



Math Blast 6

-fun and interactive math for all-



6th Grade Mathematics

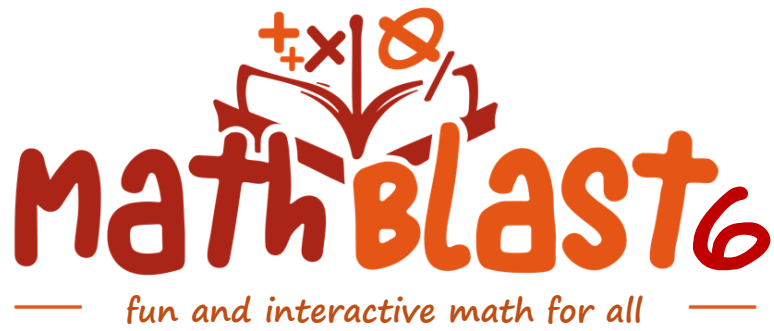
A Career-Based Approach with SEL

Student Name

Edition 2 - Volume 1

Math Blast





6th Grade Mathematics

*A Career-Based Approach
with Social-Emotional Learning*

Edition 2
Volume 1

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Unit 1 | Area, Surface Area, and Volume

Urban Planning

6th Grade Mathematics

North Carolina 6th Grade Math Standards

Unit 1

Solve real-world and mathematical problems involving area, surface area, and volume.	
NC.6.G.1	Create geometric models to solve real-world and mathematical problems to: • Find the area of triangles by composing into rectangles and decomposing into right triangles. • Find the area of special quadrilaterals and polygons by decomposing into triangles or rectangles.
NC.6.G.2	Apply and extend previous understandings of the volume of a right rectangular prism to find the volume of right rectangular prisms with fractional edge lengths. Apply this understanding to the context of solving real-world and mathematical problems.
NC.6.G.3	Use the coordinate plane to solve real-world and mathematical problems by: • Drawing polygons in the coordinate plane given coordinates for the vertices. • Using coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate.
NC.6.G.4	Represent right prisms and right pyramids using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
Apply and extend previous understandings of numbers to the system of rational numbers.	
NC.6.NS.6	Understand rational numbers as points on the number line and as ordered pairs on a coordinate plane. a. On a number line: ○ Recognize opposite signs of numbers as indicating locations on opposite sides of 0 and that the opposite of the opposite of a number is the number itself. ○ Find and position rational numbers on a horizontal or vertical number line. b. On a coordinate plane: ○ Understand signs of numbers in ordered pairs as indicating locations in quadrants. ○ Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. ○ Find and position pairs of rational numbers on a coordinate plane.
NC.6.NS.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

1.1 The Coordinate System – Quadrilaterals and Triangles

Warm-Up

Write all you know about the Coordinate System.

Main Topic City Park Design

The mayor of Mathville has hired your team of junior urban planners to design a brand-new park for a special empty lot in the city! This isn't just any park; it needs to be fun and functional.

Your Mission:

1. Draw a scaled floor plan of your park on the next page.
2. Include specific park features that fit within the lot.
3. Calculate the area and perimeter of different parts of your park.

Understand Your Lot

- **The Lot:** Your park will be built on a rectangular lot that is 100 feet long and 80 feet wide.
- **Your Scale:** On your graph paper, you will use a scale where 1 square (1 inch by 1 inch) on your paper represents 10 feet by 10 feet in the real world.
- **Draw the Boundary:** Lightly draw the outline of your park lot on your graph paper using your chosen scale.

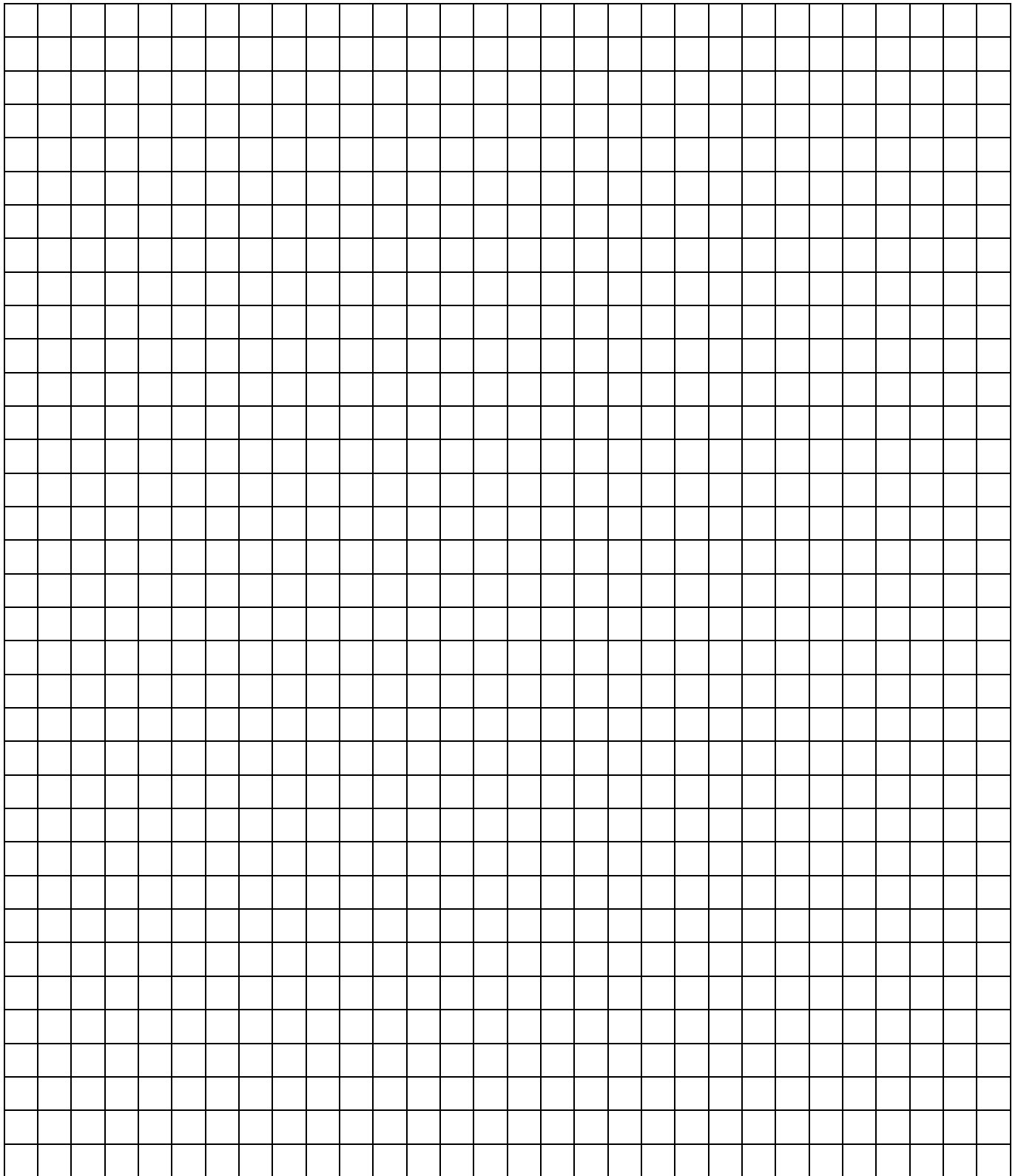
Step 2: Decide on Your Park Features

Carefully plan the features in the park: playground, walking path, flower garden, picnic area, and etc. Neatly color your park design.

- Clearly label all features on your map.
- On a separate sheet (or the back of your map), provide your calculations for:
 - Area of each feature
 - Perimeter of each feature
 - Total Park Area
 - Total Remaining Open Space
 - Total Perimeter of the Park

Main Topic

City Park Design



Main Topic The Cartesian Plane

TASK

1

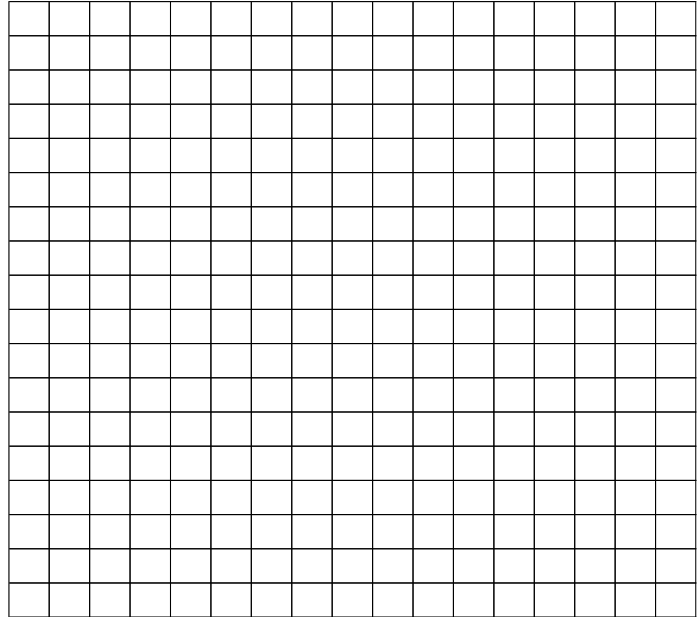
- Draw an x-axis then label.
- Draw a y-axis then label.
- What do you call the intersection between the axes?
- Label the quadrants (I, II, III, IV).
- Plot and connect the points consecutively.

$$A(5,0), B(2,-2)$$

$$C(0,-5), D(-2,-2)$$

$$E(-5,0), F(-2,2)$$

$$G(0,5), H(2,2)$$



Identify the quadrant location of the points.

$(3, -1)$	$(-5, -2)$	$(1, 6)$
$(-32, 100)$	$(-0.71, -58.01)$	$(5\frac{1}{2}, \frac{1}{4})$

Identify the coordinates of the plotted points.

A

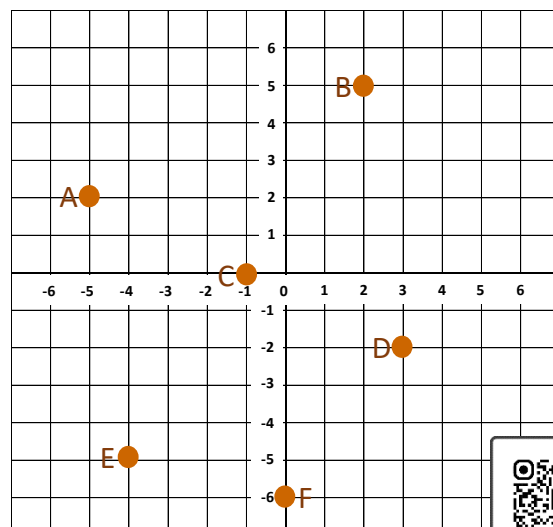
B

C

D

E

F



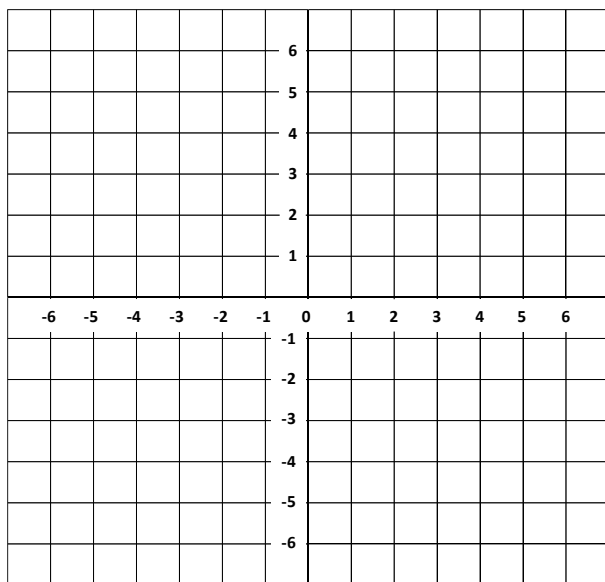
Need Help?

Main Topic Square and Triangle

TASK

2

- Draw a quadrilateral with vertices at $A(-2, 4)$, $B(3, 4)$, $C(3, -1)$, $D(-2, -1)$
- What shape is it?
- What is the perimeter?
- Create a perimeter formula.
- What is the area?
- Create an area formula.
- Connect the vertices A and C.
- What shape is formed?
- What is the area?
- Create an area formula.



Write your observations about the areas of the square and triangle.

The Affordable Housing Lot

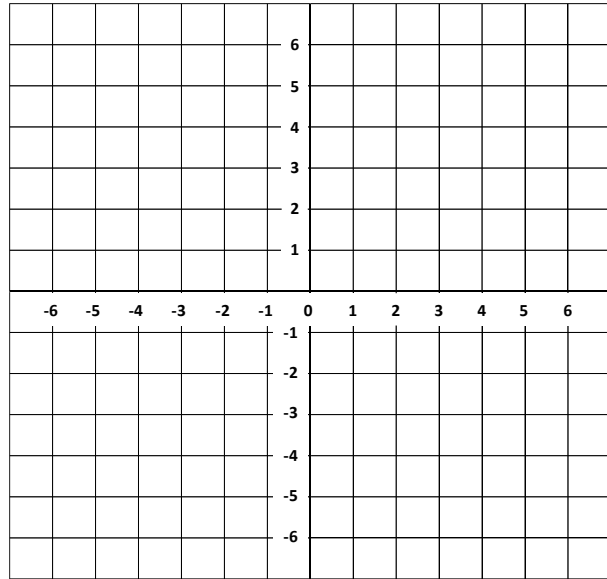
A developer plans to build affordable housing units on a square lot that has a perimeter of 360 feet. The Zoning Board requires the developer to know the exact area of the lot before they can approve the construction plans.

What is the total area of the square lot in square feet? (Hint: First, find the length of one side.)



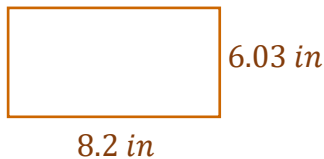
Main Topic **Rectangle and Triangle**
**T
A
S
K**
3

- Draw a quadrilateral with vertices at $A(-2, 3)$, $B(4, 3)$, $C(4, -5)$, $D(-2, -5)$
- What shape is it?
- What is the perimeter?
- Create a perimeter formula.
- What is the area?
- Create an area formula.
- Connect the vertices A and C.
- What shape is formed?
- What is the area?
- Create an area formula.



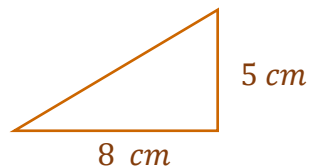
Write your observations about the areas of the rectangle and triangle.

Find the perimeter and area.



A rectangle has an area of 180 in^2 . What is the length of the base if the height is 12 in ?

Find the area.



The area of a rectangle is 99 in^2 . What is the length of the height if the base is 22 in ?

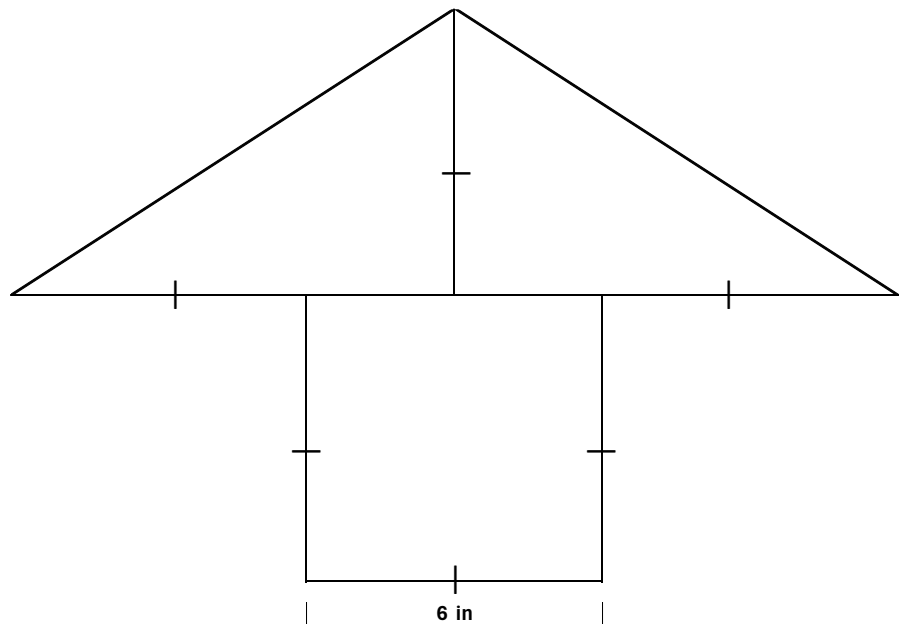
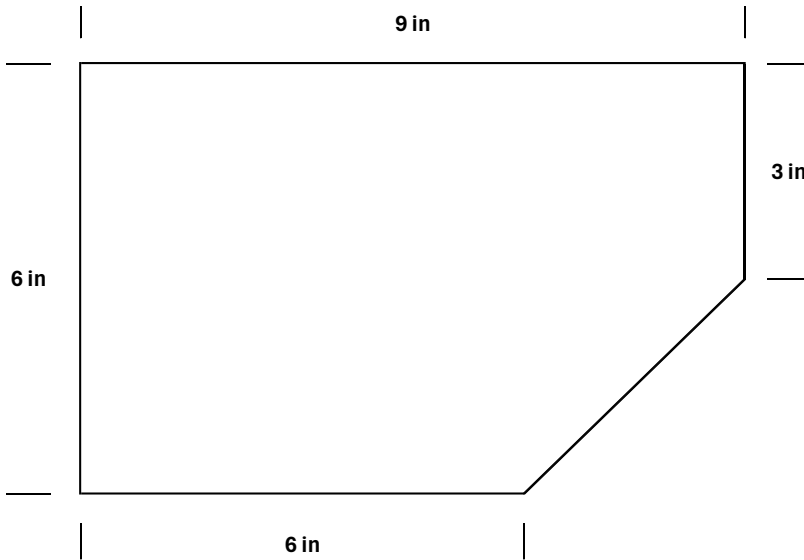


Need Help?

Rectangle-Triangle Cutouts

Composite Shapes

Find the area.



Honors Level

Explain the conceptual difference between the coordinates (a, b) and (b, a) . When, geometrically, would these two points represent the same location?

What does the relationship between the signs of the coordinates (positive/negative) tell you *conceptually* about the quadrant a point lies in, and how does this relate to directions from the origin?

Describe the relationship between the two axes (X and Y) and the standard one-dimensional number line. How does the plane essentially combine two independent number lines?

Explain *why* the formula for the area of a rectangle ($A = l \times w$) is considered the foundation for the area formula of every other polygon.

Why must area always be expressed in "square units" (e.g., in^2 , ft^2) and what fundamental concept does the exponent of 2 visually represent?

SEL Activity**The Geometry of Resilience**

Self-Management & Relationship Skills

The Concept: A quadrilateral has four sides and four angles. Unless it is braced, its angles can change even if the side lengths stay the same (like a square shifting into a rhombus).

Activity:

1. **The Four Sides of You:** Label the four sides of a square with four things you spend your time on (e.g., *School, Social Media, Sports, Family*).
2. **The "Shifting" Prompt:** When life 'pushes' on one side—like a stressful week at school—a quadrilateral can lean or collapse. It's flexible, which is good for movement, but bad for stability.
3. **Reflective Prompt:** When was a time you felt your 'shape' shifting because you were leaning too much into one side of your life?
4. **The SEL Bridge:** That diagonal line is called a Brace. In your life, a brace is a 'Core Support'—something that turns your flexible quadrilateral into two stable triangles.
5. **Task:** Draw a diagonal through your 'Four Sides' square. On that diagonal line, write the name of one person or habit that keeps you stable when things get shaky.
6. **Closing Question:** If you had to simplify your life down to just three 'sides' (a triangle) for one day to reduce your stress, which three sides would you keep to stay strong?

1.2 The Coordinate System – More Quadrilaterals

Warm-Up

Describe the following shapes.

Square

Rectangle

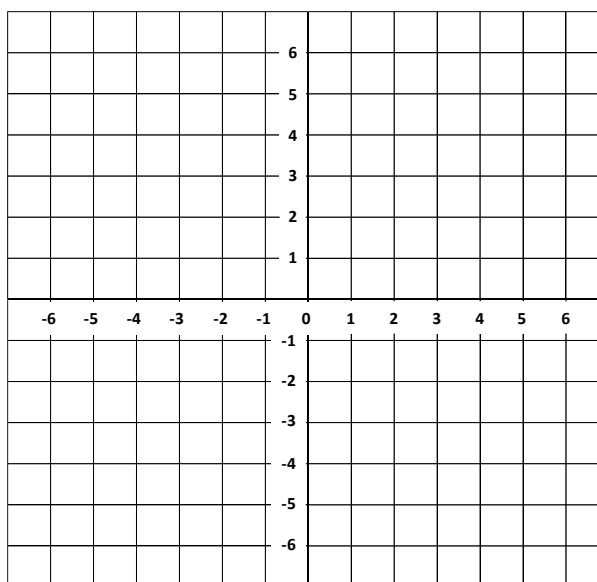
Triangle

Main Topic Parallelogram

TASK

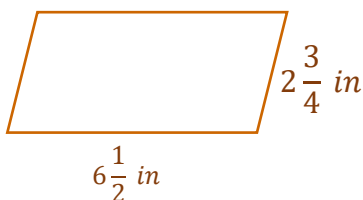
1

- Draw a quadrilateral with vertices at $A(0, 1)$, $B(5, 1)$, $C(3, -3)$, $D(-2, -3)$
- What shape is it?
- What is the area?
- Create an area formula.



Write your observations about the area of a parallelogram.

Find the area.



The area of a parallelogram is 216 cm^2 .
What is the height if the base is 18 cm ?



Need Help?

Parallelogram Cutouts

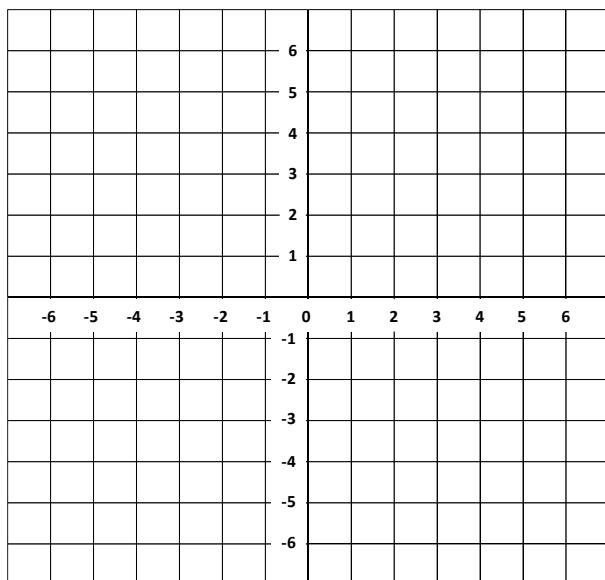
Main Topic Trapezoid

TASK

2

- Draw a quadrilateral with vertices at $A(-2, 4)$, $B(2, 4)$, $C(5, -2)$, $D(-5, -2)$
- What shape is it?
- What is the area?
- Create an area formula.

Write your observations about the area of a trapezoid



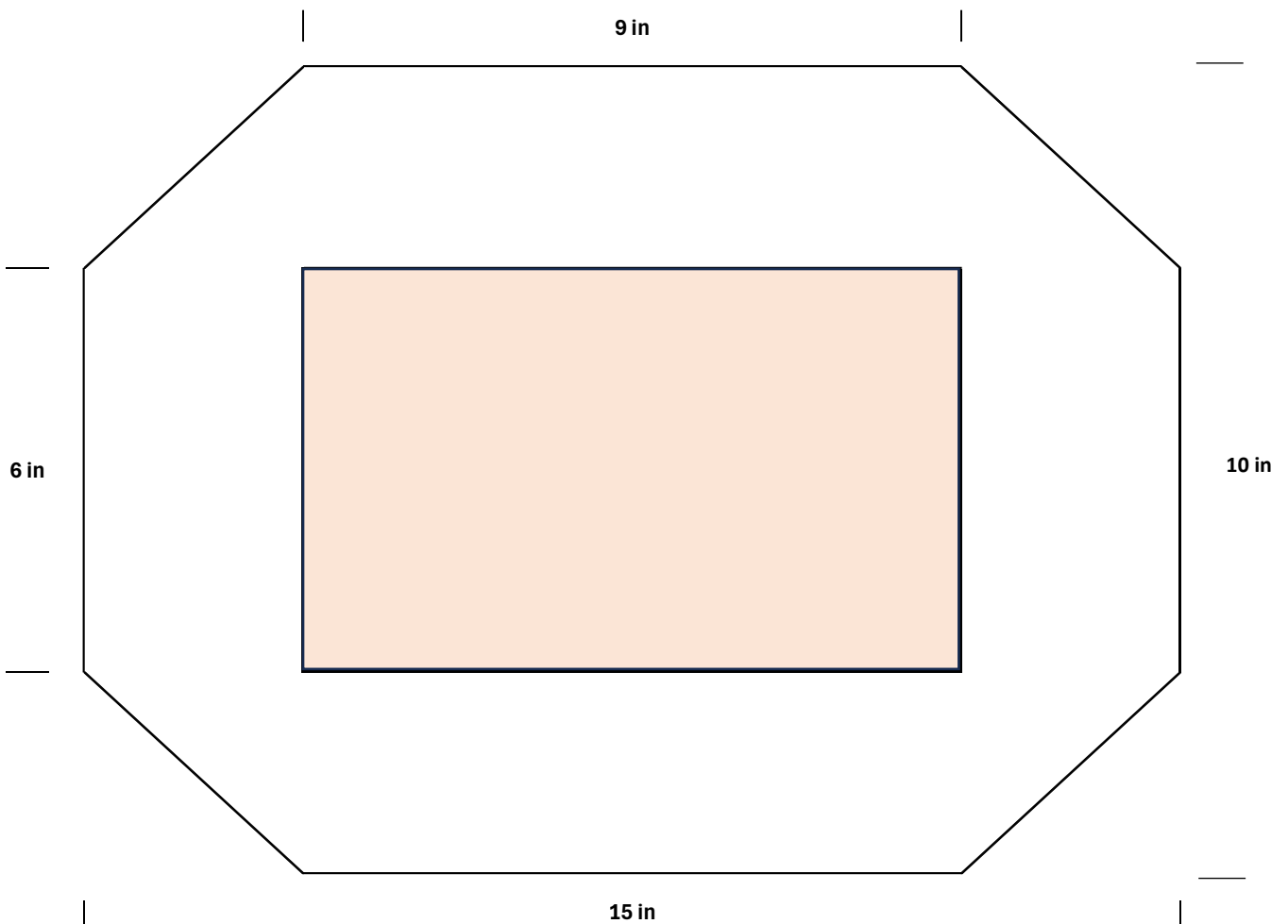
Trapezoid Cutouts



Need Help?

Composite Figure

Find the area of the shape that is not shaded.



Main Topic**Quadrilaterals Applications****The Riverfront Park Lot (Area of a Trapezoid)**

Landscape Architect Chloe is designing a new park along a river. The lot is shaped like a trapezoid because one side follows the curved riverbank and the opposite side is a straight road. The two parallel sides (the bases) of the lot measure 80 feet and 120 feet. The perpendicular distance between these two parallel sides (the height) is 60 feet.

What is the total area of the riverfront park lot in square feet?

**The New Bike Lane Median (Area of a Parallelogram)**

City planners are installing a decorative, parallelogram-shaped median strip between two lanes of a new bike path. The median has a base of 75 meters and a perpendicular height of 4 meters. The entire area will be filled with colorful, drought-resistant plants.

What is the total area (in square meters) of the median that needs planting?

**The Shopping Center Property (Composite Area)**

A large retail developer has purchased a property for a new shopping center. The property is made up of two shapes: a large square in the back that measures 200 feet on each side, and a front access area shaped like a parallelogram with a base of 200 feet and a perpendicular height of 80 feet.

What is the total combined area (in square feet) of the entire property?



Honors Level

If you cut a right-angled triangle off one end of a parallelogram and paste it to the other side, it forms a rectangle. What does this spatial manipulation prove about the relationship between the area formula for a parallelogram ($A=bh$) and a rectangle ($A=lw$)?

Why is it mathematically incorrect to multiply the two adjacent side lengths of a parallelogram to find the area? What physical quantity would you actually be calculating if you did that?

The formula for a trapezoid is $A = \frac{(b_1+b_2)}{2} \cdot h$. Conceptually, what does the term $\frac{(b_1+b_2)}{2}$ represent? How does this relate the trapezoid to a rectangle?

A diagonal line drawn from one corner of a trapezoid to the opposite corner splits the shape into two triangles. How can you derive the area formula of the trapezoid by adding the area formulas of these two specific triangles?

The midsegment of a trapezoid connects the midpoints of the non-parallel legs. Why is the length of the midsegment equal to the average of the two bases, and how can you calculate the area of a trapezoid using *only* the midsegment and the height?

SEL Activity**The Family Tree of Traits**

Social Awareness & Self-Awareness

The Concept: A quadrilateral is any four-sided polygon. This is the "Universal" category.

Activity:

1. **The Shared Human Property:** At our most basic level, we are all part of the "Human Quadrilateral." We all have four basic needs: *To be seen, to be heard, to be safe, and to be valued.*
2. **Reflective Prompt:** No matter how different we look on the outside, we share these four 'sides.' How does remembering these shared 'properties' change the way you treat someone you don't agree with?
3. **The SEL Bridge:** Think about your own labels. You might be a Student (the big category), an Athlete (more specific), and a Captain (most specific). Each label adds a new 'property' (responsibility) to your life.
4. **Task:** Create your own "Identity Hierarchy."
General: I am a person who...

Specific: I am a friend who...

Most Specific: I am the only one who...

1.3 Understanding Circles

Warm-Up

Describe the terms.

Circle

Radius

Diameter

Main Topic π

- Draw 3 circles with different sizes.
- Use a string to measure the circumference.

	Circle 1	Circle 2	Circle 3
Circumference			
Diameter			
Circumference $\div$ Diameter			

Write your observations.

Main Topic

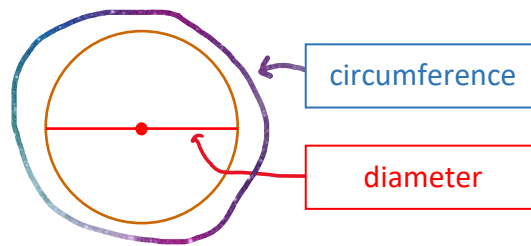
Circumference

Circle

A geometric shape formed by a set of points that are equidistant to a fixed point called **center**.

Based on the experiment, when a circumference is divided by its diameter the result is π .

$$\frac{c}{d} = \pi$$



Create a circumference formula.

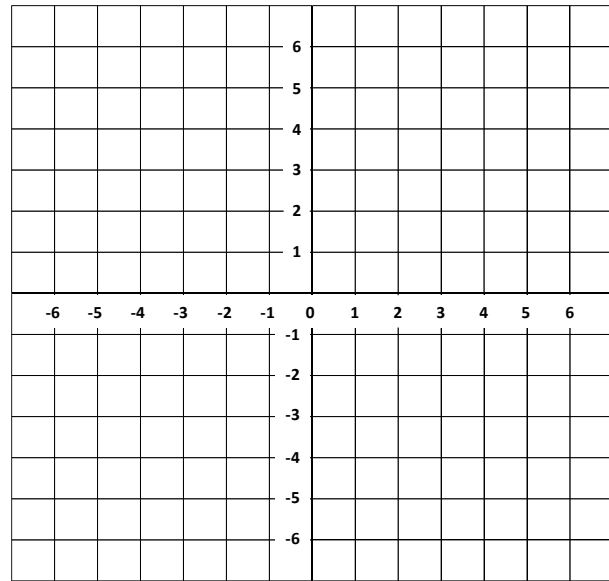
What is the circumference of a circle with diameter equals 8 in?	What is the circumference of a circle with diameter equals 12.6 in?
What is the circumference of a circle with radius equals 8 in?	What is the circumference of a circle with radius equals 12.6 in?
What is the diameter of a circle with circumference equal to 24π cm?	What is the radius of a circle with circumference equal to 24π cm?

Main Topic Area

TASK

1

- Draw a circle with center at $C(2, -1)$ and one of its points is at $P(2, 3)$.
- What is the radius of the circle?
- What is the diameter of the circle?
- What is the estimated area of the circle?



It may take us a lot of time to figure out the number of square units (area) in the circle. Let's just use this formula.

Find the area of the circles given the radius/diameter.

Radius = 5 cm	Radius = 13.7 in
Diameter = $8 \frac{1}{2}$ ft	Diameter = 18 mm

Area of Circle Cutouts

Main Topic Word Problems

Your bicycle wheel has a radius of 18 inches. You want to replace the old tire with a new one. What is the circumference of the wheel in inches so you can buy the correct size tire?

Illustration

Work

You are designing a circular flower bed around a circular pond. The pond has a radius of 10 ft. The width of the flower bed is 2 ft. Find the area of the flower bed.

Illustration

Work

Main Topic**Word Problems**

You are helping to design a running track for your school. The track will be a standard oval with two equal straightaways connected by two semicircles at each end. If each straightway will be 100 meters long, and the entire track needs to have a total circumference of 400 meters, what is the radius of each semicircle?

Illustration

Work

You are at an arcade game where you throw darts at a circular target. The bullseye in the center is 2 inches in diameter, and the next scoring ring around the bullseye has a diameter of 6 inches. If you hit the target outside the bullseye but within the next scoring ring, what is the area of that scoring region in square inches?

Illustration

Work

Main Topic Circles Applications**The Traffic Roundabout Conversion**

A city's transportation department wants to replace a dangerous four-way stop intersection with a modern roundabout to improve traffic flow and reduce accidents.

The engineering team has determined that the central island of the roundabout needs a radius of 40 feet to accommodate large trucks turning. Surrounding that island will be a single paved driving lane that is 20 feet wide.



The planner needs to know how many linear feet of white reflecting paint is required to stripe the outer edge of the driving lane. They must calculate the circumference using the total radius (40 ft island + 20 ft lane = 60 ft total radius).

The city needs to purchase the land for the entire project. They also need to know how much asphalt is needed just for the driving lane. This requires calculating the area of the whole circle and subtracting the area of the central non-paved island (an annulus calculation).

Honors Level

The number π (pi) is defined as a ratio. Describe in simple terms what two measurements of *any* circle are being divided to always result in the value of π (approx 3.14).

If a circle's diameter is doubled, explain *why* its circumference must also be exactly doubled. How does the constant π guarantee this proportional relationship?

A square and a circle both have a perimeter of 20 inches. Which shape encloses the largest area, and what does this reveal about the efficiency of a circular boundary?

Why does the area formula for a circle ($A = \pi r^2$) use the radius squared (r^2), while the circumference formula ($C = 2\pi r$) only uses the radius once? What does the exponent of 2 signify?

If you double a circle's radius, the circumference doubles. Explain why the area does *not* double, but instead increases by a factor of four.

SEL Activity

The Circle of My World

Social Awareness & Relationship Skills

The Concept: A circle cannot exist without its **Center**. The center is the "anchor" for everything else.

Activity:

1. **The Math:** Identify the center point C on your worksheet.
2. **The SEL Bridge:** The center of the circle is your **Core Self**. It holds your most deeply rooted values—like honesty, kindness, or family. Everything else you do loops around this center point.
3. **Task:** Draw a small circle. Right in the center point, write down the *one* word that matters most to you about who you are.
4. **The Math:** If a circle has a radius of 5 cm, what is its diameter?
5. **The SEL Bridge:** Think of the Radius as your inner circle—the close friends and family you allow right next to your center. The Diameter is your outer circle—the classmates, teammates, and acquaintances who know you, but aren't as close to your core.
6. **Reflection:** It takes exactly two radii to make a full diameter. In life, your 'Outer Circle' (diameter) is supported by the strength of your 'Inner Circle' (radius). Why is it healthy to have different levels of trust for the people in your radius versus your diameter?

1.4 Surface Area of Prism

Warm-Up

Write the area formula for each shape.

Rectangle

Square

Triangle

Main Topic

Surface Area Activity

Materials:

Scissors, Graphing paper, Tape

Directions:

- Construct a rectangular prism using graphing paper.
- Make sure that the opposite faces are parallel to each other.
- Draw the net.

- Count the number of squares on each face.

Face Number	1	2	3	4	5	6
No. of Squares						

- Create a surface area formula.

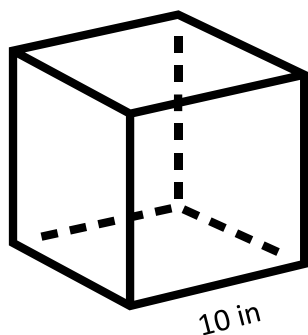
Rectangular Prism Net

Main Topic Surface Area

Surface Area

The total amount of space covering the exterior of a three-dimensional (3D) shape.

Draw the net of a cube



Find the surface area.

Face Number	1	2	3	4	5	6
Area						

Cube Net

Main Topic Surface Area Applications**Rectangular Prism (Skyscraper Facade)**

The city planning commission is reviewing a proposal for a new skyscraper. The building's design is a rectangular prism with a base of 80 meters by 50 meters and a height of 300 meters. The developer plans to cover the entire exterior (including the roof, as this is a common specification for facade maintenance contracts) with a specialized reflective glass paneling.

What is the total surface area (in square meters) of the glass paneling required for the entire exterior of the skyscraper?

**Cube (Modular Housing Unit)**

A sustainable urban development firm is designing a prototype for a compact, modular housing unit shaped like a cube. They need to apply an insulating, weatherproof coating to the entire exterior of the unit to meet energy efficiency standards. Each edge of the cubic module measures 4.5 meters.

What is the total surface area (in square meters) that needs to be coated with the weatherproof material?



Honors Level

Why is surface area always expressed in square units (e.g., m^2) even though it describes a three-dimensional object? What real-world quantity does this unit represent?

Explain the conceptual difference between Lateral Surface Area (LSA) and Total Surface Area (SA) for a rectangular prism. In which real-world applications (like painting a room vs. wrapping a gift) is one more relevant than the other?

Why is the surface area formula for a cube ($SA = 6s^2$) considered a specialized case of the general rectangular prism formula ($SA = 2lw + 2lh + 2wh$)?

Is it possible for two different rectangular prisms to have the exact same volume but completely different surface areas? Explain this concept using the dimensions (l , w , h).

If the side length (s) of a cube is doubled, by what factor does its surface area increase? How does this compare to the increase in its volume?

SEL Activity**What's on the Surface?**

Self-Awareness & Social Awareness

The Concept: A circle cannot exist without its **Center**. The center is the "anchor" for everything else.

Activity:

1. **Unfolding:** Imagine you are a rectangular prism. If you were to "unfold," you would have 6 faces.
2. **The Faces of Identity:** On a blank net, label the faces:
 - **Front/Back:** What I show at school.
 - **Top/Bottom:** My hobbies and interests.
 - **Left/Right:** My private thoughts and feelings.
3. **Reflective Prompt:** When we are 'folded up' into a prism, some of our faces are hidden or hard to see. Which 'face' of yours do you wish people noticed more often?
4. **The Social Connection:** Our 'Surface'—our expressions, our words, and our body language—acts as a boundary. It tells the world how we are feeling.
5. **Closing Question:** Sometimes we try to have a very small 'Surface Area' because we want to hide. Other times, we expand our 'Surface Area' to be big and bold. Which one feels more like you today, and why?

1.5 Surface Area of Pyramid

Warm-Up

Write all you know about a pyramid.

Main Topic

Square Pyramid Net

Main Topic

1

- Use a ruler to measure the sides of the base of the pyramid.
- What is the area of the base?

What is the surface area of a square pyramid with base side 4 m and slant height 5 m?

Find the surface area of a pyramid with a base side of 2 ft and a slant height of 6 ft.

If the slant height of a square pyramid is doubled, which part of the surface area changes?

A square pyramid has a base side of 7 and a slant height of 5. Calculate the surface area.

Main Topic Square Pyramid Applications

A city planner is designing a glass entrance for a subway station shaped like a square pyramid. The base side is 6 meters and the slant height of each glass triangle is 5 meters. What is the total area of glass needed for the four triangular sides?

An architect designs a pyramid-shaped roof for a park gazebo. The square base has a side length of 10 feet and the slant height is 12 feet. What is the surface area of the roof (excluding the floor)?

A town is building a decorative stone monument in the shape of a square pyramid. The base side is 4 feet and the slant height is 6 feet. If the entire monument (including the base) is covered in stone, what is the total surface area?

A lighting designer wants to cover a small pyramid-shaped street lamp cover with a special film. The base side is 8 inches and the slant height is 10 inches. How much film is needed for the 4 triangular sides?

Honors Level

If you double the side length of the square base, does the area of the base double or quadruple?

If you have two square pyramids with the same base size, but one is much taller than the other, which one will have a larger total surface area?

To find the "Lateral Area," why do we multiply the area of one triangle by four?

If you were painting a pyramid-shaped tent that is sitting on the grass, would you need to calculate the area of the base? Why or why not?

A "Great Pyramid" in Egypt is missing its top point (it's flat). Would the formula for a standard square pyramid still work perfectly to find its surface area? Why?

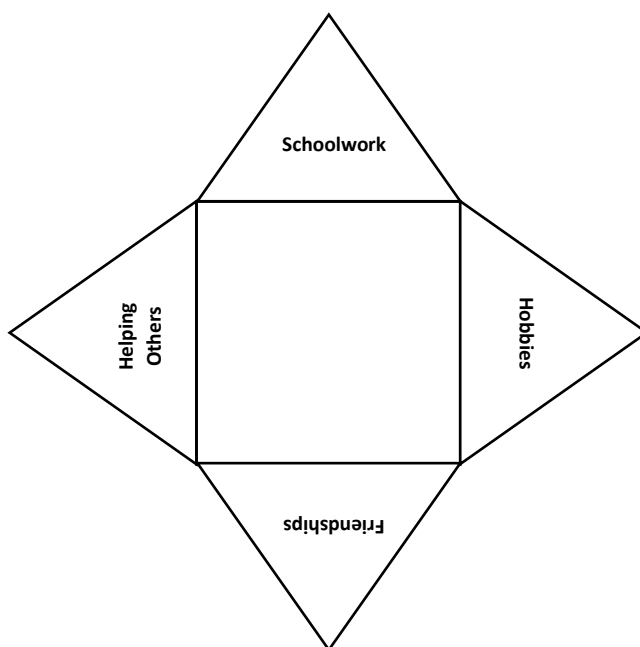
SEL Activity**Building Toward the Apex**

Self-Management & Goal Setting

The Concept: Every pyramid starts with a base. In a square pyramid, the area of the base is s^2 . If the base isn't strong, the pyramid can't stand tall.

Activity:

1. **Define Your Base:** What is the most important "Foundation" in your life right now? (e.g., *Being honest, my family, or my hard work*).
2. **The Math:** If your "Foundation Square" has a side length of 6 cm, what is the total area of your base?
3. **Reflective Prompt:** In math, the base is flat on the ground. In life, your 'Base' is the part of you that stays grounded when things get difficult. What keeps you grounded?



4. **Task:** Which of your four 'Faces' is the strongest right now? Which one needs a little more 'Slant Height' (effort) to help you reach your peak?

Warm-Up

Write all you know about volume.

Materials:

Directions:

- [illegible]

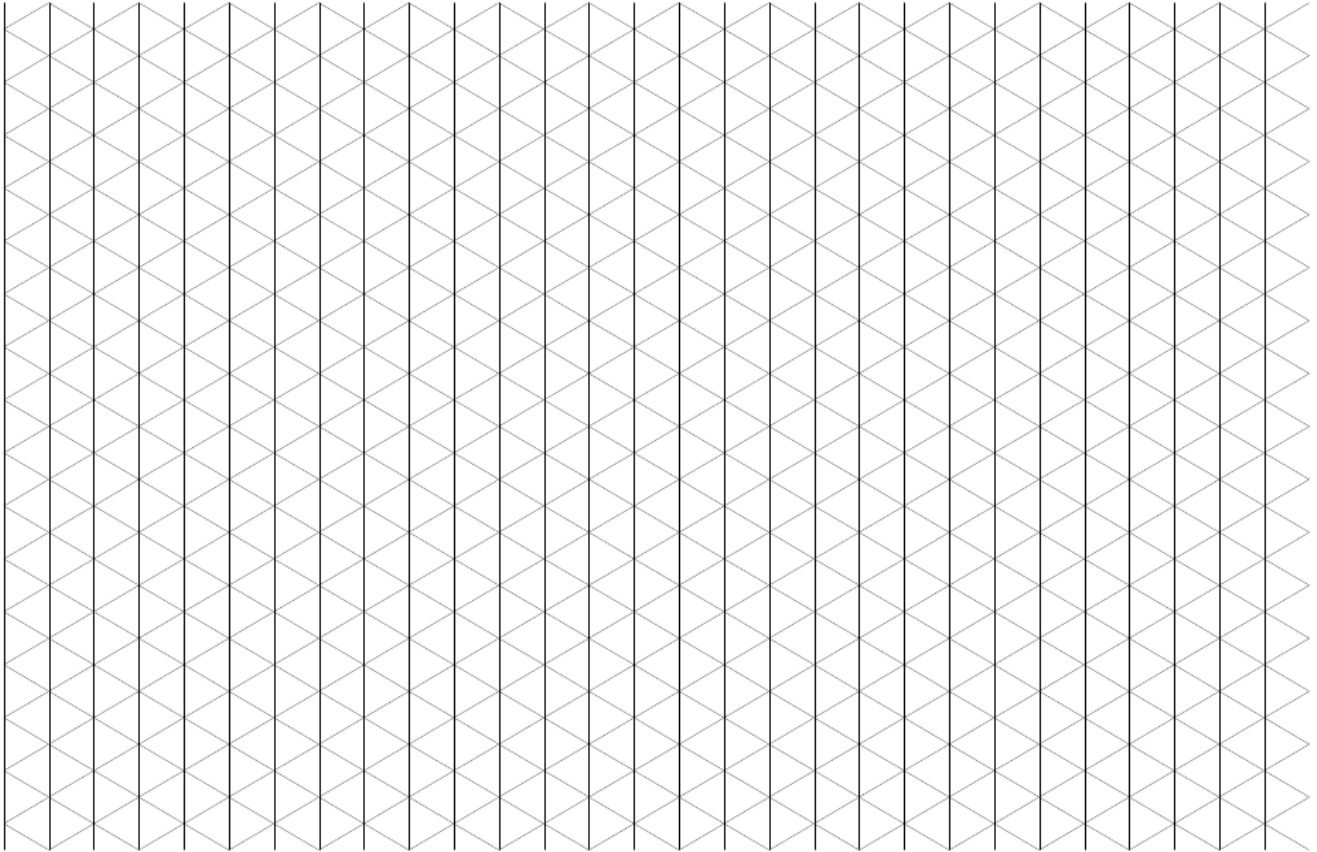
The total amount of space occupied by a three-dimensional (3D) shape.



Need Help?

Main Topic Rectangular Prism Volume

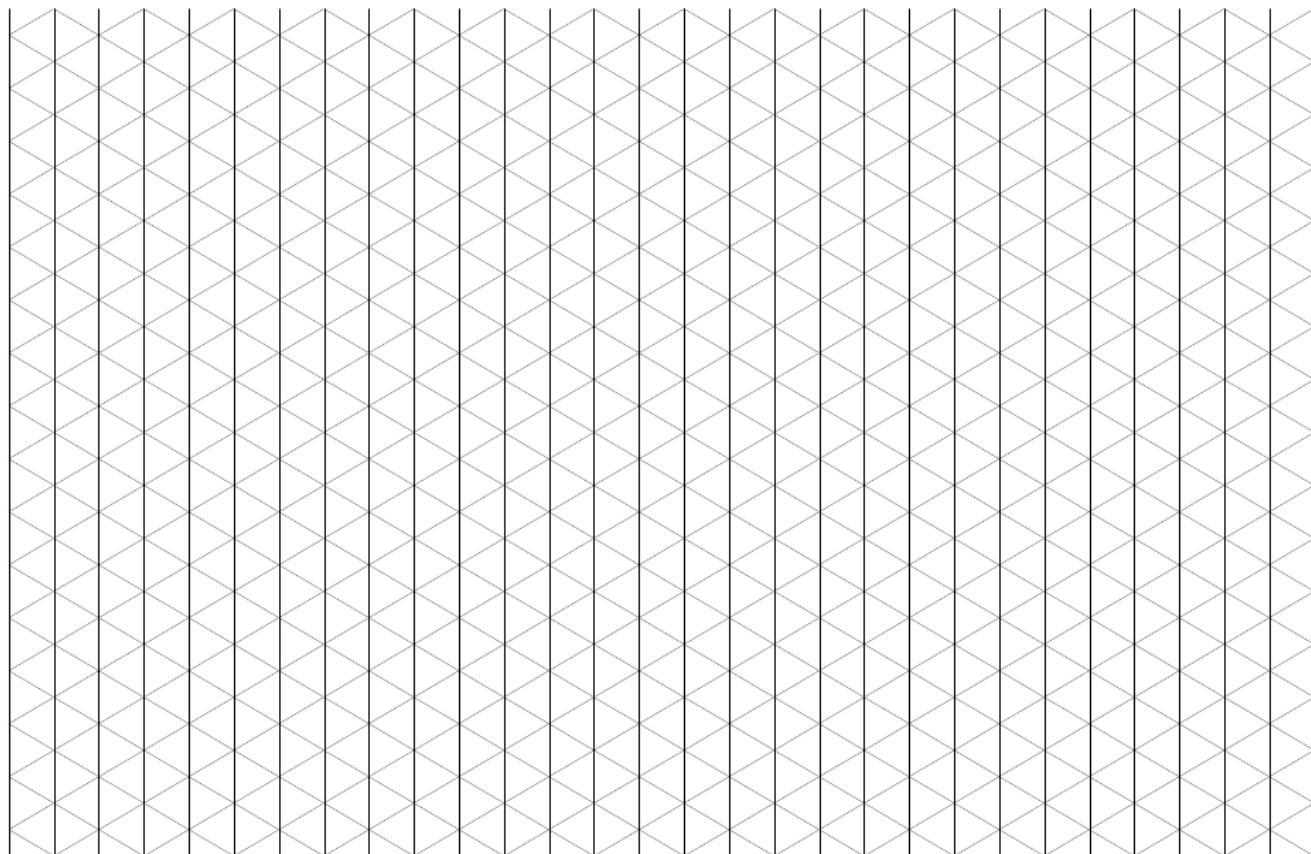
Construct a rectangular prism with 24 blocks.



	Measurement	Volume
Length		
Width		
Height		

Main Topic**Composite Solid Volume**

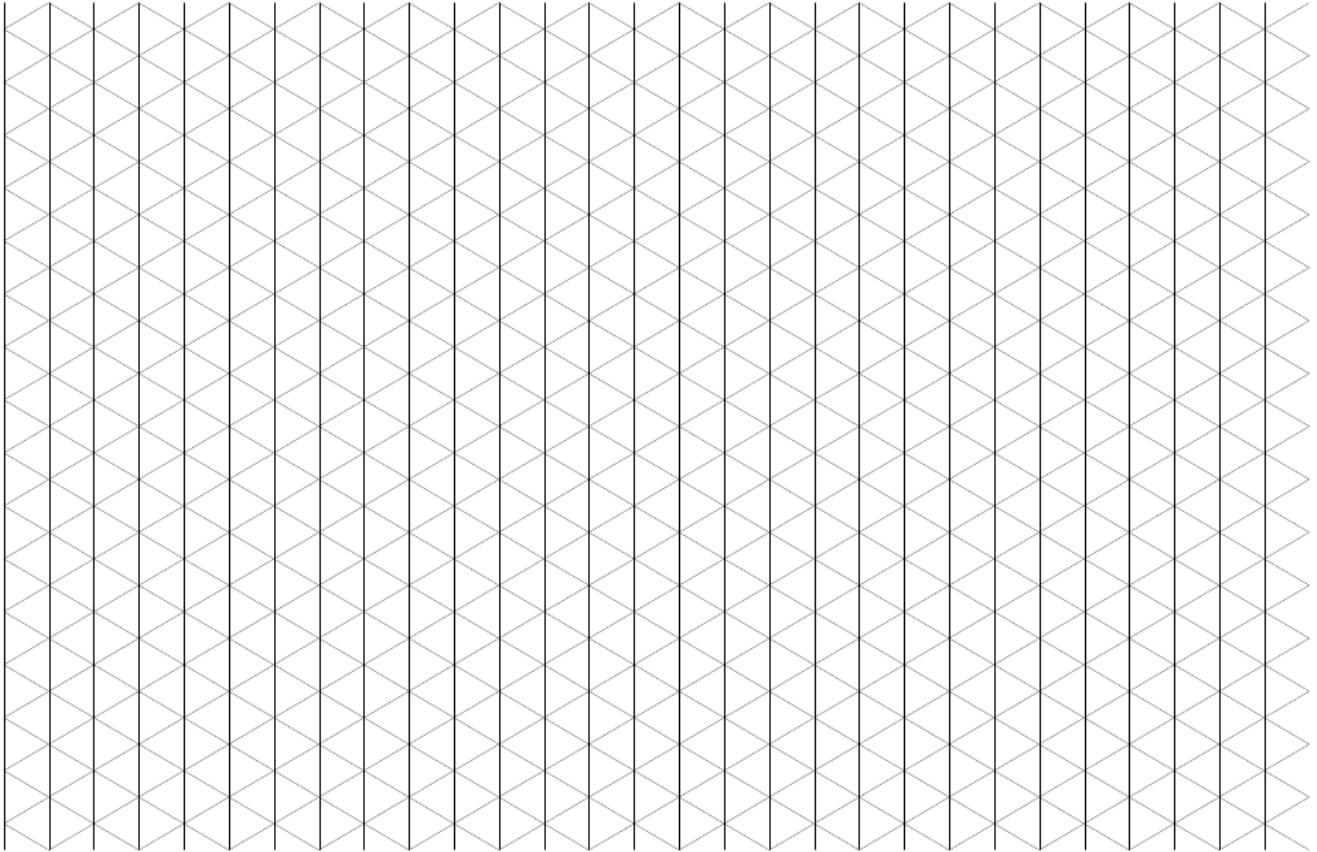
Construct a shape composed of 3 prisms.



	Volume	Total Volume
1 st Prism		
2 nd Prism		
3 rd Prism		

Main Topic	Rectangular Prism Volume
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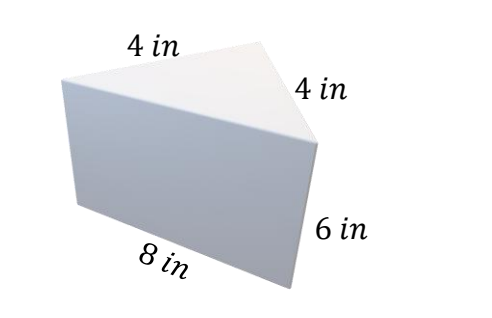
Construct 3 cubes with different sizes.



	Volume	Cube Description
1st Cube		
2 nd Cube		
3 rd Cube		

Main Topic	Surface Area and Volume Problems
-------------------	---

Rectangular Prism Length = 8 in Width = 5 in Height = 4 in	Illustration 
Surface Area	Volume

Triangular Prism 	Illustration 
Surface Area	Volume

Main Topic Volume Applications**Water Reservoir Capacity**

The city is planning a new subterranean water reservoir to improve water security in the downtown area. The reservoir is designed as a massive rectangular prism with interior dimensions of 200 meters long, 150 meters wide, and 30 meters deep. Urban planners need to know the total water storage capacity to meet the projected demand for the next 20 years.

What is the maximum volume of water (in cubic meters) that the new reservoir can hold?

**Road Material Estimation**

The municipal public works department is preparing to repave a section of a major city street. The asphalt layer will have a uniform thickness of 0.2 meters. The section to be paved is a rectangular prism shape, measuring 1,200 meters long and 15 meters wide. The planners need the total volume of asphalt required for ordering and budgeting.

What is the total volume of asphalt (in cubic meters) needed to complete the repaving project?



Honors Level

Conceptually, explain what volume represents in a three-dimensional object, and why its unit of measurement is always cubed (e.g., in^3).

How does the volume formula for a general rectangular prism, $V = l \times w \times h$, simplify to the formula for a cube, $V = s^3$, and what geometric property makes this simplification possible?

Explain why the volume formula can be interpreted as $V = B \times h$ (where B is the area of the base). How does this relationship connect the 2D base with the 3D volume?

Is it possible for two different rectangular prisms to have the exact same volume but completely different surface areas? Describe a real-world scenario (like packaging) where this difference is significant.

If the side length (s) of a cube is tripled, by what factor does its volume increase? How does this scaling factor compare to the factor by which its surface area increases?

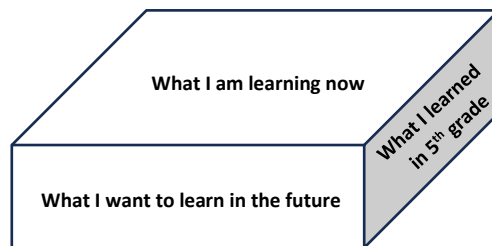
SEL Activity**Building Toward the Apex**

Self-Awareness & Self-Management

The Concept: The "Base" of a prism (lw) is the floor. In SEL, this is your "Daily Routine"—the things you do every day to stay steady.

Activity:

1. **Define Your Base:** If your "Base" is made of your favorite habits (e.g., *reading, playing outside, talking to friends*), how much space does it take up?
2. **The Math:** A prism has a length of 5 cm and a width of 4 cm. What is the area of the base?
3. **Reflective Prompt:** If your base is too small, it's hard to build a lot of 'Volume.' What is one habit you can add to your base to make your foundation bigger?



4. **The SEL Bridge:** As you get older, your 'Height' increases, which means your 'Volume'—your ability to understand the world—gets bigger. You can hold more ideas and more complex feelings than you could last year.
5. **Task:** What is one 'High' point from this year that increased your inner volume (made you a bigger person)?

1.7 Volume of Square Pyramid

Warm-Up

Write all you know about the volume of a prism.

Main Topic

Volume Activity

Materials Needed

- Cardstock or heavy paper
- Tape
- A "filler" (dry rice, sand, or water)
- Scissors and a ruler

Step 1: Construct the Shapes

To make this work, the pyramid and the prism must be **congruent** in two ways:

1. They must have the **exact same square base**.
2. They must have the **exact same vertical height**.

Step 2: The Prediction

How many pyramids of rice do you think it will take to fill the cube?

Step 3: The Experiment (The Pour)

1. Fill the square pyramid to the very top with your filler (e.g., rice). Level it off with a ruler so it is perfectly flat.
2. Pour the contents of the pyramid into the square prism.
3. Repeat this process until the square prism is exactly full.

Step 4: Deriving the Formula

What is the formula for the volume of a square pyramid?

Main Topic Volume of Square Pyramid

Illustrate the shapes, solve, and show all steps.

Calculate the volume: Base side = 1 cm, Height = 6 cm.	What is the volume of a square pyramid with a base side of 6 units and a vertical height of 10 units?
Calculate the volume of a square pyramid where the base side is 6 ft and the height is 5 ft.	A pyramid has a height of 9 m and a square base with side length 4 m. What is its volume?
Find the volume: Base side = 10 in, Height = 12 in.	What is the volume of a pyramid with a base side of 2 ft and a height of 3 ft?

Main Topic**Volume Applications****The "Eco-Park" Compost Bin**

To encourage recycling, the city is placing decorative compost bins in a public park. Each bin is shaped like an upside-down square pyramid. The top opening (the base) is 4 feet wide on each side, and the bin is 6 feet deep (height).

What is the maximum volume of compost that one bin can hold?

**The Winter Village Salt Pile**

During the winter, the city's Department of Public Works stores road salt in a square pyramid-shaped shed to keep it dry. The shed has a square floor with sides of 9 meters and a vertical height of 10 meters.

If the shed is completely full, how many cubic meters of salt does the city have ready for the roads?



SEL Activity**The One-Third Rule**

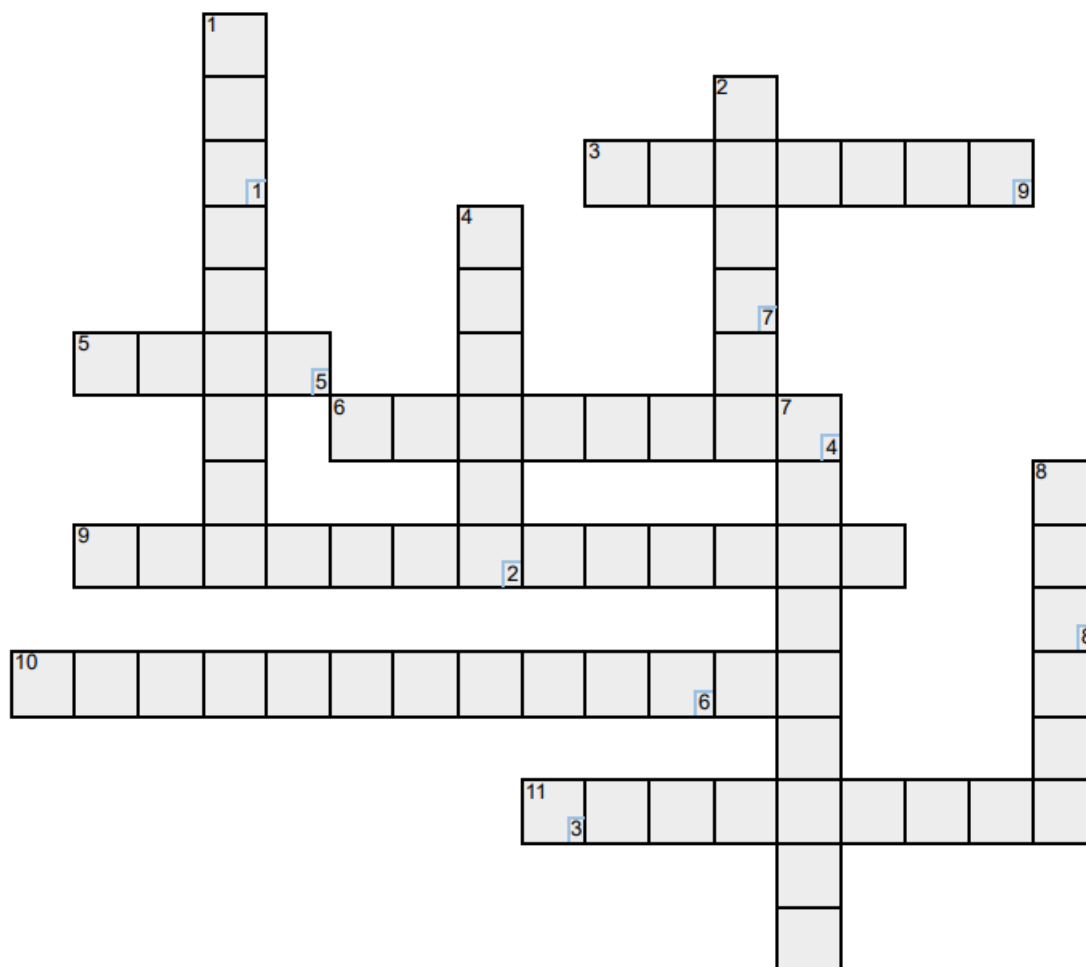
Self-Management & Goal Setting

The Concept: Imagine a rectangular box (a prism). If you carve out a pyramid inside it, you lose two-thirds of the space, but you gain a beautiful, focused shape.

Activity:

1. **The "Box" of Distractions:** Think of a typical weekend. The "Prism" is all the time you have. Two-thirds of that time might be filled with "noise" (e.g., *scrolling on a phone, chores, or boredom*).
2. **The Pyramid of Purpose:** The remaining **one-third** is your "Pyramid"—the time you spend on things that truly matter to you.
3. **Reflective Prompt:** In math, a pyramid is more efficient than a prism. In your life, why is it sometimes better to have a small, 'focused' pyramid of time than a big, 'empty' prism of time?
4. **The Social Connection:** In 6th grade, we often try to do everything (the prism). But as we get older, we learn to 'taper' our focus to the things we are truly passionate about (the pyramid)."
5. **Closing Questions:** If your life was a pyramid, what is the one point at the top you are reaching for right now? How does your 'Base' support that point?

Area and Surface Area



Across	Down
3. A _____ area is the total amount of space occupied by the outermost layer of a solid object. 5. The number of square units in a shape. 6. A specific region or area created by the intersection of the horizontal and vertical axes (x and y axes). 9. A quadrilateral with two pairs of parallel sides. 10. The distance around a circle. 11. A _____ shape is a shape created by combining two or more basic shapes.	1. The distance around a polygon. 2. The intersection between the x and y axes 4. A quadrilateral with congruent sides and diagonals. 7. A quadrilateral with one pair of parallel sides. 8. The measurement of the space occupied by a three-dimensional object.



Unit 2 | Ratios and Rates

Architecture

6th Grade Mathematics

North Carolina 6th Grade Math Standards

Unit 2

Understand ratio concepts and use ratio reasoning to solve problems.	
NC.6.RP.1	Understand the concept of a ratio and use ratio language to: • Describe a ratio as a multiplicative relationship between two quantities. • Model a ratio relationship using a variety of representations.
NC.6.RP.2	Understand that ratios can be expressed as equivalent unit ratios by finding and interpreting both unit ratios in context.
NC.6.RP.3	Use ratio reasoning with equivalent whole-number ratios to solve real-world and mathematical problems by: • Creating and using a table to compare ratios. • Finding missing values in the tables. • Using a unit ratio. • Converting and manipulating measurements using given ratios. • Plotting the pairs of values on the coordinate plane.
NC.6.RP.4	Use ratio reasoning to solve real-world and mathematical problems with percents by: • Understanding and finding a percent of a quantity as a ratio per 100. • Using equivalent ratios, such as benchmark percents (50%, 25%, 10%, 5%, 1%), to determine a part of any given quantity. • Finding the whole, given a part and the percent.

2.1 Understanding Ratios

Warm-Up

Write all you know about ratios.

Main Topic

Dream House Floor Plan Design Project

Project Objective

The goal of this project is to apply principles of **scale drawing, spatial reasoning, and functional design** to create a detailed, accurate, and aesthetically pleasing floor plan of your "dream house."

Design Requirements

Your final submission must include the following elements:

- 1. Scale Drawing:** The floor plan must be drawn accurately to a specified scale (e.g., 1/4 inch = 1 foot or 1:50 scale if using metric).
 - **Scale Identification:** Clearly state the chosen scale on your drawing.
 - **Dimensions:** Include the length and width of the entire structure in your chosen unit (e.g., feet or meters).
- 2. Essential Rooms:** The house must contain a minimum of four distinct rooms:
 - A primary living area (e.g., living room, great room).
 - A kitchen/dining area.
 - A minimum of one bedroom.
 - A minimum of one full bathroom.
- 3. Architectural Features:** Clearly label and accurately draw the following:
 - **Walls:** Differentiate between interior and exterior walls (exterior walls are often drawn thicker).
 - **Doors:** Include swings to indicate how the door opens.
 - **Windows:** Show the location and size of all windows.
 - **Stairs (if multi-story):** Indicate the direction of ascent.
- 4. Furniture & Appliances:** Sketch in essential furniture and appliances to demonstrate the functionality of each room. Use simple, to-scale geometric shapes.
 - *Examples:* Bed, sofa, dining table, kitchen counters, refrigerator, toilet, sink.
- 5. Labels & Annotation:** Clearly label the function of every room (e.g., "Master Bedroom," "Powder Room," "Garage").

Main Topic**Dream House Floor Plan Design Project**

Ratio
Notations

5 is to 7 can be expressed in the forms 5:7 or $\frac{5}{7}$

	Colon Form	Fraction
9 to 11		
3 is to 4		

Part-to-Part Ratios

The Pet Shop In a pet shop, there are 12 cats and 18 dogs. What is the ratio of cats to dogs in simplest form?	Fruit Basket A basket contains 5 apples and 12 oranges. What is the ratio of oranges to apples?
Classroom Count In Mr. Miller’s class, there are 14 boys and 16 girls. What is the ratio of girls to boys in simplest form?	Art Supplies A drawer has 24 red colored pencils and 30 blue colored pencils. What is the ratio of red pencils to blue pencils?

Create two situations using “Part-to-Part Ratios”.

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Part-to-Whole Ratios

Pizza Toppings A pizza is cut into 8 slices. 3 slices have pepperoni and 5 have only cheese. What is the ratio of pepperoni slices to the whole pizza?	Garden Flowers A garden has 30 flowers. 12 are roses and the rest are tulips. What is the ratio of tulips to the total number of flowers?
Marble Jar A jar contains 40 marbles. 10 are green, 15 are blue, and the rest are red. What is the ratio of red marbles to the total number of marbles?	Library Books In a stack of 25 books, 10 are mystery novels. What is the ratio of mystery novels to books that are <i>not</i> mystery novels?

Group the fractions that are equivalent.

$\frac{1}{2}$

$\frac{5}{25}$

$\frac{8}{16}$

$\frac{15}{30}$

$\frac{1}{5}$

$\frac{3}{15}$

$\frac{2}{3}$

$\frac{10}{15}$

$\frac{4}{12}$

Group 1	Group 2	Group 3

List the strategies to determine equivalent fractions.

Write a value in the shape that satisfies the equation.

$\frac{2}{3} = \frac{10}{\quad}$	$\frac{7}{9} = \frac{\quad}{81}$	$\frac{\quad}{35} = \frac{3}{7}$
$6 = \frac{36}{\quad}$	$\frac{\quad}{5} = 18$	$-9 = \frac{\quad}{4}$
$\frac{9}{15} = \frac{6}{\quad}$	$-\frac{8}{36} = \frac{12}{\quad}$	$-\frac{42}{35} = -\frac{\quad}{15}$

Equivalent Ratios and Scaling

Recipe Scaling A recipe for lemonade calls for a ratio of 2 cups of lemon juice to 6 cups of water. If Sarah uses 18 cups of water, how much lemon juice does she need?	The Track A runner finishes 4 laps every 10 minutes. At this rate, how many laps will the runner finish in 30 minutes?
Photography A photo has a width-to-length ratio of 4:6. If the width is increased to 12 inches, what must the length be to keep the same ratio?	Smartphone Battery A phone battery drops 5% every 20 minutes of video streaming. How much will the battery drop after 60 minutes?

Tic – Tac - Toe

Be the first player to get three of your marks in a row (horizontally, vertically, or diagonally).

There are 5 red apples and 8 green apples. What is the ratio of red apples to green apples?

In a class of 30 students, 12 are boys. What is the ratio of boys to girls?

Simplify the ratio 24:36.

Complete the ratio table:
If $1:4 = 2:8 = 3:? = 4:16$.

Write the ratio "6 to 18" in three different ways (using "to," a colon, and as a fraction).

A map scale is 1 cm : 50 miles. If two cities are 4 apart on the map, how far apart are they in real life?

To make orange paint, you mix 3 parts red with 2 parts yellow. If you have 15 parts red, how much yellow do you need?

A pattern uses 3 blue beads for every 2 yellow beads. If you use 12 yellow beads, how many blue beads do you need?

Find the missing value:

$$x : 12 = 3 : 4.$$

Honors Level

Explain the difference between a part-to-part ratio and a part-to-whole ratio.
Which one can be easily written as a fraction of the total?

Why can we multiply or divide both terms of a ratio by the same number without changing the ratio, but we cannot add or subtract the same number?

How is a ratio similar to an equivalent fraction? How is it different?

If the ratio of boys to girls in a class is 1:1,
what does that tell you about the total number of students?

If a bag contains red and blue marbles and the ratio of red to blue is 5:1,
what is the smallest possible number of marbles in the bag?

SEL Activity**The Ratio of My Day**

Self-Management & Self-Awareness

The Concept: A ratio is a comparison. In a kitchen, a ratio tells you if the food will taste good. In life, your "Time Ratio" tells you if your week will feel good.

Activity:

1. **The Ingredients:** Think about a typical Tuesday afternoon.
 - **Part A:** Time spent on screens/gaming.
 - **Part B:** Time spent outside or being active.
2. **Writing the Ratio:** Write the ratio of **Screen Time to Outside Time** in all three math forms.
3. **Reflective Prompt:** Is your current ratio 'in balance'? If your ratio is 5:1 (5 hours of screens for every 1 hour outside), how does your body feel compared to a 1:1 ratio?
4. **The Social Connection:** In a community, every 'Part' is necessary to make the 'Whole.' If the ratio of 'People who agree' to 'People who disagree' is always 1:0, we never learn anything new! We need different ratios to have a healthy discussion.
5. **Closing Questions:** Look at your own friend group.
 - What is the ratio of Talking to Listening?
 - If that ratio is 10:1, how can you adjust it tomorrow to make your 'Whole' friendship stronger?"

2.2 Mastering Ratios

Warm-Up

Simplify:

$$\frac{12}{15}$$

$$\frac{25}{35}$$

$$\frac{18}{24}$$

Main Topic

Ratio

The Blueprint to Reality (Scale Ratio)

The Setup: An architect is drawing the blueprints for a new local library. Because a library is too big to fit on a piece of paper, they have to use a scale ratio to shrink the measurements down accurately.

- **The Ratio:** The architect uses a scale ratio of **1:50**. This means that 1 centimeter (cm) on the drawing represents 50 centimeters in the real world.
- **The Problem:** If the main lobby is drawn as 12 cm wide on the blueprint, how wide will the actual lobby be in real life?

Illustrate and solve.

Ratio

A ratio compares the sizes of two quantities of the same unit.

Circle the quantities that can be expressed in ratios.

6 in

9 cm

12 secs

4 months

8 mi

7 days

5 hours

12 in

6 mins

7 ft

12 yr

120 mins

18 pieces

2 dozens

24 weeks

8 g

17 in

4 kg

Main Topic Unit Conversion


It will take $\frac{2}{5}$ hour to sketch a floor plan of my dream house.
If there are 60 minutes in 1 hour, how many minutes is $\frac{2}{5}$ hour?

$$1 \text{ hour} = 60 \text{ minutes}$$

$$\frac{1 \text{ hour}}{60 \text{ minutes}} = \frac{60 \text{ minutes}}{1 \text{ hour}}$$

Convert $\frac{2}{5}$ hour to minutes

- Multiply $\frac{2}{5}$ hour by $\frac{60 \text{ minutes}}{1 \text{ hour}}$.
(use the ratio with hour denominator)
- Cancel the hour unit.
- Simplify.

Convert 45 minutes to hour

- Multiply 45 minutes by $\frac{1 \text{ hour}}{60 \text{ minutes}}$.
(use the ratio with minutes denominator)
- Cancel the minutes unit.
- Simplify.

Convert $14\frac{4}{5}$ hours to minutes	Convert 135 minutes to hours
Convert 2.8 hours to minutes	Convert 40 minutes to hour



Need Help?

Main Topic**Unit Conversion Applications****The International Design Competition (Area - Imperial to Metric)**

An architectural firm based in Seattle, USA, decides to enter an international design competition for a new cultural center in Kyoto, Japan.



The competition brief dictates that all final submissions must use the metric system. The American team has spent the design development phase working in their native Imperial units (feet and inches). They have finalized the main exhibition hall design, which currently measures 85 feet by 140 feet.

The Concrete Foundation Pour (Volume - Linear to Cubic Yards)

An architect is acting as the project manager for a custom residential build. The site superintendent needs to order the concrete for the basement foundation slab.



The structural drawings show the foundation slab measures 54 feet in length, 32 feet in width, and has a specified thickness of 8 inches. However, the local concrete supplier sells ready-mix concrete by the cubic yard, not by linear dimensions or cubic feet.

Honors Level

All rates can be expressed as ratios, but not all ratios are rates. What is the fundamental distinction between the two regarding the *types* of quantities being compared?

If you have an image with a ratio of 16:9 and you resize it to a ratio of 4:3 without cropping, the image distorts. Explain what is happening to the "internal" ratios of the objects within the picture.

A map has a scale of 1:10,000. Is this a unitless ratio? If you measure the map in inches, does the real world correspond in inches? If you measure in centimeters, does the real world correspond in centimeters? Explain why.

If the ratio of boys to girls in a class is 3:2, the fraction of the class that is female is $\frac{2}{5}$, not $\frac{2}{3}$. Why does converting a ratio to a fraction often confuse the denominator, and how can you visually prove the difference between the two?

Algebraically, a ratio can be written as a fraction $\frac{a}{b}$. Why is it impossible to have a ratio where the second term is zero (e.g., 5:0) in the context of physical quantities, and how does this relate to the definition of a vertical line on a graph?

SEL Activity**The Constant of Me**

Self-Awareness & Relationship Skills

The Concept: A proportional relationship is one where the ratio between two quantities (y/x) is always the same. This constant value is called k .

Activity:**1. Identify Your Variables:**

- **x (The Situation):** Number of people you are hanging out with.
- **y (The Action):** How much you speak up or share your true opinion.

2. The "Authenticity" Test: *

- If you are with 2 friends ($x=2$), you share 4 opinions ($y=4$). Your k is 2.
- If you are with 10 friends ($x=10$), do you still share 20 opinions ($y=20$)?

3. Reflective Prompt: If your k changes when the group gets bigger, your relationship with yourself is **non-proportional**. Why do we sometimes 'shrink' our k (our personality) when the scale of the crowd increases?**4. The SEL Bridge:** Resilience is about keeping your resources proportional to your challenges. If you have 10 challenges but your resources stay at 3, the line breaks.**5. Task:** List 3 'Resources' (people, habits, or self-talk) that you can scale up when life gets more challenging. How do you make sure your y (support) always matches your x (stress)?

2.3 Understanding Rates

Warm-Up

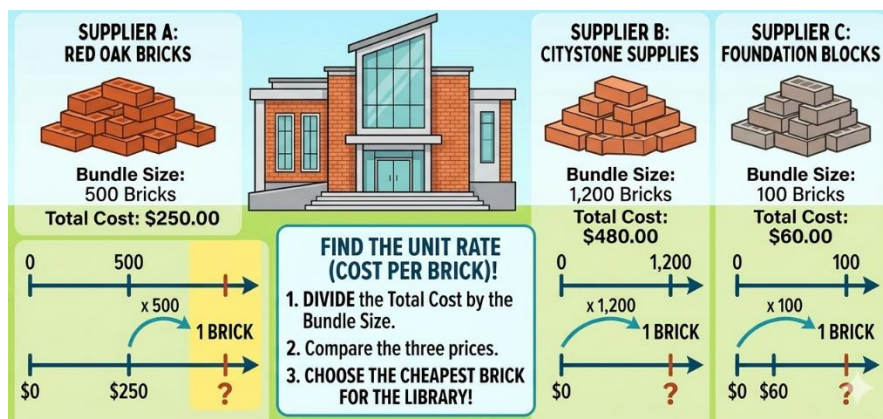
Write all you know about rates.

Main Topic Brick-by-Brick Challenge

You are the lead architect for a new library. You have three different suppliers for bricks, but they all sell in different bundle sizes. To stay under budget, you must find the **cost per single brick**.

Supplier A	Supplier B	Supplier C
500 bricks for \$250	1,200 bricks for \$480	100 bricks for \$60

Use a double number line to scale each supplier down to "1 brick."



Rate

A rate that compares two quantities with different units.

Circle the Rate Language.

\$4.50 for every 3 pounds

\$0.75 each

\$4.00 per gallon

Why do stores use "for every 3" instead of just telling you the price of one?

Does it make you feel like you have to buy more than you need?

Finding the "Value of One" (The Unit Rate)

Scenario: You are buying popcorn for a movie night with friends.

Brand A (The Big Bag)

\$6.00 for 3 bags.

Brand B (The Mega Box)

\$10.00 for 10 bags.

Calculate the Unit Rate for Brand A

Calculate the Unit Rate for Brand B

Which is the "Better Buy" mathematically? Explain

Main Topic	Unit Rates
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Grocery Store Math (Price per Item)	
A pack of 6 Gatorades costs \$12. What is the unit rate per bottle?	A 5-pound bag of apples costs \$10. How much does 1 pound cost?
At the deli, 3 pounds of turkey cost \$21. What is the price per pound?	A giant bag of 500 gummy bears costs \$5. What is the cost per gummy bear?

Speed and Travel (Distance per Hour)	
A train travels 300 miles in 5 hours. What is the train's unit rate of speed in miles per hour?	A cyclist rides 36 miles in 3 hours. How many miles do they travel in 1 hour?
An airplane flies 1,800 miles in 3 hours. What is its speed per hour?	A snail crawls 10 inches in 2 hours. What is the snail's unit rate in inches per hour?

Social Media & Gaming (Points per Action)	
A YouTuber gained 1,000 subscribers over the last 5 days. What was the average number of subscribers gained per day?	In a video game, you earn 150 points for defeating 3 bosses. How many points is each boss worth?
A TikToker's video got 600 likes in 10 minutes. How many likes did the video get per minute?	A streamer played for 4 hours and received 20 "donations." What is the unit rate of donations per hour?

Bingo

B	I	N	G	O
		FREE		

Main Topic	Rates Applications
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- 1. Blueprint Scaling:** An architect is drawing a floor plan for a new library. On the blueprint, a wall that is **12 feet** long in real life is drawn as **3 inches** long. What is the unit rate of "real-life feet" per "blueprint inch"?

- 2. Flooring Costs:** A contractor needs to buy hardwood flooring for a rectangular lobby. They paid **\$1,200** for **150 square feet** of wood. What is the unit price per square foot of the flooring?

- 3. Bricklaying Speed:** A masonry team is building a decorative brick wall. They are able to lay **240 bricks** in a **4-hour** shift. What is their unit rate of bricks laid per hour?

- 4. Window Spacing:** An architect wants to place windows evenly across the front of a building. The building is **60 meters** wide, and the design includes **5 windows**. What is the unit rate of meters per window?

- 5. Concrete Mixing:** To create a strong foundation, a builder mixes **18 bags** of cement for every **3 cubic yards** of concrete produced. What is the unit rate of cement bags per cubic yard of concrete?

SEL Activity**The Power of One**

Self-Management & Responsible Decision-Making

The Concept: A rate compares two different things (like *miles* and *hours*). A **Unit Rate** tells us the amount for exactly **one** of something.

Activity:

1. **The Math:** If a car travels 120 miles in 2 hours, the rate is $120/2$. The **Unit Rate** is 60 miles per 1 hour.
2. **The SEL Connection:** Think about your "Stress Rate." If you have 6 chores to do and it takes you 2 hours, your unit rate is **3 chores per hour**.
3. **Reflective Prompt:**
 - If someone else's unit rate is 5 chores per hour, does that mean they are 'better,' or just that they have a different pace?
 - How does it feel when you try to force yourself to match someone else's unit rate?
4. **The Social Connection:** Consistency is a unit rate of trust. If you are kind to a friend 1 time for every 1 interaction (1:1), your 'Unit Rate of Kindness' is 1. If it changes constantly, the 'trust' can't be calculated.
5. **Closing Question:** What is one 'Unit Rate' you want to keep constant this week? (e.g., 1 compliment per day, 20 minutes of reading per night).

2.4 Solving Proportions

Warm-Up

Convert.

8 inch to ft

250 g to kg

2.45 hrs to mins

Main Topic The LEGO® Skyscraper Challenge

You are the Lead Model Maker for a famous architectural firm in New York City. Your firm has just designed the "Titan Tower," a massive new skyscraper that will be 800 feet tall and 200 feet wide. Before the construction crew starts building, the client wants to see a perfect scale model of the tower in the lobby of their current office.

The Constraints: You have a table in the lobby where the model will sit. The table is small, so you decide that the width of your model will be exactly 10 inches.

The Problem: You have the width (10 inches), but you don't know how tall to build the model.

- If you build it too short, the tower will look fat and squished.
- If you build it too tall, the tower will look skinny and stretched.

The Mission: Use **proportions** to calculate the exact height your model needs to be so that it looks *exactly* like the real building, just smaller.

Show all steps below.



Main Topic Solving Proportions

Write a value in the shape that satisfies the equation.

$$\frac{2}{5} = \frac{10}{\quad}$$

$$\frac{7}{9} = \frac{\quad}{45}$$

$$\frac{\quad}{70} = \frac{3}{7}$$

**Cross
Multiplication
Method**

Multiply diagonally

$$\frac{2}{5} = \frac{10}{x}$$

- Multiply 2 and x.
- Multiply 5 and 10.
- Divide both sides by 2.
- Simplify.

The Skate Park Design Challenge

Architect Leo is designing a new concrete skate park for the city. He draws a detailed floor plan to show the construction crew where the ramps and rails should go. On Leo's blueprint, he uses a scale where 2 inches on the paper represents 5 feet in the real world.

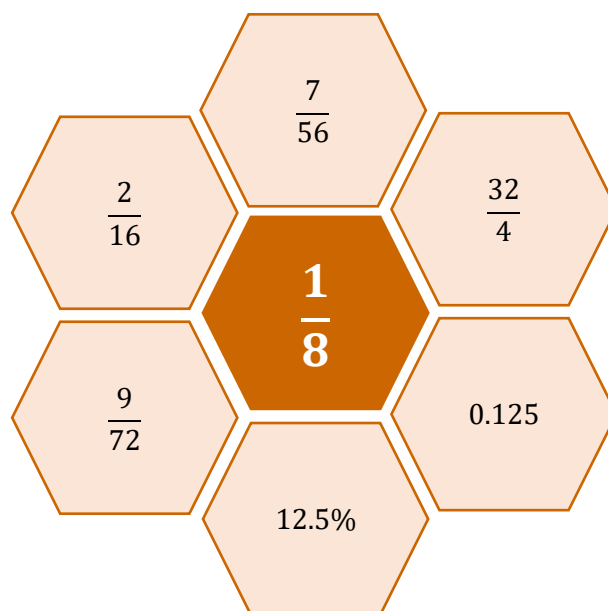
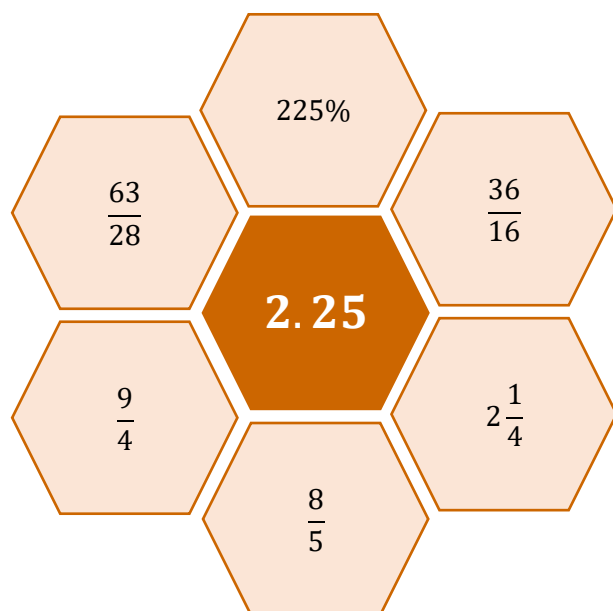
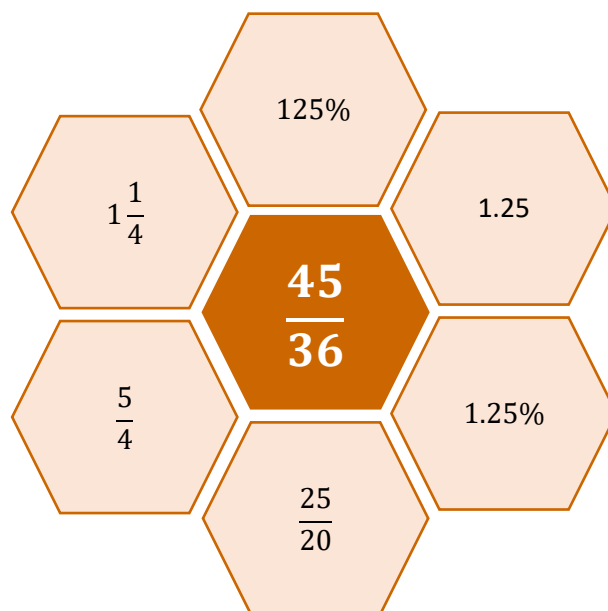
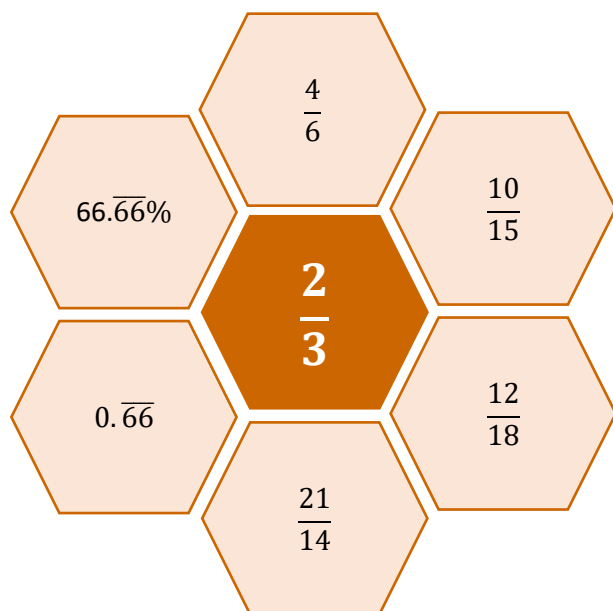
Leo draws a long grinding rail on the blueprint that measures 8 inches long. Using a proportion, calculate how long the grinding rail will be in the real skate park.



Need Help?

Odd One Out

Cross out a value that is **not** equal to the value in the middle.



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- Draw triangle ABC.
- Side AB measures 8 in.
- Side BC measures 11 in.
- Draw similar triangle DEF.
- Side EF measures 55 in.
- Find the length of side DE.

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- Draw rectangle ABCD.
- Side AB measures 5 cm.
- Side BC measures 9 cm.
- Draw similar rectangle EFGH.
- Side FG measures 108 cm.
- Side GH measures $4x+8$ cm.
- Solve for x .



Need Help?

Solve each problem and show all steps.

The Art Class For every 2 paintbrushes, there are 5 jars of paint. If the class has 10 paintbrushes, how many jars of paint do they have?	Reading Speed If you can read 3 pages in 6 minutes, how many pages can you read in 18 minutes?
The Baker A recipe calls for 2 eggs to make 12 cupcakes. How many eggs are needed to make 36 cupcakes?	Soccer Practice A player scores 3 goals for every 10 shots taken. If the player takes 30 shots, how many goals should they expect to score?
The Blueprint An architect uses a scale where 1 inch = 4 feet. If a wall on the blueprint is 5 inches long, how many feet long is the actual wall?	Floor Tiling You need 5 boxes of tiles to cover 100 square feet. How many boxes do you need to cover 400 square feet?
The Snack Bar If 3 granola bars cost \$4, how much will 12 granola bars cost?	Eraser Pack A pack of 4 erasers costs \$2. If you have \$10, how many erasers can you buy?

Honors Level

A proportional relationship is defined by a constant ratio. What does it mean for a constant to be a multiplier (multiplicative relationship) rather than an adder (additive relationship) in the context of equivalent ratios?

How does the conceptual difference between a ratio (part-to-part, e.g., 3:2) and a fraction/probability (part-to-whole, e.g., $\frac{3}{5}$) influence how a problem is set up and solved?

If the scale factor from object A to object B is $\frac{5}{2}$, what does the reciprocal scale factor $\frac{2}{5}$ conceptually represent?

If the ratio of the sides of two similar triangles is 1:4, why is the ratio of their areas 1:16?
Explain the mathematical reason for this square relationship.

Two shapes are similar if the ratio of their corresponding side lengths is constant. If two rectangles are similar, what property of the shapes changes (i.e., size) and what property remains the same (i.e., shape)?

SEL Activity**The Balance of Fairness**

Responsible Decision-Making & Social Awareness

The Concept: Two ratios form a proportion if they simplify to the same value or if their cross-products are equal.

Activity:**1. The Scenario:**

- **Friend A** helps you for 2 hours, and you give them 4 stickers. (Ratio 2:4 or 1:2)
- **Friend B** helps you for 5 hours, and you give them 8 stickers. (Ratio 5:8)

2. The Math: Test if these ratios are proportional ($2/4 = 5/8$).**3. The SEL Bridge:** Is this situation 'fair'? Friend B worked more, but did they get a proportional reward? Why does it feel 'wrong' when a relationship is out of proportion?**4. The Recipe:** A "Kind Classroom" needs a ratio of 1 "Brave Truth" for every 3 "Encouraging Words" (1:3).**5. The Logic:** If our class has 30 students and everyone shares 1 Brave Truth, how many Encouraging Words do we need to keep the classroom in proportion? ($1/3 = 30/x$)**6. Closing Question:** If a group becomes 'out of proportion' (too much criticism, not enough support), what is one mathematical 'variable' you can change to bring it back into balance?

2.5 Solving Word Problems

Warm-Up

Write all you know about the following terms.

Fraction

Proper Fraction

Mixed Number

Numerator

Denominator

Main Topic

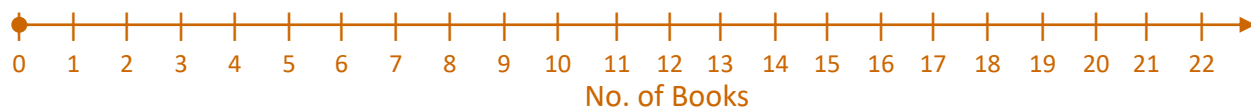
Rate Problems



I can read 2 books per hour.

I can read 3 books per hour.

Shade a part of the number line based on the number of books they can read per hour.



Fill out the table.

No. of Hours	1	2	3	4	5	6
No. of Books Read (Girl)						
No. of Books Read (Boy)						

Create a formula to determine the number of books they can read in “h” hours.



Need Help?

Main Topic Work Problems

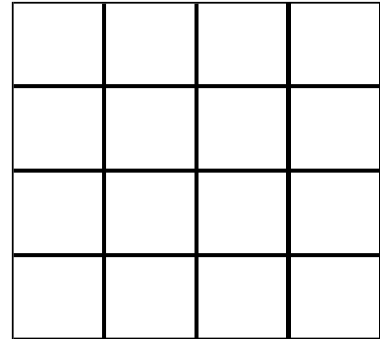
$$\frac{\text{Work Done}_{1\text{st person}}}{\text{Time}_{1\text{st person}}} + \frac{\text{Work Done}_{2\text{nd person}}}{\text{Time}_{2\text{nd person}}} = \frac{\text{Work Done}_{\text{Together}}}{\text{Time}_{\text{Together}}}$$

Valerie can vacuum a small room in 4 minutes, while Marvin takes 16 minutes to do the same job. If they work together, can they vacuum the room faster?

$Rate_1$	$Rate_2$	$Rate_{\text{Together}}$

- Express $Rate_1$ and $Rate_2$ in similar fractions.

$Rate_1$	$Rate_2$	$Rate_{\text{Together}}$



- Shade parts of the shape based on their work rates per minute.

No. of Minutes	1	2	3	4
No. of boxes to shade (Valerie)	4	8	12	?
No. of boxes to shade (Marvin)	1	2	3	?
Total No. of boxes to shade	5	10	15	?

- How many minutes can they vacuum the room together? Estimate.

- To solve the problem algebraically, follow the steps.

- Setup the equation.

$$\frac{1}{4} + \frac{1}{16} = \frac{1}{x}$$

- Express the fractions to similar fraction form.

$$\frac{4}{16} + \frac{1}{16} = \frac{1}{x}$$

- Combine the left part of the equation.

$$\frac{5}{16} = \frac{1}{x}$$

- Cross multiply.

$$5x = 16$$

- Solve for x.

$$x = 3.2$$

- Therefore, it will take them 3.2 minutes to vacuum the room.

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Need Help?

Main Topic**Work Problems - Practice**

You can paint a house in 5 days. Your friend can paint the same house in 12 days. If you and your friend work together, how long would it take to paint the house?

If Frank can wash a car in 30 minutes and Tim can wash the same car in 45 minutes, how long would it take them to wash the car together?

You can weed the entire garden in 2 hours, while your friend can do it in 1.5 hours. If you both work together, how long will it take to finish weeding the garden?

Riva can deliver newspapers to 20 houses in 30 minutes. Mark can deliver to the same number of houses in 25 minutes. If they both deliver newspapers together, how many minutes will it take to complete all the deliveries?

It takes you 1 hour to build a sandbox by yourself. Your friend can build it in 45 minutes. If you work together, how much time in minutes can you save compared to if you each built it alone?

Solve My Problem. Please!

Create 3 work problems. Have a partner solve at least 2 work problems.

Honors Level

When calculating speed $\left(\frac{\text{distance}}{\text{time}}\right)$, the units are different $\left(\frac{\text{miles}}{\text{hour}}\right)$, yet we use proportional reasoning. Conceptually, why is a rate still treated as a ratio for mathematical purposes?

Why is the denominator of a unit rate always 1 (e.g., 5 miles per 1 hour) and how does this simplification allow for quicker proportional calculations?

If the rate of production for a machine increases by 25%, how does the time required to complete the same task change proportionally?

In work problems, "work" is often represented by the number 1 (representing one whole task). Explain why this dimensionless unit allows us to use proportional reasoning regardless of the task's size (e.g., painting one wall vs. one skyscraper).

When two people work together, we add their rates $\left(\frac{1}{A} + \frac{1}{B} = \frac{1}{T}\right)$. Conceptually, why must we use the reciprocal $\left(\frac{1}{\text{time}}\right)$ to represent an individual's rate, rather than just their total time A?

SEL Activity**The Story in the Numbers**

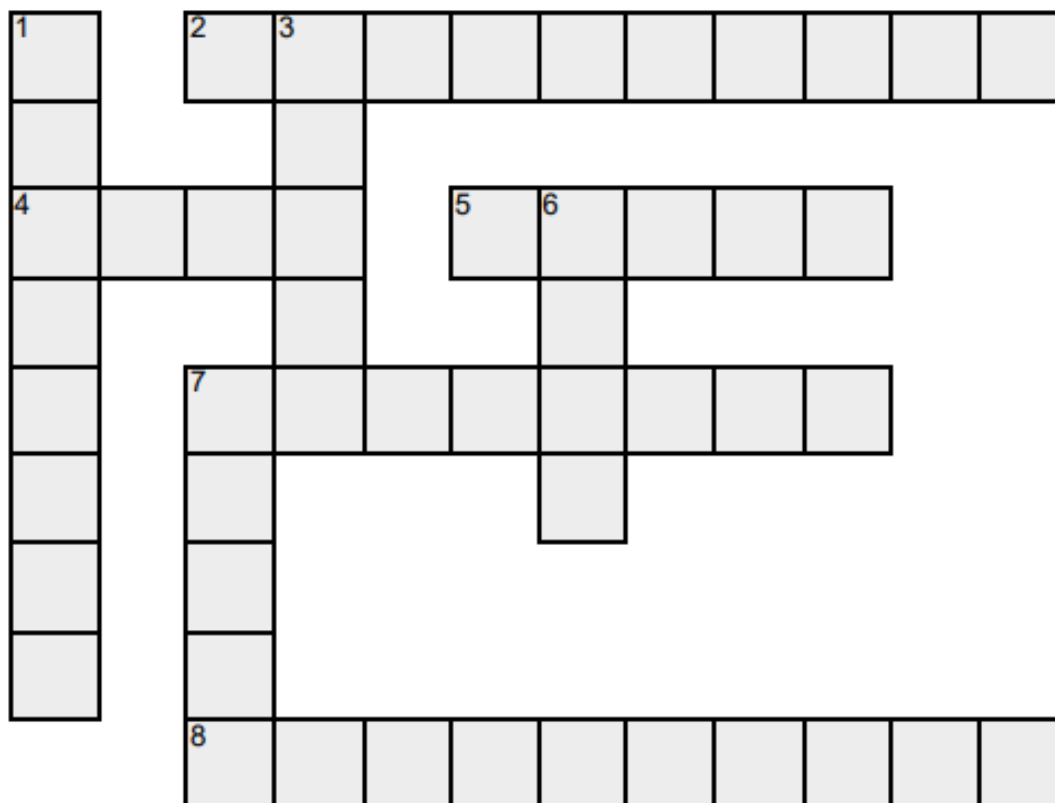
Social Awareness & Problem-Solving Skills

The Concept: Cross-multiplication ($ad = bc$) is the "bridge" that connects the two sides of the proportion to solve the mystery.

Activity:

1. **The Logic:** To solve a proportion, you multiply diagonally. It's like reaching across a gap to connect with the other side.
2. **The Social Connection:** When you have a conflict with a friend (a 'Word Problem'), you have to 'Cross-Multiply' your perspectives. You share your side, they share theirs, and you find the 'value' that makes the relationship equal again.
3. **Closing Question:** If you are in a situation where the 'Ratio of Effort' is 10:2 (you are doing 10 things, they are doing 2), what 'Cross-Multiplication' conversation do you need to have to bring the story back into proportion?

Ratio and Rates



Across	Down
2. A statement that expresses equality between two ratios.	1. A statement that expresses equality between two expressions.
4. A standard amount used to measure a specific quantity, like length, weight, time, etc.	3. A _____ compares the sizes of two quantities of the same unit.
5. _____ multiplication is a process in solving proportion equations.	6. A comparison between two quantities with different units expressed as a ratio.
7. A value or a set of values that satisfies the equation.	7. The ratio between the corresponding dimensions of two similar figures is called the _____ factor.
8. Ratios are _____ if their simplified forms are the same.	



Unit 3 | Percentages

Social Media

6th Grade Mathematics

North Carolina 6th Grade Math Standards

Unit 3

Understand ratio concepts and use ratio reasoning to solve problems.

NC.6.RP.4

Use ratio reasoning to solve real-world and mathematical problems with percents by:

- Understanding and finding a percent of a quantity as a ratio per 100.
- Using equivalent ratios, such as benchmark percents (50%, 25%, 10%, 5%, 1%), to determine a part of any given quantity.
- Finding the whole, given a part and the percent.

3.1 Understanding Percentages

Warm-Up

Simplify.

$$\frac{20}{100}$$

$$\frac{70}{100}$$

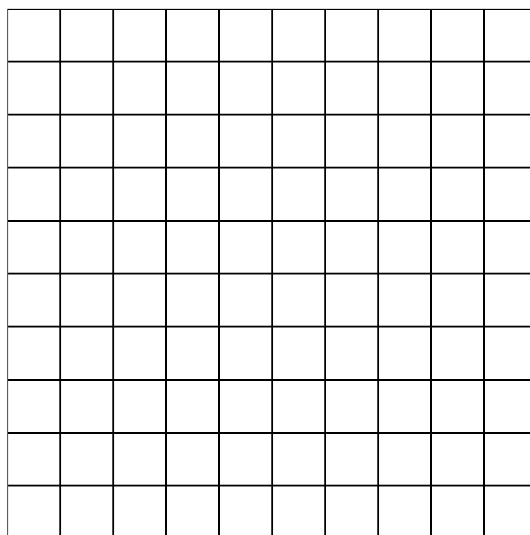
$$\frac{35}{100}$$

$$\frac{80}{100}$$

Main Topic Percentages

Our social media team is launching a new campaign and needs a **Pixel Art Hero**. Your mission is to design a character head on a **10 x 10 grid**.

The Rules of the Studio: To keep the brand consistent, you are restricted to exactly **4 colors**. Every one of the 100 pixels must be filled, and you must report the **percentage** used for each color to ensure our printers can match the design perfectly!



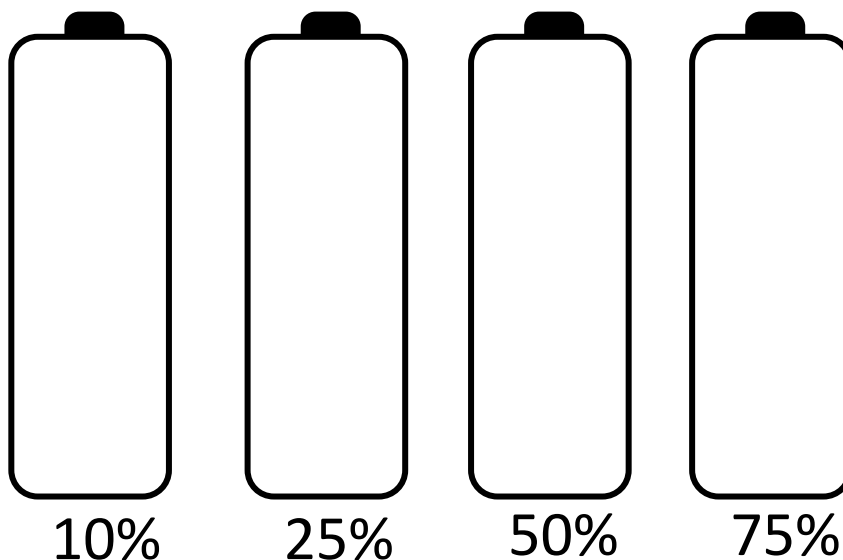
	Red	Green	Blue	Yellow
No. of Grids				
Fraction				
Percentage				

Percent

A way of expressing a number as a fraction of 100.

Trivia: The word originates from the Latin phrase *per centum*, which literally translates to "by the hundred." % is a shorthand for "divided by 100."

Shade the interior to match the indicated % capacity of the battery.



Express the percentage in fraction form.

	10%	25%	50%	75%
Fraction Form				

Pair-and-Share

Student A, work on question A. Student B, work on question B.
Prepare to share your work with a partner in 5 minutes.

Question A

In a survey of 100 students, 57 said they prefer pizza. What percentage of students prefer pizza?

Question B

In a survey of 100 students, 42 said they prefer pizza. What percentage of students prefer pizza?

Question A

Calculate 25% of 200.

Question B

Calculate 50% of 200.

Question A

If a team wins 5 out of 20 games, what is their win percentage?

Question B

If a team wins 5 out of 10 games, what is their win percentage?

Main Topic	Percentages Applications
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In a group of 200 teenagers, 140 said their favorite app is TikTok. What percentage of teenagers prefer TikTok?

A YouTuber has 5,000 subscribers. If 10% of them comment on a video, how many people commented?

Out of 80 photos posted by an influencer, 12 were sponsored. What percentage of the photos were sponsored?

A small business account has 400 followers. If the follower count increases by 15%, how many followers do they have now?

A reel received 1,200 views. If 300 of those viewers "liked" the video, what percentage of viewers gave a like?

An artist posted a story that was viewed by 500 people. If 20 people replied, what percentage of viewers engaged with the story?

A student spends 4 hours a day on social media. What percentage of a 24-hour day is spent on social media?

Honors Level

Why is 100% considered a "whole" in most real-world contexts?

Explain the relationship between a fraction with a denominator of 100 and a percentage.

If a grid has 50 squares and 10 are shaded, why is the percentage not 10%?

Describe what 1% looks like compared to the whole.

If a store offers "one-fifth off," what percentage discount are they giving?

SEL Activity**The 100% Version of Me**
Self-Awareness & Self-Management

The Concept: A percent is just a shortcut for a fraction with a denominator of 100. If you color 25 squares out of 100, you have 25%.

Activity:

1. **The Identity Grid:** Imagine this 100-square grid represents your "Personality."

2. **The Shade-In:** Use different colors to represent different parts of who you are.
- **Blue:** I am a student (x%).
 - **Green:** I am a friend/sibling (y%).
 - **Yellow:** I am a dreamer/creative (z%).
3. **Reflective Prompt:**
- When you look at your grid, which color takes up the most 'percent'?
 - Does that percentage feel right to you, or do you want to change the ratio tomorrow? Explain.

3.2 Percent Conversion

Warm-Up

Divide and express your answer in decimal.

$$2 \div 100$$

$$52 \div 100$$

$$30 \div 100$$

Main Topic For Every One Hundred

Percent

“per” means *for every*
“cent” means *one hundred*

Shade the grids to trace the initial of your first name.

What fraction of the 100-grid is shaded?

What percent of the 100-grid is shaded?

Shade the grids to trace the initial of your last name.

What fraction of the 100-grid is shaded?

What percent of the 100-grid is shaded?

Dollar

One dollar has 100 cents.

Express in fraction and in lowest term.

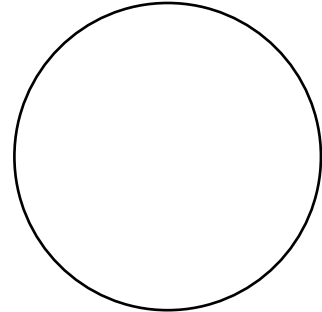
5 cents	8 cents	12 cents	20 cents
23 cents	40 cents	50 cents	75 cents

Answer the problems and show all steps.

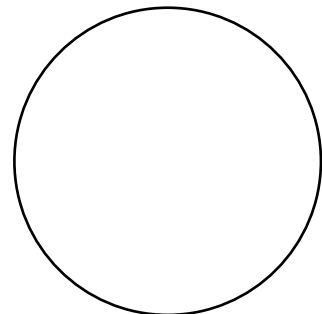
A nickel is worth 5 cents. Write this as a fraction of a dollar and then simplify the fraction to its lowest terms.	A quarter is worth 25 cents. Express a quarter as a fraction of a dollar in simplest form.
Marcus has 45 cents and Janie has 60 cents. Write both amounts as fractions of a dollar. Who has a fraction closer to 1 whole dollar?	A bus ride used to cost 75 cents. Now it costs 80 cents. Write both the old and new prices as fractions of a dollar in simplest form.
In a certain city, the sales tax on a small toy is 8 cents. Express this tax as a fraction of a dollar.	A vending machine requires 95 cents for a granola bar. What fraction of a dollar do you need to insert to get the snack?

Main Topic Fraction to Percent
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- Partition the circle into four equal parts.
- Shade exactly one section of the circle.
- Write the fraction that represents the shaded portion.
- Determine what percent of the total circle is shaded.


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- Partition the circle into five equal parts.
- Shade exactly two sections of the circle.
- Write the fraction that represents the shaded portion.
- Determine what percent of the total circle is shaded.



Convert to percent. Show all steps.

$\frac{7}{10}$	$\frac{13}{20}$
$\frac{18}{25}$	$\frac{3}{5}$

Main Topic Percentage Applications

A creator's video was shown to 500 people.

Out of those, 125 people clicked the "Like" button. What percentage of the viewers liked the video?

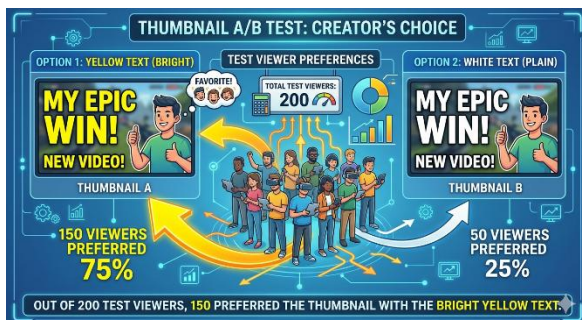


An ad for a new sneaker was shown 1,000 times. It received 70 clicks.

What percentage of people who saw the ad clicked on it?



A creator tested two thumbnails. Out of 200 test viewers, 150 preferred the thumbnail with the bright yellow text. What percent preferred that version?



400 people signed up for a Live Q&A session. 312 people actually showed up.

What percent of the sign-ups attended the live?



Honors Level

Which is larger: 25% or $\frac{1}{5}$? Explain your reasoning.

Explain the relationship between a fraction with a denominator of 100 and a percentage.

If a fraction is $\frac{3}{4}$, how can you turn it into a percentage without using a calculator?

What fraction is equivalent to 12.5%? (Hint: Think about half of 25%).

How would you write 150% as a decimal?

SEL Activity**The Language of Truth**

Social Awareness & Communication

The Concept: A value can look different but mean the same thing. To convert a fraction to a decimal, we divide. To turn a decimal into a percent, we move the decimal point two places to the right (multiplying by 100).

Activity:

1. **The Translation Table:** Fill in the missing "languages" for these feelings.
 - **The Feeling:** "I'm a little bit nervous."
 - **Fraction:** $\frac{1}{4}$
 - **Decimal:** 0.25
 - **Percent:** _____%
2. **Reflective Prompt:**
 - If one friend says 'I'm 25% finished' and another says 'I've done $\frac{1}{4}$ of the work,' are they in the same place?
 - Why is it helpful to speak more than one 'math language' when working in a group?
3. **The Math:** Convert 0.01, 0.1, and 1.0 into percentages.
4. **The SEL Bridge:** Sometimes a small 'Decimal Shift' in our perspective changes everything.
 - 0.01 perspective: 'I made a mistake.' (1% focus)
 - 1.00 perspective: 'I am a mistake.' (100% focus)
5. **Task:**
 - When you fail at something, are you looking at the 0.01 decimal or the 1.0 whole?
 - How can you 'convert' your thinking to see the mistake as just a small part of your percent?

3.3 Percent of a Number

Warm-Up

Multiply.

$$\frac{4}{5} \cdot 20$$

$$\frac{7}{10} \cdot 15$$

$$\frac{6}{25} \cdot 50$$

Main Topic **Percent of a Number**

The 20 biggest fans of a famous content creator have been selected for an exclusive meet-and-greet! To make sure everyone can see and ask questions, the event coordinator is dividing the fans into 4 equal seating sections.

Represent the fans by drawing an equal number of circles (fans) in each of the four sections below.

Section 1	Section 2	Section 3	Section 4

How many fans are sitting in each individual section?

What percent of the total group does one section represent?

If the content creator talks to the fans in Section 1 and Section 2 first, what percentage of the total fans have they spoken to?

Complete the statement below.

_____ % of 20 is _____.

Main Topic Percent of a Number

10% of 80

50% of 18

20% of 45

75% of 8

Solve each problem and show all steps.

What is 10% of 60?	What is 10% of 120?
What is 50% of 12?	What is 50% of 24?
What is 75% of 52?	What is 20% of 50?
What is 30% of 70?	What is 80% of 10?

Main Topic	Percent of a Number Applications
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A YouTuber has 60 videos. If 50% of them are gaming videos, how many gaming videos do they have?	A TikToker's video got 400 views. If 10% of the viewers clicked the "Like" button, how many likes did they get?
A tech reviewer has 40 gadgets. If 25% are smartphones, how many smartphones do they have?	A travel vlogger visited 20 countries. If 20% were in Asia, how many Asian countries did they visit?
A makeup artist has 60 brushes. They use 75% of them for a "Full Glam" tutorial. How many brushes is that?	A video editor spent 8 hours on a project. 25% of the time was spent "color grading." How many hours did they color grade?
A gamer has 200 skins. They choose to wear a rare skin 5% of the time. How many rare skins do they use?	An Instagram post got 80 likes. If 15% of those likes came from the "Explore" page, how many likes was that?
A fashion blogger has 40 pairs of shoes. 40% of them are sneakers. How many sneakers do they have?	A creator sells merch. If they sell 80 shirts and 60% are Size Large, how many Large shirts were sold?

Percent Matching

Match column A with a correct answer in Column B by connecting the boxes.

Column A

10% of 50**50% of 24****100% of 47****20% of 30****20% of 100****5% of 20**

Column B

47**12****20****1****5****6**

Honors Level

Why does finding 10% of a number only require moving the decimal point one place to the left?

If you find 10% of a number and then 10% of that result, what total percentage of the original number do you have?

75% of a number is the same as $\frac{3}{4}$ of that number. Prove.

Why is 150% of a number always greater than the number itself?

How can you use the "half of a half" strategy to find 25% of any number?

SEL Activity**The Percent of My Focus**

Self-Management & Self-Awareness

The Concept: To find the percent of a number, we convert the percent to a decimal and multiply by the total.

Activity:

1. **The Math:** You have 24 hours in a day. If you spend 25% of your day sleeping, how many hours is that?
 - *Calculation:* $0.25 \times 24 = \underline{\hspace{2cm}}$ hours.
2. **The SEL Connection:** We all have the same "Whole" (24 hours). But we choose what "Percent of the Whole" we give to our worries.
3. **Reflective Prompt:** If you spend 10% of your day (2.4 hours) worrying about what others think, that is a large part of your 'Whole.' What is a smaller percentage you'd like to give to that worry tomorrow?
4. **Task:** List 3 things you are grateful for today. Give each one a percentage of your "Focus Battery."
5. **The Social Connection:** You don't have to be a superhero to change the world. You just have to decide what Percent of your Energy you are willing to share with others.
6. **Closing Question:**
 - If you gave just 5% more effort to being kind today, what would that look like in real life?

 - Calculate 5% of your 60-minute lunch break. How many minutes is that?

3.4 Whole vs. Percent

Warm-Up

Solve for x.

$$\frac{4}{x} = \frac{10}{100}$$

$$12 = x \cdot 24$$

Main Topic

Whole Numbers

The "Viral Snapshot"

You are a Social Media Manager. You posted a teaser video, and it got 8 "super-likes" in the first couple of minutes. Your analytics tool says this is exactly 10% of the total likes you usually get for a full video.



Use a "Percent Tape" to find your total expected likes.

- ☐ Draw a long rectangle and divide it into 10 equal sections.
- ☐ Label each section as 10%.
- ☐ If the first box (10%) represents 8 likes, how many likes go in every other box?
- ☐ Total them up to find the "Whole."

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Main Topic**Whole Numbers – Rectangle Division**

7 is 10% of a number. Find the value of that number.

7 is 25% of a number. Find the value of that number.

7 is 50% of a number. Find the value of that number.

3 is 5% of a number. Find the value of that number.

60 is 75% of a number. Find the value of that number.

Percentages Matching

Match column A with a correct answer in Column B by connecting the boxes.

Column A

4 is 10% of a number.

6 is 20% of a number.

11 is 25% of a number.

20 is 40% of a number.

9 is 75% of a number.

7 is 5% of a number.

Column B

30

50

12

40

140

44

Main Topic Percentages Applications

A YouTuber has filmed **10 videos** so far. If this is **10%** of their goal for the year, how many total videos do they plan to make?

A gamer reached **20%** of their "level up" goal after earning **400 XP**. What is the total amount of XP needed to level up?

If **5** comments on a post were negative, and that was **10%** of all comments, how many total comments were there?

An artist received **12** commissions in January. If this was **20%** of their goal for the spring, what is their total goal?

A video has **600** likes. If the creator knows that **75%** of their viewers usually leave a like, how many total people viewed the video?

A giveaway had **30** winners. If the host explained that only **15%** of entrants could win, how many total people entered the giveaway?

Honors Level

If a grid is divided into 100 squares and 45 are shaded, we say 45% is shaded.
If the grid only has 50 squares and 45 are shaded, why is the percentage not 45%?

If Person A has 10% of a pizza and Person B has 10% of a pizza, is it possible that Person A has more pizza than Person B? Explain why.

We often think of percentages as being less than a whole. Describe a real-world situation where a percentage would be 200%. What does that look like?

If you know that 8 is 10% of a mystery number, why is the mystery number *larger* than 8?

If you have 0% of a million dollars, how much do you have? If you have 100% of a penny, how much do you have? Which is worth more?

SEL Activity**The Big Picture Detective**

Self-Awareness & Perspective-Taking

The Concept: If you know that 12 minutes is 20% of a workout, you can find out how long the total workout was.

Activity:

1. **The Math:** If 20% of a mystery number is 12, what is the whole number?
2. **The SEL Connection:** Think of a "Bad Moment" today that lasted 15 minutes.
3. **Reflective Prompt:** If that 15-minute moment was only 2% of your entire week, how many total minutes are in your week? When we see how huge the 'Whole' is, does the 'Part' feel quite as scary?
4. **The Logic:** If you gave 3 compliments today, and that was only 25% of your goal, what is your 'Whole' goal for the day?
5. **The Social Connection:** Sometimes we feel like we aren't 'enough.' But if you have even one good quality, like being a good listener, that is a 'Part' of a 100% amazing person. You don't need to be 100% perfect at everything to be a 'Whole' valuable human.
6. **Closing Question:** If your 'Kindness Part' is currently at 40%, what are the missing pieces you need to reach your 100% 'Whole' self today?

3.5 Percent Word Problems

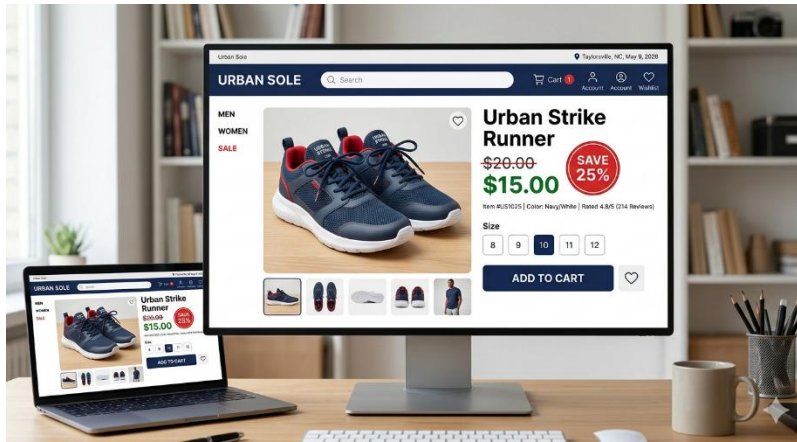
Warm-Up

Write your name, then calculate the percentages for each category below.

- **Vowels:** _____ %
- **Consonants:** _____ %

What is the sum of the two percentages above?

Main Topic Calculating Discounts



1. **Original Price:** What was the price of the shoes before any discounts?
2. **Discount Amount:** How many **dollars** are saved with this deal?
3. **Discount Rate:** What **percentage** is being taken off the original price?
4. **Sale Price:** What is the final price a customer pays at the register?

Fill in the blanks to make each mathematical statement true:

_____ is 25% of 20.

15 is _____% of 20.

25% of _____ is 5.

75% of 20 is _____.

Main Topic	Translating to Math
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what	is	of	percent
x	=	.	/100

What is 10% of 20?

7 is 50% of what number?

What percent of 24 is 6?

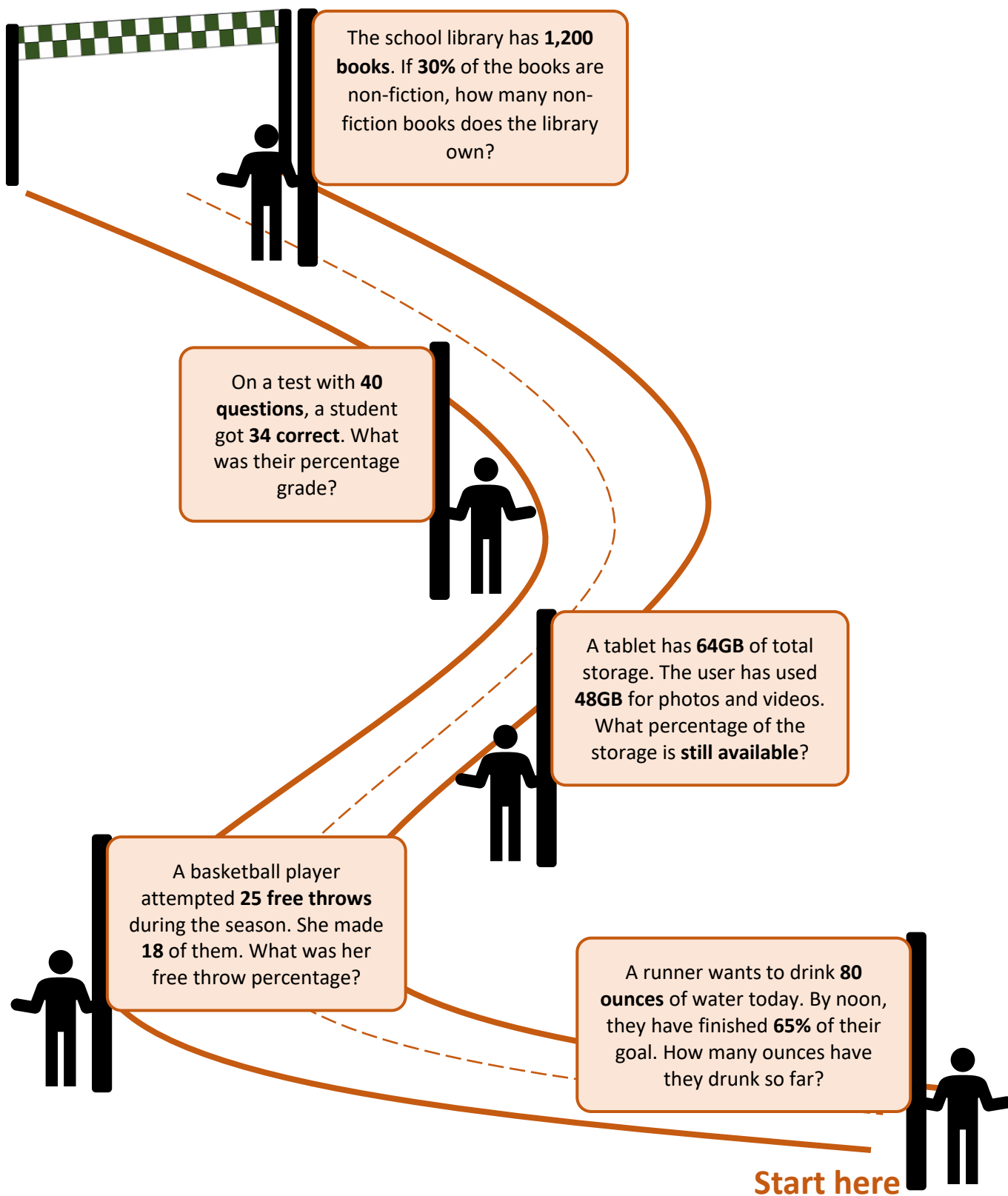
Solve each problem and show all steps.

What is 25% of 40?	12 is 50% of what number?
What percent of 20 is 5?	15 is what percent of 60?

Main Topic	Word Problems
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1. **The New Kicks:** A pair of sneakers costs **\$80**. The store is offering a **25% discount**.
 - A) How many dollars do you save?
 - B) What is the final sale price?
2. **The Video Game:** A game is originally **\$60**. It is on sale for **10% off**. How much money is taken off the price?
3. **The Math Quiz:** Jackson answered 18 questions correctly out of 20 total questions. What percentage did she get right?
4. **Free Throws:** A basketball player made 15 out of 20 free throw attempts during practice. What is their shooting percentage?
5. **The Pizza Party:** 6 students in a class chose pepperoni pizza. If these 6 students represent 20% of the total class, how many students are in the class?
6. **The Phone Battery:** Your phone says it is at 10% battery. If you have 45 minutes of battery life left, what is the total battery life (100%) of the phone?

Reaching the Finish Line



Honors Level

In the sentence "20% of 80 is 16," which number represents the "Whole" (100%)?
If we changed the 80 to 100, would the "16" get bigger or smaller? Why?

If a store has a "20% off" sale, is the 20% calculated based on the *original price* or the *sale price*? Why does that distinction matter to your wallet?

If I tell you that "10 people in the room are wearing hats," can you tell me what percentage that is? What is the one piece of information you are missing to solve this?

If you are asked to find "120% of 50," should your answer be larger or smaller than 50?
How do you know without doing any multiplication?

A jacket is 50% off. You have an extra coupon for "10% off the sale price." Your friend says, "That's just 60% off the original price!" Why is your friend's math incorrect?

SEL Activity**The Power of the Percentage**

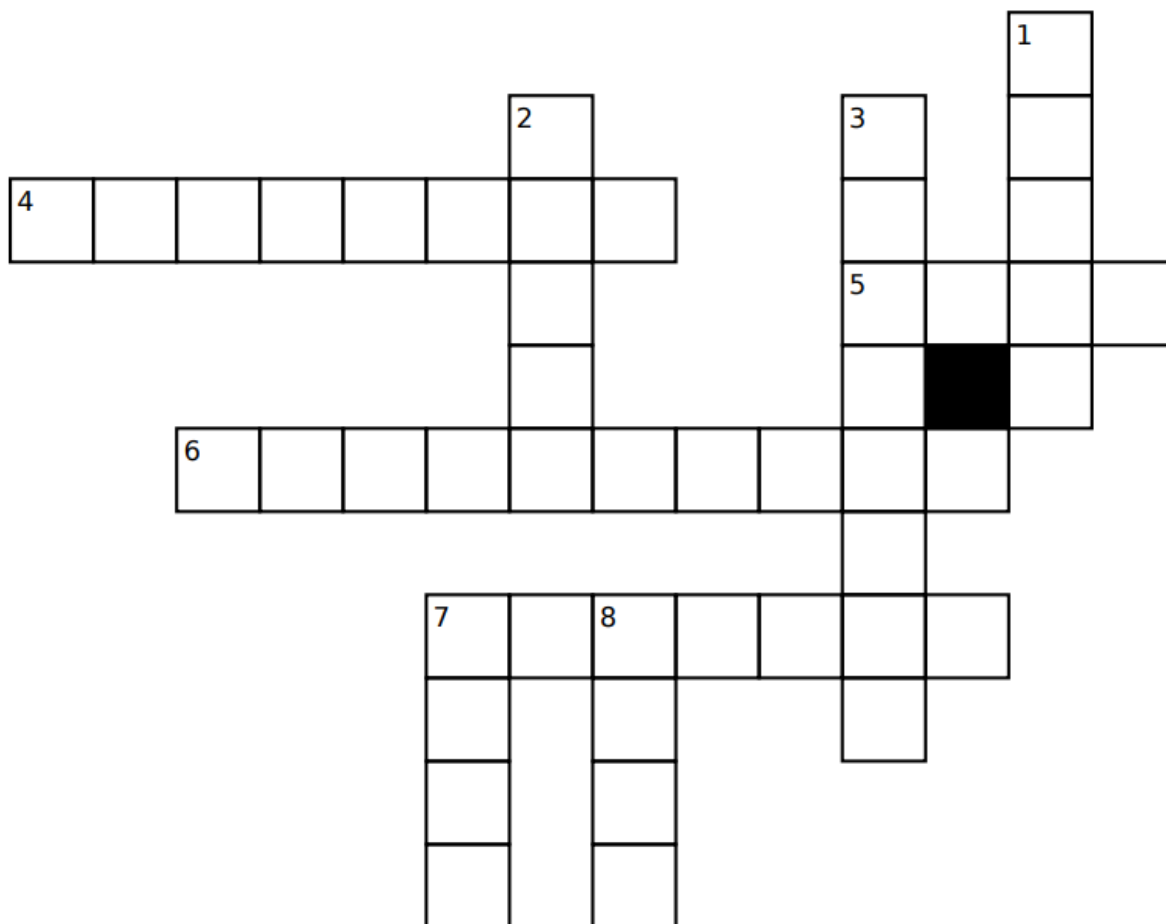
Social Awareness & Responsible Decision-Making

The Concept: Often in life, we hear a percentage (like "20% of people disagreed") but we forget that the percentage represents actual people.

Activity:

1. **The Problem:** In a classroom of 30 students, 40% feel that the playground rules are unfair. How many individual students is that?
2. **The Math:** $0.40 \times 30 = \underline{\hspace{2cm}}$ students.
3. **The SEL Bridge:** When you hear '40%', it might sound like a small number. But when you realize it's **12 people**, it feels different. If 12 of your friends were unhappy, would you stop to listen to them?
4. **Reflective Prompt:** Why is it important to convert percentages into 'real numbers' (parts) when we are thinking about people's feelings?

Percentages



Across	Down
4. An _____ price is the cost of an item before any discounts or taxes are added.	1. The total amount or the "original" number.
5. A _____ price is the final cost of an item after the discount has been subtracted.	2. A comparison of two quantities.
6. An equation stating that two ratios are equal.	3. The amount of money taken off the original price.
7. The rate or the amount per hundred.	8. The portion of the whole.
	9. A ratio that compares two different quantities.



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