

Using Mathematical Representations to Provide Student Choice and Enrichment

Kara Yanochko

Anna Lane Lingelbach Elementary School

Abstract

This unit is designed to provide extension and enrichment to a small group of gifted and high performing 4th grade students. Students will be provided opportunities for choice and challenges as they expand their mathematical thinking using flexibility, modeling, problem solving, abstract reasoning and more.

Keywords

Mathematics, flexibility, choice, reasoning, enrichment, extension, choice boards, menus, student choice, centers and rotations

Unit Content

Anna Lane Lingelbach Elementary School is located in the Germantown section of Philadelphia. The school receives Title I funding and services students spanning grades K-8. The school currently serves approximately 350 students. This is my 14th year in the school as the middle school mathematics teacher in 7th and 8th grade. This year I serve as the 8th grade mathematics teacher for our only section of 8th grade, then I spend the rest of my day supporting students and classrooms around the school in the capacity of dean of students. While a main goal within my position is to build relationships school wide, I also pride myself on making cross grade connections with mathematical strands necessary for success in my classroom, and overall good life skills.

In my time supporting students and classrooms, I identified a need for enrichment opportunities for our high performing students as it related to mathematical opportunities that allow for acceleration. One grade level that stood out as a high need was 4th grade, therefore this unit is being written for a 4th grade enrichment group I have been working with consisting of 8 students from a class of 32, 5 of which scored proficient and 3 of which scored advanced on the 3rd grade PSSA testing. I think it can be easy to fall into the mindset that these students will naturally succeed, and often more focus and attention is given to struggling students, however gifted and high performing students can actually fail to live up to their full potential and find themselves bored in class if not provided with opportunities to be fully engaged in challenges.

During the Teacher's Institute of Philadelphia at the University of Pennsylvania, in the Fall of 2022, I was able to take the class: *What Makes Something a Number* with Professor Henry Towsner. Through the topics we have discussed in this seminar, I have

done a lot of thinking about how to provide enrichment opportunities for the gifted and high performing 4th grade students at Lingelbach. The school is undergoing a variety of shifts in need that require us to face and embrace new opportunities for growth. Each year we measure student growth and outcomes using a variety of metrics?. Historically my school has been underperforming in mathematics and has committed to improving student growth through deliberate and meaningful implementation of research based best practices. This put us in a position of growth this past school year, with a specific and clearly identifiable population in 4th grade ready to excel.

During our exploration in class, I began thinking about how students use patterns, problem solving, higher order thinking, reasoning, and algebraic thinking as it relates to numbers and operations, building understanding of order of operations, and developing fundamental skills necessary to approach middle school math with flexibility, creativity, and procedural fluency. I fear we fall into the trap of assuming that students who are high performing in lower grades can automatically make the connections and extensions to transfer these skills into middle school, but often don't focus on these students as an opportunity to transcend expectation. I hope to build advanced proficiency in students already meeting expectations by providing opportunities to continue to foster their love and excitement of mathematics outside of the prescribed curriculum. These students continually take challenges as an opportunity to learn.

Number sense and flexible thinking are crucial for students making sense of numbers in both concrete and abstract contexts. Students and teachers often get fixated on procedural understanding because they view it as a clear cut path to a solution, but in my experience, offering students strategies to expand their thinking and how they approach problems can lead to deeper understanding and proficiency when tackling unfamiliar concepts. This also helps us make sense efficient ways to calculate values mentally. In working with various grade levels, I have seen a growing trend with even the strongest mathematical thinkers where they are not all proficient in their foundational fact fluency, despite proficiency. While it's not necessary in order for students to find success, it does help approach problems more efficiently.

Through this unit, students will explore a variety of ways to make sense of rational numbers using addition, subtraction, multiplication and division. Students will work with patterns, riddles, logic problems, menus, choice catalogs and other materials to connect their number sense with applicable life skills. They will then use their developed understanding of numbers and operations to create original choice boards that will be taken back to the whole class and shared with peers for exploration, enrichment, and feedback where it might be necessary. We will explore how number sense and reasoning build to algebraic thinking and work to solve and create various representations of how this presents itself in the real world.

Often when we encounter early finishers we try to compensate for their extra time by loading on additional work. Some students approach these tasks with enthusiasm while others see it as additional unwanted work. I want students to use challenges as an opportunity to learn and see their participation as both fun and meaningful, not a punishment for already meeting expectations, or often exceeding them, while also finishing early.

Students will explore various representations of math present in both the academic context as well as make the real world connections necessary to bridge their understanding of how the skills we build in school help us make sense of things happening in our lives outside of school. We often treat math as a process we apply to problems instead of a means for understanding problem situations in life. It is my belief that students need more opportunities to see those connections and find the value of understanding the numbers in context around them.

Teaching Strategies

Small group instruction offers many benefits to students and teachers. It allows the teacher to see where students are, their areas of strength and growth, their interests and aversions, and the general way they chose to approach problems. Students are given a place to expand their thinking in a safe place with space for real time growth and acceleration or remediation.

Direct and guided instruction provides the information, tools, and support students need to be able to apply skills independently. Teachers and students will discuss different ways to represent numbers in a problem set including tables, charts, pictures, equations, expressions, graphs, diagrams, models, etc. We will then connect with methods and strategies and begin to implement as we process and solve the information given in a variety of ways including but not limited to sequencing, visualization, making comparisons, looking for a pattern, working backwards, simplification, etc. (Publishers & Education, 2009).

I will also utilize 3 of the 4 essential instructional strategies in routines for reasoning to support student learning and advancement. Students will ask themselves questions, annotate, and implement the Four Rs (repeat, rephrase, reword, record) as we explore the activities in this unit. This helps to promote a language rich environment where students can engage in rich and meaningful conversations (Kelemanik et al., 2016). I chose to omit sentence starters for this particular group of students as it would reduce not increase the rigor and creative capacities of the students in the group this aims to serve. If sentence starters are a useful aid to some of your students, you may want to incorporate them into your routine to scaffold for students in need.

Students will engage in a variety of centers and rotations as we explore our enrichment activities. Centers and rotations allow for increased exposure to mixed standards and independent practice that will help support their ability to make choices when they create their final product. This practice enables students to focus on specific standards and learning targets or spiral through content and objectives that vary as their skill sets progress and develop.

Making choices about your learning creates increased buy in. During this unit I aim to provide opportunities for students to explore their current understanding and expand it to new problem situations where they can flexibly apply a variety of strategies and representations to form a pathway to their solution while embracing that it may look different than their neighbor. Sharing thinking with peers can allow students to make connections to their own thinking and enhance their problem solving process in future problems. Students will produce original activities that they will take back to share with their larger class.

Classroom Activities

Students benefit from a variety of teaching and learning strategies. Throughout this unit, students will engage in direct and guided instruction, small group instruction, and hands-on learning tasks and activities. Students will play games, engage in centers and rotations, and work cooperatively while also having fun. The teacher will guide and support students as they work through challenges and extend their learning and knowledge of the grade level content and standards that bridge to pre-algebraic thinking and reasoning.

At the end of the unit, students will independently implement content to create a personal choice board displaying one or more objectives from the unit. Students will then share their choice boards with the small group to explain some of the choices they made. In culmination, students will have an opportunity to participate by working through a choice board created by their peers.

The School District of Philadelphia aligns its Core Curriculum to the Pennsylvania Academic Standards for Mathematics and Common Core Standards. The key 4th grade standards that will be included in this unit are:

4.OA.B.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.

4.NBT.B.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the

properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

4.OA.A.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison

4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

4.OA.C.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.

Lesson 1: Figure Me Out

Objectives:

Students will engage prior knowledge in order to use a variety of representations to express values in the context of their life.

Students will identify and interpret values of others based on the representations they display.

Materials:

- Pencils
- "Figure Me Out" handout
- Card sort
- Chart paper

Instructional Activities:

In order to prepare for this lesson and its activities you will need to make some decisions on how you would like to gather information from your students in the opening discussion. You can gather this list on a smartboard page, chart paper, or hand out post it notes to solicit responses, or simply discuss thoughts verbally. You will also need copies of the Figure Me Out document for each student and a copy of the card sort (one per pair

or trio). It is best if you pre-cut the set so students don't have to. It also allows for the set to be mixed. If you plan to use them for multiple groups of students, you may also want to laminate the sets so they are reusable.

The teacher will introduce the idea of representations and ask students to name some ways they see numbers represented around them. Anticipated answers may include tables, graphs, equations, expressions, patterns, pictures, numbers. If there are specific representations you want them to include based on your student group, make a list for yourself prior to help steer students if there are any gaps in their lists.

Next, break students into partners or groups of three. Make sure students have enough space to lay out all their cards in the sort. Students will begin by working with a partner to sort cards into groups. First allow students to sort the cards in any way that makes sense to them. Allow brief time for students to share out about their groupings. If students already group by like values, regardless of representation, move to the next activity, if no student group noted that as their categories, ask students to sort cards into groups that show representations of the same numerical value. The goal is to allow them to see that numbers can be expressed in a variety of ways prior to them moving on to the next activity in which they will express values that represent things about themselves.

Once students have had time to sort, discuss, and make sense of the various representations, provide each student with a copy of the "Figure Me Out" handout. Allow students time to respond to each prompt and provide support where needed. Encourage students to use as many different ways to express the values they identify with each prompt. If students seem to be finishing at different times, encourage early finishers to flip over their paper and either create a second way to express each value, or create their own questions that can be represented using their mathematical understanding.

Have students review their responses with a partner to check their representations for accuracy. Depending on time and availability of resources, I suggest making a photo copy of each paper, or taking a picture of it, prior to swapping papers to let a classmate solve. If you are just planning to use them in the small group, additional copies may not be necessary, but to share in the larger class setting you will want multiple copies of each chart for peers to solve.

I always like to have a copy of my own responses on chart paper so as students finish their own papers, they can also solve for the numbers that represent my life. If implementing this plan in a virtual setting, you can pre-create your personal example in Google Docs or Word for students to solve. Have a blank chart ready and ask for volunteers to complete each box of the chart as a combined representation of the student group and their values.

Lesson 2: Making Sense of Situations

Objectives:

Students will be able to solve word problems using a method or strategy of their choosing.

Students will be able to share their thinking in both written form and academic conversations.

Materials:

- Pencils
- Word problems
- Logic puzzles
- Post it notes
- Colored pencils
- Dry erase markers (optional)

Instructional Activities:

Teacher will select a word problem and/or logic puzzle to display for students as an activator. Choose from the bank provided, problems supported through your school's curriculum, or create your own. You may want to have students begin individually or already have them in their partners or small groups for discussion.

Students will work in partners or small groups to rotate through the problems in this set. The teacher will need to prepare materials for each center. Make enough copies for each student to have their own if you wish for them to be consumable or you may want to laminate them for repeated use. If you laminate problems, you may want to offer students dry erase markers or simply ask them to record responses on loose paper, post its or in their notebook.

You can set up this activity as table groups, or use what I like to call “around the room” problems and post them in a clock like fashion, timing the rotation for each individual problem or set and allowing students to rotate to all problems. Problems can be done in like sets or mixed sets depending on your preference and the number of rotations you would like students to make. I like to make my choice based on time available and the ability of my student group to appropriately be up and traveling from place to place. Movement can be a motivator, but can also be a distraction. Use your best judgment based on your audience.

As the students rotate the teacher can monitor and support groups while also managing time for rotations. After the first rotation or two, adjust time to extend or shorten each

rotation if needed. You could also break this into two sessions depending on the amount of time you have with your student group. Once students have traveled to all stations, allow time for questions to the group for any problems there isn't a consensus on.

I have created a few logic puzzles that can be found below, but you can also find a plethora of ready to use logic puzzles at [The Chicago Tribune](#), [aha! Puzzles](#), and [Math is Fun!](#) or create your own to suit your interest!

Lesson 3: Tic-Tac-Toe Choice Boards

Objectives:

Students will use prior knowledge in order to exercise mixed skills.

Students will be able to solve problems using a method or strategy of their choosing.

Materials:

- Pencils
- Notebook or lined paper
- Choice board hand outs

Instructional Activities:

The teacher will introduce or review the idea of a choice board and read through directions together to ensure students know how to select their problems and show applicable work. Depending on the type of choice board you are using, the number of student responses required can be different so it is helpful to make sure students know what is being asked of them prior to being given work time.

I have included a few mixed skill challenge boards that I have designed to work with a “tic-tac-toe” format to ensure students choose problems from a variety of standards, not just one. Allow students time to work through problems and make adjustments to fit their needs. If you notice that students are struggling on a particular problem set, you may want to pull the group together to clarify any misunderstandings. This was designed as enrichment, so the problems will be a reach for many and may require some probing questions to get students thinking.

Students can also complete the activity with a partner and choose problems based on the instructions, with an additional detail to clarify that if completing with a partner, you may actually end up with one overlapping problem, but should not overlap on more than one (if using the “tic-tac-toe” format provided). If partners finish faster than other groups, you can challenge them to alternate completing the whole board with their partner, first to finish 5 of 9 “wins”.

Have multiple choice boards for students to choose from whether they have time to complete one board or multiple boards. The more exposure they have as they explore problems, the more ideas they will have when it comes time to create their own choice opportunity to share with classmates.

You can find examples of additional choice boards that may suit the needs of your students on the following web pages: [technotes](#) and [Teacher Vision](#). If you are interested in templates to create your own, you can find options here: [Shake Up Learning](#). While there are many great options ready to use, I often find the need to self-create to achieve the desired outcomes I aim to achieve.

Lesson 4: What's on the Menu?

Objectives:

Students will be able to use addition and subtraction to combine positive and negative values.

Students will be able to solve problems using positive and negative rational numbers.

Materials:

- Pencils
- Notebooks or lined paper
- Positive and negative chips
- Charged computers
- Interactive slides

Instructional Activities:

In order to prepare for this lesson, the teacher will need to make copies of a number line that includes positive and negative values. You will also need positive negative chips to help model expressions. Prior to starting the lesson, I would also ensure that students have charged computers for use after the opening activity.

Students will explore their understanding of addition and subtraction and how it relates to negative values through the use of a number line and positive and negative chips to model expressions. For this section of the lesson, use values that can be modeled using a basic number line. I would start by modeling about 4 problems together, then asking students to try a few independently. Some examples you may want to start with could be $4 - 7$, $-3 + 5$, $9 + (-6)$, or $-2 - 8$. The goal should be to model different combinations of positive and negative integers as students use their manipulative to understand how the values combine. You may want to ask the students for suggestions on what to model.

I have created slides for this activity using a site called slidemia.com which allows for more expansive editing and formatting capabilities than google slides. I have included the [menu board](#) I have made for use in this lesson that should be accessible to anyone who accesses the link. Although it can be labor intensive the first time you create one, it does get easier the more you make!

Students will need laptops or desktop computers to work independently on this activity. Students will follow the prompts in order to build their menu. It is important to make sure that students are viewing the presentation in “slideshow” mode so that the interactive components will take them directly to the item from the menu they have chosen. Students will not get the best experience by viewing all the slides at once. I recommend pulling it up on a smartboard or computer to show students how the components work before releasing them to work.

Allow students time to explore and work through at their own pace. I have included a copy in the unit materials that can be found below to help students track their menu as they work. However, if you would like a version that is editable, I have also included an open link to the [answer sheet](#) that you can make a copy of and edit to your liking.

The teacher should circulate to monitor and support students. Depending on the time you have with the student group, this activity could take 2 days for students to complete as there are a lot of menu options and it includes rational numbers, not just integers. You could also choose to reduce the number of choices the students are asked to make from each menu category in order to fit into the time you have allocated.

Allow time at the end for students to share their favorite menu items. If you find that there are menu items that were not chosen by anyone, you could answer them together or choose to use those problems in a different capacity if students still need or want additional practice in this skill as it stretches beyond a 4th grade standard.

Lesson 5*: Champions of Our Own Choices!

Objectives:

Students will be able to use prior knowledge in order to apply understanding and create an original problem set.

Students will be able to share their thinking in both written form and academic conversations.

Materials:

- Pencils
- Lined paper

- Copy paper
- Computers
- Chart paper (optional)

Instructional Activities:

Students will spend time brainstorming, consulting, researching and constructing their own choice boards, or menus, based on the experiences of the previous lessons. Students can work individually or in partners depending on the goals you are setting for the finished products.

You may want to provide students with blank grids to use as a graphic organizer to draft their plan. Students may want to gain ideas from prior activities or resource books that you may have. There are a variety of options to choose from linked in the lessons from previous days.

Allow students or partners to gain feedback prior to creating a publishable piece. Some students may need more support than others in such an open ended assignment. Students can create these by hand or digitally and would be great to take back to the larger group of students if created in a small group setting.

Resources

Kelemanik, G., Lucenta, A., & Creighton, S. J. (2016). *Routines for Reasoning: Fostering the Mathematical Practices in All Students*. Heinemann.

Math Educational Vector Seamless Pattern Handwritten Stock Vector (Royalty Free) 795328972. (n.d.). Shutterstock.
https://www.shutterstock.com/search/equations?image_type=vector

Wolf, N. B. (2015). *Modeling with Mathematics: Authentic Problem Solving in Middle School (Illustrated)*. Heinemann.

Annotated Bibliography

Bell, K. (2020, December 19). *Interactive Learning Menus (Choice Boards) with G Suite – FREE Templates*. Shake up Learning.
<https://shakeuplearning.com/blog/interactive-learning-menus-choice-boards-using-google-docs/>

In this resource teachers can find blank templates for offering opportunities for choice

in their classroom activities. It provides an explanation of different types of choice activities and how they can be used while also offering materials that support you in self-creation to meet your students' needs.

Dusko, T. (2020, July 11). *New This Week: Three Math Choice Boards*. TeacherVision. <https://www.teachervision.com/blog/morning-announcements/new-this-week-three-math-choice-boards>

This resource provides rationale for why blended learning and student choice are important, examples of basic choice boards, and also teaching tips for them implementation.

Gracey, L. (2022, January 24). *Choice Boards for Active Learning in Math*. TechNotes Blog. <https://blog.tcea.org/choice-boards-for-active-learning-in-math/>

This is a great resource for ready-made choice boards presented in a variety of print and digital formats. It also offers templates that teachers can use to create activities that align with the objectives they hope students meet.

Lee, M., & Miller, M. (2001). *40 Fabulous Math Mysteries Kids Can't Resist*. Scholastic, Incorporated.

This resource can help make cross curricular connections as students explore story situations and make sense of what is happening in the scenario. Reading comprehension and logical reasoning are needed to approach problems coherently.

Logic Puzzles - Aha! Puzzles. (n.d.). <https://www.ahapuzzles.com/logic/logic-puzzles/>

Logic Puzzles. (n.d.). <https://www.mathsisfun.com/puzzles/logic-puzzles-index.html>

These resources offer a variety of logic puzzles ranging from easy to challenging and can be scaffolded for different student groups.

Publishers, S. A., & Education, C. D. (2009). *Singapore Math – 70 Must-Know Word Problems Workbook for 4th Grade Math, Paperback, Ages 9–10 with Answer Key (Illustrated)*. Frank Schaffer Publications.

This resource provides a series of word problems that can be solved using a variety of methods. It covers a range of skills and offers multiple entry ways for success. This resource can be extremely versatile and while leveled as a 4th grade practice set, questions can easily extend to middle school mathematics in how students' model and represent each scenario to solve.

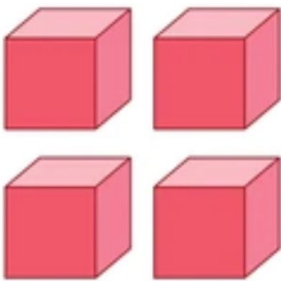
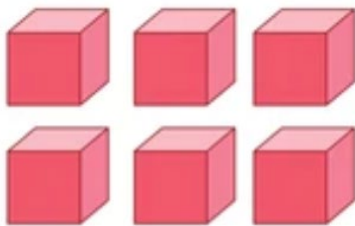
SlidesMania. (2022, May 31). SlidesMania | Free Google Slides themes and PowerPoint templates.<https://slidesmania.com>

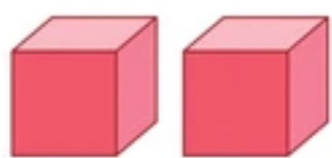
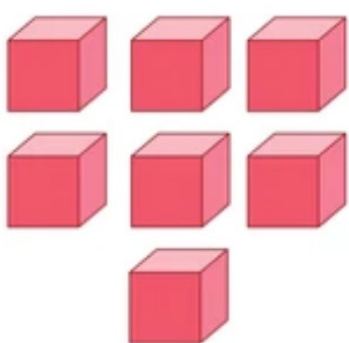
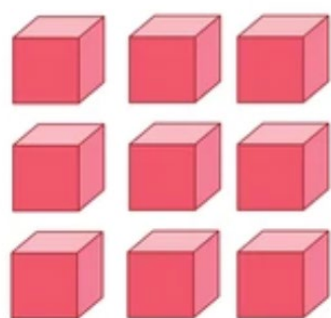
This is a free tool that helps to format slides and activities in Google Slides in user friendly ways. It has expanded templates and themes beyond what the standard Google Slides offers and can be used for any subject

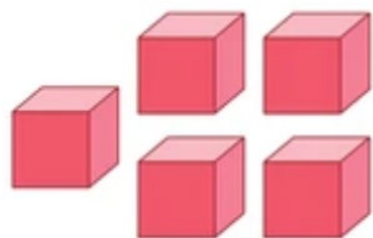
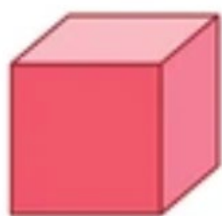
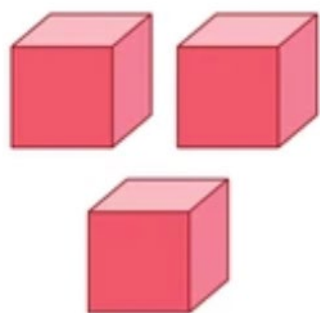
Appendix

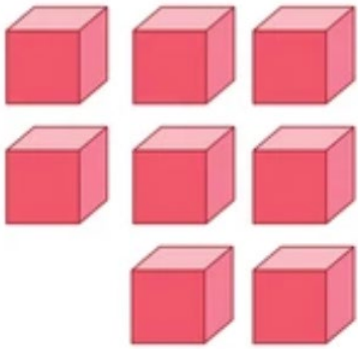
Print copies of these materials for use with lessons described in the unit above.

CARD SORT

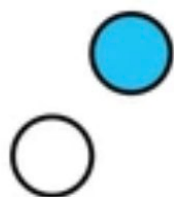


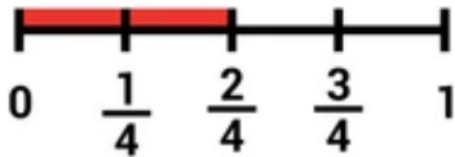












Brooklyn makes spending money by making friendship bracelets and selling them at the school store. At the end of one school week, she earned \$45. What was the average amount of money she earned each day that week?

2, 4, 6, __, 10, 12...

48, 24, 12, __, 3...



$$3a+2 = 11$$

$$2c+2 = 10$$

$$5x = 40$$

$$15-x = 6$$

$$12 = 24b$$

$$19 = 4+3y$$





$$4(3 - 2)$$

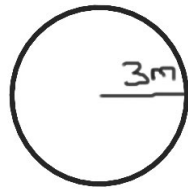
$$10 - 16 \div 2$$

$$24 \div 2 \times \frac{1}{2}$$

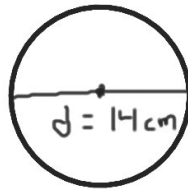
$$\frac{1}{4} \times 2$$

$$\begin{array}{r|cccccc} 0 & 1 & 2 & 3 & 3 & 5 & 7 \\ 1 & & 3 & 6 & 8 & 8 & \\ 2 & & 1 & 4 & 7 & 9 & 9 \\ 3 & & 0 & 2 & 5 & 5 & 8 & 8 \end{array}$$

$$\begin{array}{r|cccccc} 0 & 2 & 2 & 4 & 6 & 7 & 9 \\ 1 & & 1 & 3 & 5 & 8 & \\ 2 & & 0 & 4 & 6 & 7 & 7 \end{array}$$



d =



r =

How many zeros are in seven million?

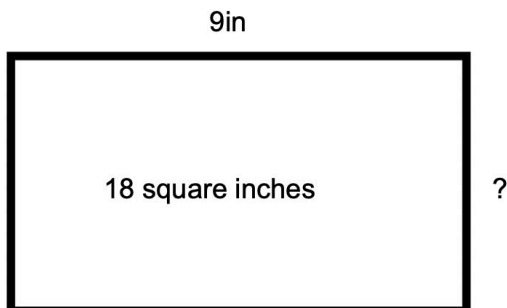
What is the average of 9, 11, 5, and 7.

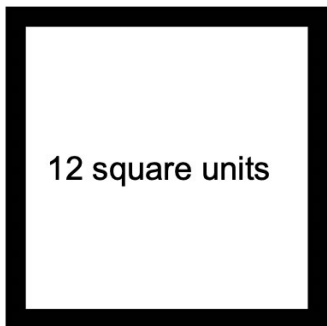
You are playing a football game with friends. If you stood on -3 and moved in a positive direction for 13 spaces, where would you be?

How many units are there between positive 2 and its opposite?

$$1000 \div 10 \div 10 \div 10$$

$$4g + 3 = 11$$





What is the length of each side of the square?

Create your own:

Create your own:

FIGURE ME OUT

Create a mathematical representation to express each of the following values about yourself. Then challenge yourself to find more than one way to convey the value if possible! Please use various forms of mathematical representations to express your thinking.

Caution: do not solve it, allow others to do the work!

MY AGE
OF YEARS I HAVE LIVED IN PHILADELPHIA
OF PETS
OF YEARS AT THIS SCHOOL

FREE CHOICE
BIRTH MONTH
OF SIBLINGS

SHOE SIZE
OF STATES (or Countries)
I HAVE VISITED

LOGIC PUZZLES

$$\text{Pencil} + \text{Pencil} + \text{Calculator} = 36$$

$$\text{Calculator} + \text{Pencil} + \text{Notebook} = 41$$

$$\text{Notebook} + \text{Notebook} = 20$$

$$\text{Beach Ball} + \text{Flip Flops} + \text{Flip Flops} = 20$$

$$\text{Flip Flops} + \text{Flip Flops} + \text{Sunscreen} = 25$$

$$\text{Beach Ball} + \text{Beach Ball} + \text{Beach Ball} = 12$$

Row totals:

\$13.00

\$16.00

\$14.00










A store sells mittens, hats, and hot chocolate in the winter. Their table shows the prices (row and column totals) for different combinations of items. Use the information given to find the cost of EACH item.

Column totals:

\$9.00

\$18.00

\$16.00

Row totals:

\$3.50

\$6.00

\$4.50

A student is selling candy to fundraise for the basketball team. Their table shows the prices (row and column totals) for different combinations of items. Use the information given to find the cost of EACH item.

Column totals:

\$4.75

\$5.25

\$4.00

$$\begin{aligned}
 & \text{Fries} + \text{Hotdog} + \text{Fries} = 17 \\
 & \text{Hotdog} + \text{Hotdog} + \text{Hotdog} = 21 \\
 & \text{Hotdog} + \text{Fries} \times \text{Soda} = 17 \\
 & \text{Soda} \times \text{Hotdog} + \text{Fries} = 19
 \end{aligned}$$

5	+	3	×	?	= 32
×		+		-	
3	×	?	÷	6	= 6
-		×		+	
?	-	2	÷	?	= 1

$$= 4$$

$$= 14$$

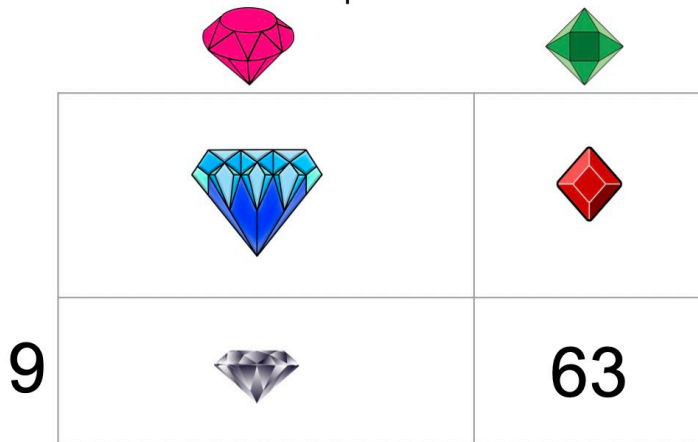
$$= 5$$






5 fourth grade students play and instrument in the school band. Use the clues below to determine which instrument each student plays.

	Violin	Trumpet	Flute	Cello	Drums
Nadia					
Jane					
Tristin					
Jada					
Mekhi					

1. Tristin plays an instrument that starts with the same letter as his first name.
2. Jada does not play the drums or the flute.
3. Mekhi plays the only percussion instrument in the band.
4. Jane plays either the flute or the cello.
5. Nadia plays a wind instrument in the band.

Find the value of each image in the area model seen here so that it represents the value **513**



WORD PROBLEM BANK

A corner store sold 63 more beef cheesesteaks than chicken cheesesteaks this week. The store sold 285 chicken cheesesteaks. How much did the store earn if each cheesesteak costs \$8?

Miriam is volunteering at the animal shelter. She walks 7 dogs and has a number of birds to care for. Altogether, the animals had 40 legs. How many birds did she care for at the animal shelter?

Layla and Alicia plan to save their allowance for the next 6 weeks. Layla saves \$2.50 and Alicia saves \$4.25 each week. After 6 weeks, they plan to combine their money and buy a Lego set. If the Lego set costs \$37.00, how much money will they have left?

Nicholas practices his instrument 5 days a week. He practiced 15 minutes on day one, 24 minutes on day 2, 18 minutes on day 3, 15 minutes on day 4. If he averaged 18 minutes of playing of practice time for the week, how many minutes did he practice on day 5?

Amari and Quinn had an equal number of Pokémon cards. After Amari gifted 42 cards to Quinn, Quinn's stamps totaled twice as many as Amari. How many cards did Quinn have in the end?

Dahlia is trying to fundraise for a class trip. She is selling candy for \$2 each and raffle tickets for 76s tickets for \$5 each. If she sold 120 candy bars and earned \$980 from the sale of both, how many raffle tickets did she sell? 3 chocolate milks and 4 juices cost \$15 at the market. 1 chocolate milk and 4 juices cost \$13. How much would it cost to buy 5 juices?

5 roses and 2 carnations cost \$19 at the florist. 4 roses and 1 carnation cost \$13. How much would it cost to buy 6 roses and 10 carnations?

Math Masters "Tic-Tac-Toe" Challenge

Below are a series of mixed review mathematics questions. Please complete each grid by playing "Tic-Tac-Toe" to complete a *vertical* or *diagonal* line of problems. Please circle the problem from each row that you have chosen to complete and show all work in the space provided to the right, or on a separate sheet of paper.

How much money do you save at $\frac{1}{4}$ off a \$36 shirt?

How much money do you save at $\frac{1}{5}$ off of a \$45 shirt?

How much money do you save at $\frac{1}{3}$ off of a \$120 jacket?

Convert the following decimal into a fraction and into a percent: .07

Convert the following decimal into a fraction and into a percent: .8

Convert the following decimal into a fraction and into a percent: .12

Find the total price paid for a dinner bill that is \$24 with leaving a tip equal to $\frac{1}{3}$ of the bill.

Find the total price paid for a dinner bill that is \$32 with leaving a tip equal to $\frac{1}{4}$ of the bill.

Find the total price paid for a dinner bill that is \$15 with leaving a tip equal to $\frac{1}{5}$ of the bill.

Find the diameter of a circle with a radius of 4in.

Find the diameter of a circle with a radius of 3cm.

Find the diameter of a circle with a radius of 5m.

Find the area of a triangle with a base of 10m and a height of 7m.

Find the area of a triangle with a base of 5in and a height of 8in.

Find the area of a triangle with a base of 12cm and a height of 6cm.

Find the radius of a circle that's diameter is 6cm.

Find the radius of a circle that's diameter is 9m.

Find the radius of a circle that's diameter is 8mm.

Math Masters "Tic-Tac-Toe" Challenge

Below are a series of mixed review mathematics questions. Please complete each grid by playing "Tic-Tac-Toe" to complete a *vertical* or *diagonal* line of problems. Please circle the problem from each row that you have chosen to complete and show all work in the space provided to the right, or on a separate sheet of paper.

Find the area of a 9in by 7in rectangle.

Find the area of a 3m by 9m rectangle.

Find the area of an 8yd by 7yd rectangle.

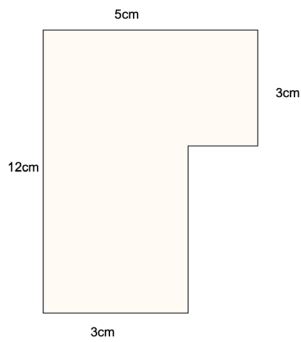
Find the volume of a 3m by 9m by 4m rectangular prism.

Find the volume of an 8yd by 7yd by 2yd rectangular prism.

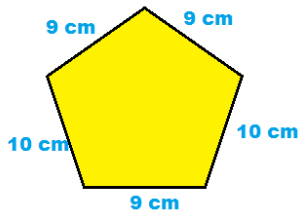
Find the volume of a 9 in by 7in by 3in rectangular prism.



Find the perimeter



Find the perimeter



Find the perimeter

Math Masters “Tic-Tac-Toe” Challenge

Solve for a .

$$\frac{A}{16} = \frac{8}{4}$$

$a =$

Solve for b .

$$\frac{6}{7} = \frac{b}{14}$$

$$b =$$

Solve for j .

$$\begin{array}{r} 15 \\ J = \end{array} \quad \begin{array}{r} 6 \\ 4 \end{array}$$

$$j =$$

Are these ratios equivalent?

*14 blue shirts to 12 indigo shirts

*4 blue shirts to 3 indigo shirts

Felicia jarred 4 liters of jam after 2 days. How much jam did Felicia jar if she spent 7 days making jam? Assume the relationship is directly proportional.

Carey drew a scale drawing of the elementary school. The scale of the drawing was 1 millimeter = 3 meters. The actual length of the school yard is 141 meters. How long is the school yard in the drawing?

$$\frac{2}{4} \times 6 + \frac{1}{8} \times 16$$

$$12 \div \frac{2}{3} - \frac{1}{3} \times 24$$

$$\frac{1}{2} \times 6 \times \frac{1}{3}$$

Name:

Choose Your Menu-Adding & Subtracting Rational Numbers

Soup or Salad

Menu Choice	Expression	Answer (with words)

Main Entree

Menu Choice	Expression	Answer (with words)

Drink

Menu Choice	Expression	Answer (with words)

Sides

Menu Choice	Expression	Answer (with words)

Desserts

Menu Choice	Expression	Answer (with words)