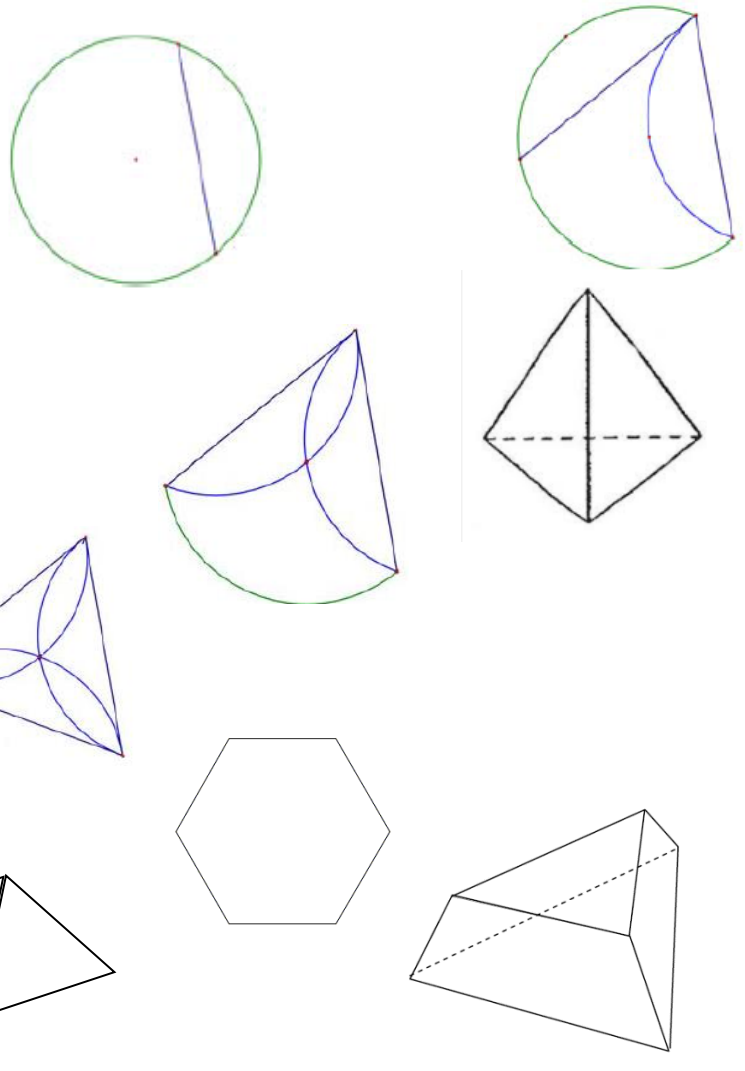
Vocabulary Review

Benefits of *Circle Folding* Activity

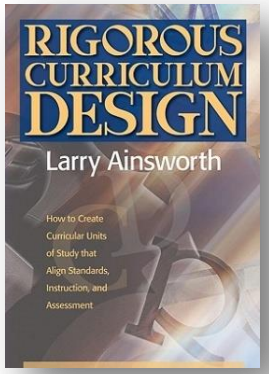
2D and 3D Connections

Opportunities to extend learning

What are some of the Benefits of Circle Folding Activity?

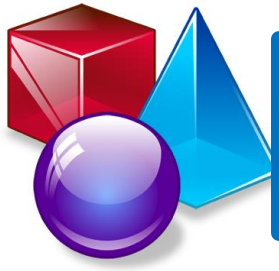


Student Engagement & Rigorous Tasks



A rigorous 21st-century curriculum ought to provide students with a dynamic blend of customary learning activities and authentic and engaging learning experiences.

Rigorous Curriculum Design
Larry Ainsworth, p. 159.



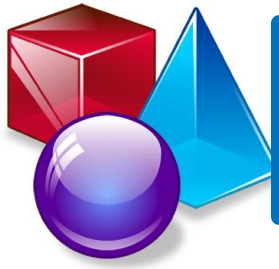
Pop Ups

7.G.2.6, 8.G.1.1 (Similarity), 912.G-MG.1.1

Protocol – Work Individually

Materials – file folder, ruler, and scissors

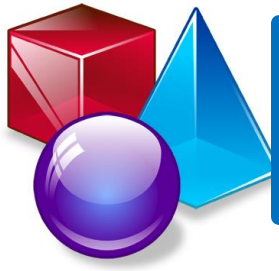
1. Cut the top tabs off of the file folder so it is even across the top
2. Place the fold at the bottom
3. From each edge measure in 3 1/2 inches on both sides and create line segments perpendicular to the fold that are 4 1/2 inches long
4. Construct a segment from one 4 1/2 inch endpoint to the other. This creates a rectangle. The fold is the bottom rectangle.
5. Cut these two vertical line segments from the fold to the horizontal line
6. Crease the line and then push the cut fold to the top, thus creating two new folds. The folds are now reserved.



Pop Ups

7.G.2.6, 8.G.1.1 (Similarity), 912.G-MG.1.1

7. From each side, measure in 4 1/2 inches and create a vertical line segment that is 2 1/4 inches from the new folds (the original horizontal line)
8. Draw a segment from each endpoint to the other creating a rectangle
9. Cut along the two vertical lines from the fold to the horizontal line. (2 1/4 inches) Cut through both folds
10. Crease the line and then push each of the new cut folds to the top. This produces four folds



Pop Ups

7.G.2.6, 8.G.1.1 (Similarity), 912.G-MG.1.1

11. From each edge, measure in 5 1/4 inches from each side and create perpendicular segments from the fold that are 1 1/8 inch in length
12. Construct a line segment from one endpoint to the other creating another rectangle
13. Cut along the two vertical lines (1 1/8 inch). Cut through all four folds, you can cut through two at a time if it is too hard to cut all four.
14. Push the cut folds to the top one at a time
15. Open up the entire project and view all the pop ups. Determine the volume of each pop up and determine if any are similar.

Pop Ups

7.G.2.6, 8.G.1.1 (Similarity), 912. G-MG.1.1

Round Robin with 4 members of your table group:

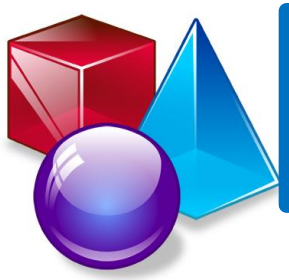
What possible questions could you use with this construction to meet the standards indicated?

Math Standards

- **7.G.2.6** - Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

- **8.G.3.9** - Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

- **912.G-GMD.1.3** - Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.



Cake Comparison

7.G.2.6, 8.G.3.9, 912.G-MG.1.1, and 912.G-GMD.1.3

Group 1
Rectangular Prism Cakes

Materials:
- 2 sizes of cake
- ruler
- string

Group 2
Cylindrical Cakes

Materials:
- 2 sizes of cake
- ruler
- string

Group 3
Hexagonal Prism Cakes
Toothpicks/Gumdrops

Materials:
- toothpicks
- gumdrops
- ruler
- string

Group 4
Pentagonal Pyramid Cakes
Flexi-straws

Materials:
- Flexi-straws
- ruler
- string

Protocol

- Work with your partner(s) to complete the performance task
- Record all findings on your recording sheet

Cake Comparison

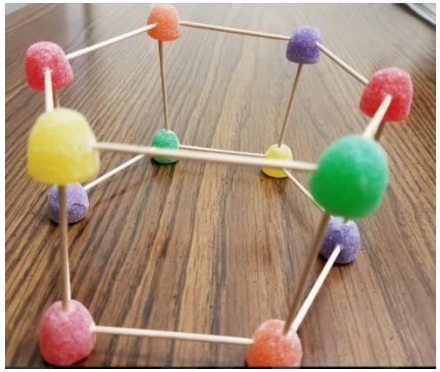
7.G.2.6, 8.G.3.9,
912.G-MG.1.1, 912.G-GMD.1.1, and 912.G-GMD.1.3

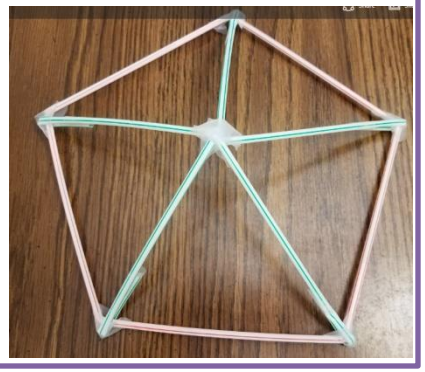
Rectangular & Cylindrical Cakes

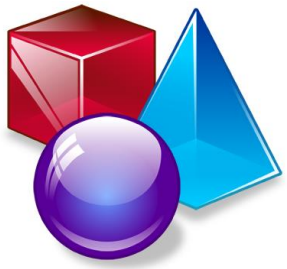
1. Measure all dimensions of each cake

Hexagonal Prism & Pentagonal Pyramid

1. Build one cake using given materials.
2. Sketch the net
3. Measure & label all dimensions.







Cake Comparison

7.G.2.6, 8.G.3.9,
912.G-MG.1.1, 912.G-GMD.1.1, and 912.G-GMD.1.3

Rectangular & Cylindrical Cakes

1. Measure all dimensions of each pan

- If the cake(s) were to be frosted only on top, how many square centimeters of frosting would be needed?
- If the cake(s) were to be frosted on all faces, how many square centimeters of frosting would be needed?
- If the cake(s) were to be frosted on all sides (including the bottom base), how many square centimeters of frosting would be needed?
- What is the volume of each of your cakes and what does the volume represent?

Hexagonal Prism & Penta… P…d

1. Build…
2. Sl…
3. …

…akes
…t?

Table Teams

Team A – Each person will build a straw triangle using scissors and three straws. Then put them together to make a square pyramid.

Team B - Each person will take 8 toothpicks and 5 gum drops and build a square pyramid. See what shapes you get by putting them together.

Ice Cream Lab

8.G.3.9, 912.G-MG.1.1, and 912.G-GMD.1.3

Protocol:

- **Find the volume of the ice cream containers**

- **Find the volume of the ice cream cones**

- **Analyze best price for purchasing ice cream and cones for class of 24 students by answering questions.**

Additional Materials – ruler and calculator

Bubble Gum Lab

8.G.3.9 and 912.G-GMD.1.3

Protocol – Work with shoulder partner

Materials – bubble gum and 2 rulers or popsicle sticks

- **Teacher explains how to measure bubbles**
- **First student blows all 5 bubbles while partner measures them and records measurements on paper**
- **Trade roles**
- **Each student has to find the volume and surface area of their bubbles**
- **Then calculate the average of their five bubbles for each of the above**
- **Write their average on class chart paper**

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Umatilla High School

Sum it up

2*1

2

- Favorite Activities

1

- Thing You Need to Do Before You Use Favorite Activities