

# The Village School's Rising 8th Grade Math Packet



Please complete and turn in the following pages  
on the first day of school in August.

Name \_\_\_\_\_

## **Rising 8<sup>th</sup> Grade Summer 2019 Mathematics Packet**

Welcome to 8th grade mathematics at The Village School. If you are enrolled in 8th grade Algebra, please complete the Algebra packet on the website.

This packet is comprised of important concepts necessary for success in 8th grade math. **Completion of this packet is mandatory for all 8th grade students and must be done in pencil. As you complete this packet, show all steps used to arrive at your final answer.**

### Adding and Subtracting Integers:

1.  $4 + (-12) =$

2.  $-17 + (-45) =$

3.  $-62 + 80 =$

4.  $-23 + 14 =$

5.  $39 + (-39) =$

6.  $\frac{2}{3} + (-\frac{4}{5}) =$

7.  $-\frac{1}{4} + (-\frac{2}{5}) =$

8.  $-\frac{1}{2} + \frac{3}{4} =$

9.  $\frac{3}{10} + (-\frac{7}{10}) =$

10.  $15 - (-42) =$

11.  $-8 - 12 =$

12.  $-95 - (-48) =$

13.  $22 - 30 =$

14.  $12 - (-12) =$

15.  $\frac{1}{2} - (-\frac{3}{4}) =$

16.  $-\frac{4}{5} - \frac{1}{2} =$

17.  $-\frac{9}{10} - (-\frac{2}{5}) =$

18.  $\frac{1}{3} - (-\frac{1}{4}) =$

Multiplying and Dividing Integers:

1.  $5 \times (-12) =$

2.  $-7 \times (-6) =$

3.  $-10 \times 8 =$

4.  $15 \times (-3) =$

5.  $-25 \times (-6) =$

6.  $1/2 \times (-7/8) =$

7.  $-3/4 \times (-6/7) =$

8.  $-5/6 \times 1/5 =$

9.  $-4/9 \times (-3/4) =$

10.  $-18 \div 3 =$

11.  $-24 \div (-6) =$

12.  $54 \div (-9) =$

13.  $-13 \div 13 =$

14.  $-66 \div (-11) =$

15.  $-4/5 \div 2/3 =$

16.  $7/8 \div (-1/2) =$

17.  $-2/3 \div (-5/8) =$

18.  $-7/8 \div 1/4 =$

Order of Operations:

1.  $17 - 6 \cdot 10 \div 2 + 12$

4.  $5 \times (11-3) + 8^2$

2.  $5 \times (8 + 7) + 7$

5.  $(62 - 2) \div 30 + 6$

3.  $(62 - 2) \div 6 + 4^2$

6.  $(85 - 5^2) \div (16 - 6)$

Solving One and Two-step Equations:

1.  $x/4 = 250$

5.  $4n + 12 = 4$

2.  $y - 3 = -2$

6.  $6a - 11 = 13$

3.  $-3x = 36$

7.  $9 + a/6 = 8$

4.  $c + 7 = -14$

8.  $d/4 - 9 = -3$

Solving One and Two-step Inequalities:

1.  $n + 6 \leq -3$

5.  $3x - 5 < 19$

2.  $-2x < -12$

6.  $-2x + 12 > -4$

3.  $r - 4 > 1$

7.  $-7d + 8 > 20$

4.  $e/-2 \geq 3$

8.  $r/-6 + 5 < 7$

Percent of Change:

1. 24 teachers to 30 teachers

4. 20 miles to 11 miles

2. \$65 to \$144

5. 126 ounces to 48 ounces

3. 95 trees to 145 trees

6. 248 workers to 200 workers

Proportions and Unit Rates:

1.  $\frac{x}{5} = \frac{18}{30}$

4.  $\frac{8}{x} = \frac{14}{7}$

2.  $\frac{x}{12} = \frac{24}{36}$

5.  $\frac{5}{6} = \frac{x}{15}$

3.  $\frac{14}{15} = \frac{x}{75}$

6.  $\frac{3}{8} = \frac{33}{x}$

7. To make 2 batches of nut bars, Jayda needs 4 eggs. How many eggs are used in each batch of nut bars?
8. On her way to visit her grandparents, Jennifer drives 265 miles in 5 hours. What is her average rate of speed in miles per hour?
9. Last week Alexander was paid \$56 for 7 hours of work. How much money does Alexander's job pay per hour?
10. An above-ground swimming pool is leaking. After  $\frac{1}{2}$  hour the pool has leaked  $\frac{7}{8}$  of a gallon of water. How many gallons of water per hour is the swimming pool leaking?
11. After  $\frac{3}{4}$  of a minute a sloth has moved just  $\frac{3}{8}$  of a foot. What is the sloth's speed in feet per minute?



**Directions:**

1. On the pages that follow you will find three STEAM activities to choose from. **You must choose ONE of the activities to complete and bring to school in August.**
2. Follow the directions carefully for your chosen project. Determine how you want to present the information. Google Slides presentation, video journal, posters and charts, or some other unique and creative way.
3. On your return to school you must bring in any and all materials and products that were created for the STEAM project. Be prepared to present what you created in class.

## OPTION #1

# Ancient Civilizations Solid Figure Project

In this project you will solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. You will solve real-world mathematical problems involving area, surface area, and volume.



1. Design a blueprint for an architectural accomplishment in an Ancient Civilization of your choice.
  - a. The blueprint must be done on graph paper.
  - b. You must include a scale (ex: 1 in = 1 ft) and dimensions on your blueprint.
  - c. You must incorporate at least three different shapes/solids.
2. Create a solid figure representing your architectural accomplishment from the Ancient Civilization. You must build three different shapes/solids into your design. This can be made of any material of your choosing.
3. Create a tri-fold brochure that shares information about the Ancient Civilization and architectural accomplishment you chose to build.
4. Write a mathematical report that includes:
  - a. The surface area of each solid used to construct your building.
  - b. The surface area of the entire building.
  - c. The volume of each solid used to construct your building.
  - d. The volume of the entire building.

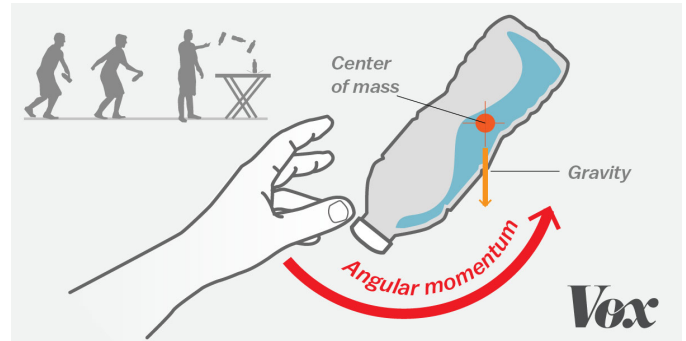
*\*\*\*Your work/calculations must be present for all parts a-d above.*

The blueprint, actual structure, tri-fold, and mathematical report should be physically brought in. They can also be included in a Google Slides presentation, or they can be modeled, shown and explained in your video journal.

## OPTION #2

# The Bottle Toss Challenge

The ORIGINAL water bottle flip stem challenge and lab! Water bottle flipping can be educational? Absolutely! This STEAM challenge is inspired by the popular YouTube water bottle flipping challenge where you toss a water bottle and attempt to land it straight up. You will practice scientific method with some probability, fractions and data collection in the mix while having fun!

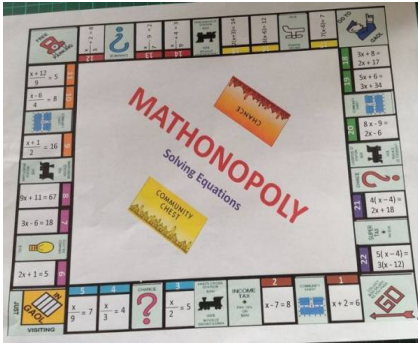


1. Select 4-8 different types of water bottles (different companies or brands) and determine which type of bottle works best for flipping.
  - a. To determine this you will need to run a minimum of 30 trials with each water bottle. Use a tally format to collect your data.
  - b. Create a bar graph to represent the success rates of each type of bottle.
  - c. Calculate the mean for how many times the bottles successfully landed on their base.
2. Using the most successful water bottle from step 1, determine the best water level to fill the water bottle.
  - a. To determine this run a minimum of 30 trials with the water bottle filled to different amounts. Use fractions to label how much water is in the bottle. (Ex:  $\frac{1}{5}$ ,  $\frac{2}{5}$ ,  $\frac{3}{5}$  ... or  $\frac{1}{4}$ ,  $\frac{2}{4}$ ,  $\frac{3}{4}$ ). Use a tally format to collect your data.
  - b. Create a table or chart that tells me what percentage of the 30 trials were successful (ex: 7 out of 30 times would be  $7 \div 30 = 0.2333 = 23\%$ ).
3. Using the best bottle and most successful water level, film a video (in slow motion!) of the bottle successfully landing on its base.
4. Create a poster explaining the physics behind bottle flipping. Be sure to use science vocabulary such as angular momentum, center of mass, gravity, and other terminology. Here are a few resources to get you started:  
<https://www.scientificamerican.com/article/the-physics-of-bottle-flipping/>  
<https://www.livescience.com/63670-physics-of-water-bottle-flipping.html>

All data collection, tables, graphs, charts and posters must be brought into school in August. They can be done on poster paper or in the Google Slides presentation or video journal.

## OPTION #3

# Mathopoly Board Game: Solving Equations



For this project you will use what you learned in 7th grade about solving one and two-step equations to make a Monopoly board that also makes connections to your summer language arts book, “I Will Always Write Back.” Although you will be required to include some of the most common and popular squares on your board, the rest is up to you!

1. Create your own Mathopoly board game using materials of your choice.
2. You must include the following Monopoly squares: GO, Go to Jail, Jail, Free Parking, Chance and Community Chest.
3. Language Arts Component: The other game board squares must make connections to *I Will Always Write Back*. You should include locations and important landmarks from both Caitlin’s home in Pennsylvania and Martin’s home country of Zimbabwe. Be sure to include the two colleges they choose to attend in the United States as well.
4. Math Component: You must include both one and two-step equations into the game board. They may be on the squares, in the Chance or Community Chest cards, or both. Part of success in the game must include being successful in solving a math problem.
5. Rules: You create the rules. Make sure they are typed and printed in a format that is easy for players to read and follow. Test the rules by having family members or friends play. You want to ensure that your classmates can play your game when we return to school.
6. Chance and Community Chest: You choose what are on these cards. They should have a connection to either the book or solving one and two-step equations.
7. Game Pieces: Create your game pieces/characters that move. They should somehow relate to the book. They can be characters or symbols that you feel are important. How your game pieces move is up to you (dice, spinner, etc...).

The game board and all materials must come to school when you return in August. Be sure to come up with a creative way to present your project. You could use Google Slides or a video journal to explain and model the game!