EASTERN ONTARIO
CATHOLIC
CURRICULUM CORPORATION

Includes Revised
Math Expectations
& Coding Tasks

M3 - Creating a Collaborative Continuum - Supporting all Learners grades 4, 5 and 6

an EOCCC Resource

Working Together for Catholic Education

www.eoccc.org

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2021 Resource Acknowledgements

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Catholic Graduate Expectations

Catholic educators continually strive to embed Catholic Expectations in their daily practice. Through the use of the continuum of tasks framework, both educators and students have the opportunity to deepen their mathematical learning. This resource provides many opportunities for educators to support and meet the needs of all learners while embracing the dignity of all. The tasks contribute to the building of a supportive community and a focus on excellence for both students and educators. The resource provides multiple opportunities for assessment and allows for ongoing reflection to further guide instructional decisions. Below is a link to a variety of the key Catholic Graduate Expectations reflected in this resource.

A Discerning Believer
CGE1h

An Effective Communicator
CGE2a, CGE2c, CGE2c, CGE2d

A Reflective and Creative Thinker
CGE3b, CGE3c, CGE3d

A Self-directed, Responsible, Lifelong Learner
CGE4a, CGE4b, CGE4c, CGE4e, CGE4f

A Collaborative Contributor
CGE5a, CGE5b, CGE5c, CGE5d, CGE5e, CGE5f, CGE5g

A Responsible Citizen
CGE7b,CGE7j

OCS Graduate Expectations

Why this? Why now?

The original resource was created in 2017 to support the need for improvement in the teaching and learning of mathematics. Due to the recent changes in the Ontario mathematics curriculum, the tasks in the original resource have been updated to reflect all adjustments made to the overall and specific expectations. We have also included tasks that address the new financial literacy and coding expectations.

The parallel tasks included in this resource have been created using the developmental continuum found in the new Ontario mathematics curriculum. The new curriculum also focuses on the development of social/emotional skills and the 7 mathematical processes across all grade levels. The tasks in this resource provide a variety of opportunities for students to develop these important skills through a problem-solving approach.

The goals of this resource are to help teachers become more familiar with the new curriculum, while also supporting a divisional approach to closing the gaps in junior grades.

Outcomes:

- Teachers will gain deeper understanding of the new Ontario Mathematics Curriculum and the continuum of junior curriculum expectations.
- Students will be exposed to a variety of problem-solving tasks, in which they can use the mathematical processes to solve and communicate their thinking.
- By working collaboratively and independently on these tasks, students will continue to build their confidence, resilience and a positive math mindset.
- Parallel tasks provide opportunities for educators to moderate and study student work in order to support students and plan instruction.

Social-Emotional Learning Skills

The development of social-emotional learning (SEL) skills helps students foster overall health and well-being, positive mental health, and the ability to learn, build resilience, and thrive.

(pg. 36, Ontario Mathematics Curriculum, 2021)

Social-emotional learning skills help students develop confidence, cope with challenges and think critically. The goal is to help students increase, expand and/or enlarge their toolkit of skills and abilities, so that they can see themselves as capable and confident math learners.

The tasks in this resource will provide students with many opportunities to develop their social-emotional learning skills and use the math processes in different ways across different areas in the mathematics curriculum.

Students will learn to:

- make connections between different mathematical concepts and in their everyday life.
- recognize mistakes as part of the learning journey.
- use their toolkit of skills and strategies when working through challenging problems.

Social-Emotional Learning Skills & The Mathematical Processes

Social-Emotional Learning Skills

- Identify and manage emotions.
- Recognize sources of stress and cope with challenges.
- Maintain positive motivation and perseverance.
- Build relationships and communication effectively.
- Develop self-awareness and sense of identity.
- Think critically and creatively.

Mathematical Processes

- Problem-Solving
- Reasoning and Proving
- Reflecting
- Connecting
- Communicating
- Representing

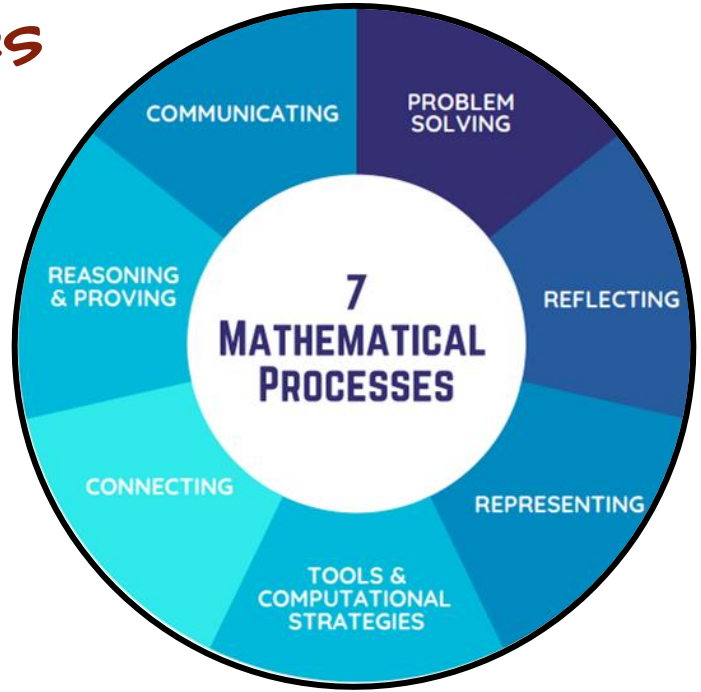
Students build a solid mathematical foundation and a positive mathematical identity and mindset simultaneously.

https://www.dcp.edu.gov.on.ca/en/curriculum/elementary-mathematics/context/the-strands-in-the-mathematics-curriculum

Math Processes

In the revised mathematics curriculum (2020), the Ontario government has identified 7 key **mathematical processes** that support effective learning in mathematics:

- problem-solving
- reasoning and proving
- reflecting
- connecting
- communicating
- representing
- selecting tools and strategies



The mathematical processes *cannot* be separated from the knowledge, concepts, and skills that students acquire throughout each academic year. All students problem-solve, communicate, reason, reflect, and so on, as they develop the knowledge and the understanding of mathematical concepts and make connections between different areas of the curriculum. As teachers, our goal is to provide students with multiple opportunities to develop the skills and abilities necessary to effectively apply these processes.

Cooperative & Independent Learning Opportunities

These tasks provide opportunities for guided lessons, group/partner work and independent practice. As teachers, we know the power of a balanced approach to teaching and learning- *balance and flexibility is key.*

> "*Sharing different solutions not only helped students build their repertoire of strategies but also provided them with the opportunity to connect their solutions to other representations and ways to apply to the mathematics.*"
>
> *Dr. Christine Suurtamm*

Independent practice is also essential in the development of social-emotional skills and effective mathematical processes. Students will have the opportunity to reinforce skills and integrate their newly acquired knowledge by completing a task or series of tasks in this resource on their own, without direct support or guidance. Independent tasks allow teachers to assess students social- emotional awareness, as well as their use of the mathematical processes.

Making Space for Students to Think Mathematically- Research Monograph #59, Research Into Practice, February 2015, Dr. Christine Suurtamm

How to Use This Resource

We encourage teachers to use this resource as a division or whole school focus as it will provide many opportunities for moderation and rich math discussions!

Each slide is designed to be easily accessible and can be used in a number of ways, including on a SmartBoard, projected on a basic white board, or printed off for group or individual use.

The **Table of Contents** is organized in such a way that everyone can access the questions simply by clicking on a problem title (e.g. The Pesky Pentagon) and you will be taken to the "Task Slide" which outlines the curriculum expectations which are addressed by the tasks. You can then scroll down to access the three differentiated parallel tasks.

***Click on the** 

icon at the top right hand corner of the screen for optimum use of links.

The arrow icon takes you to the next page or the previous page in the Table of Contents.

The Home icon takes you back to the top of the Table of Contents.

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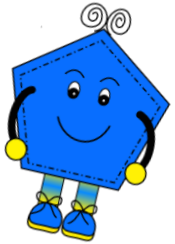
Task 1: The Pesky Pentagon



Overall Expectations

B1 demonstrate an understanding of numbers and make connections to the way numbers are used in everyday life

Grade 6 Specific Expectations

B1.6 describe relationships and show equivalences among fractions and decimal numbers up to thousandths, using appropriate tools and drawings, in various contexts

Grade 5 Specific Expectations

B1.7 describe relationships and show equivalences among fractions, decimal numbers up to hundredths, and whole number percents, using appropriate tools and drawings, in various contexts

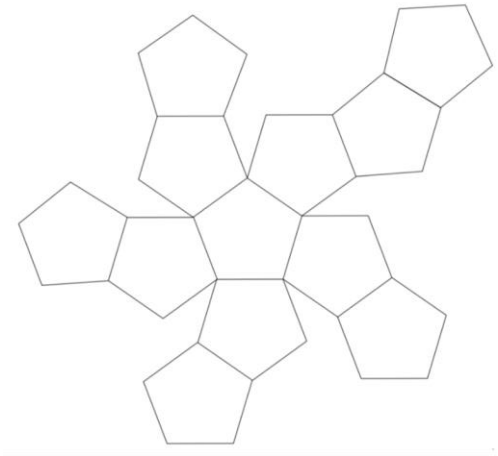
Grade 4 Specific Expectations

B1.9 describe relationships and show equivalences among fractions and decimal tenths, in various contexts

Mathematical Areas: Number
B1 Fractions, Decimals and Percents

Grade 6: Pesky Pentagon

Lucy is making a game. She uses the net of congruent pentagons below to make a 12-sided figure to roll.



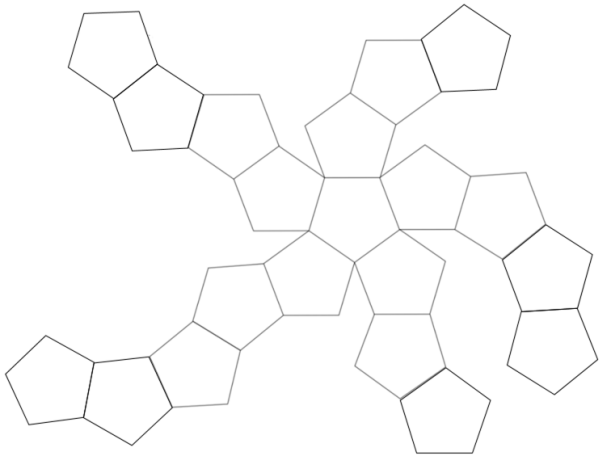
Each pentagon is labelled either A, B, C or D. Write A, B, or C on the pentagons so that:

- the chance of rolling an A is 1/6.
- the chance of rolling a B is 2/12.
- the chance of rolling a C is 3/9.

What is the chance of rolling a D?

Show your work.

Grade 5: Pesky Pentagon



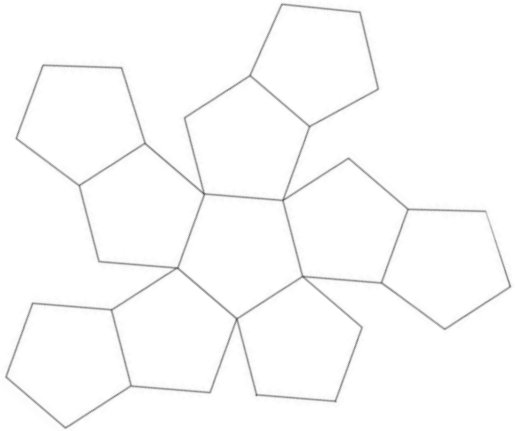
Each pentagon is labelled either A, B, C or D. Write A, B, or C on the pentagons so that:

- the probability of rolling an A is 3/10 .
- the chance of rolling a B is 2/5.
- the chance of rolling a C is 1/20 .

What is the chance of rolling a D?

Show your work.

Grade 4: Pesky Pentagon



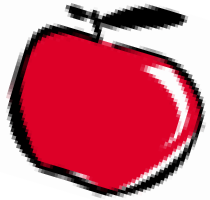
Each pentagon is labelled either A, B, C or D. Write A, B, or C on the pentagons so that:

- The chance of rolling an A is 1/2
- The chance of rolling a B is 2/10
- The chance of rolling a C is 2/10

What is the chance of rolling a D?

Show your work.

Task 2: The Apple Problem



Overall Expectation

B2 use knowledge of numbers and operations to solve mathematical problems encountered in everyday life

Grade 6 Specific Expectations

B2.4 represent and solve problems involving the addition and subtraction of whole numbers and decimal numbers, using estimation and algorithms

B2.11 represent and solve problems involving the division of decimal numbers up to thousandths by whole numbers up to 10, using appropriate tools and strategies

Grade 5 Specific Expectations

B2.4 represent and solve problems involving the addition and subtraction of whole numbers that add up to no more than 100 000, and of decimal numbers up to hundredths, using appropriate tools, strategies, and algorithms

Grade 4 Specific Expectations

B2.5 represent and solve problems involving the multiplication of two- or three-digit whole numbers by one-digit whole numbers and by 10, 100, and 1000, using appropriate tools, including arrays

B2.6 represent and solve problems involving the division of two- or three-digit whole numbers by one-digit whole numbers, expressing any remainder as a fraction when appropriate, using appropriate tools, including arrays

Mathematical Area: Number

B2: Addition and Subtraction, Multiplication and Division

Grade 6: The Apple Problem

A grade 6 class is having a fundraiser.

The class buys 3 bags of apples. Each bag has 8 apples. The total cost of the 3 bags of apples is $12.24.

The class sells the apples for $0.75 each.

How much money will the class gain per apple?

Show your work.

Grade 5: The Apple Problem

Jessica buys an apple for $0.25.

Jaden buys an apple for $0.49.

They each buy 4 apples. How much more will Jaden pay for his 4 apples?

Show your work.

Grade 4: The Apple Problem

A grade 4 class is having a fundraiser.

Each class needs to sell 100 apples.

Abby buys 5 apples and pays with a toonie.

How many more people need to buy 5 apples until they have sold them all?

How much money will the class make?

Show your work.

Task 3: Luck of the Flip!

Overall Expectations

D2 describe the likelihood that events will happen, and use that information to make predictions

C3 solve problems and create computational representations of mathematical situations using coding concepts and skills

Grade 6 Specific Expectations

- D2.2 determine and compare the theoretical and experimental probabilities of two independent events happening.
- C3.2 read and alter existing code, including code that involves conditional statements and other control structures, and describe how changes to the code affect the outcomes and the efficiency of the code

Grade 5 Specific Expectations

- D2.1 use fractions to express the probability of events happening, represent this probability on a probability line, and use it to make predictions and informed decisions
- C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves conditional statements and other control structures

Grade 4 Specific Expectations

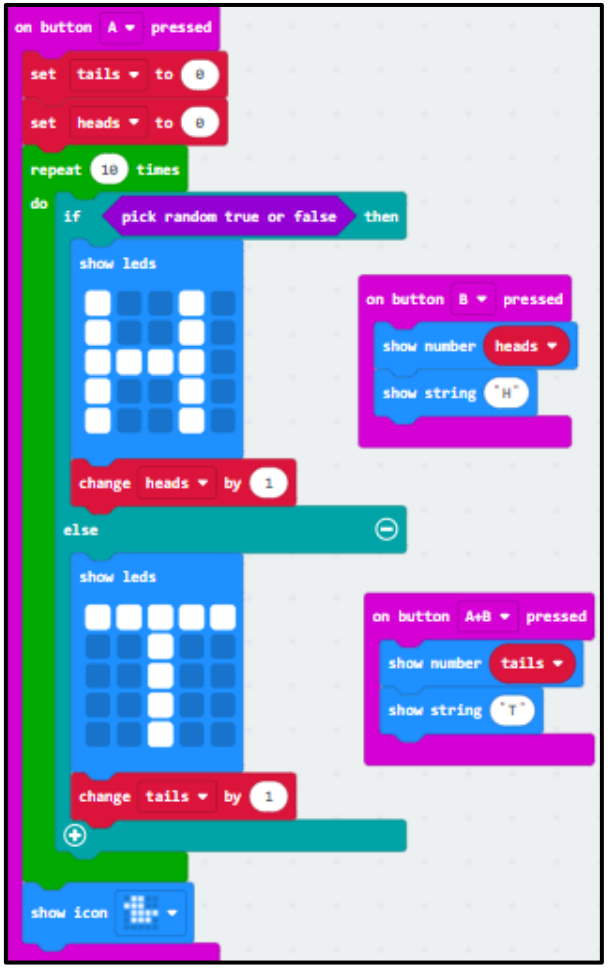
- D2.1 use mathematical language, including the terms “impossible”, “unlikely”, “equally likely”, “likely”, and “certain”, to describe the likelihood of events happening, represent this likelihood on a probability line, and use it to make predictions and informed decisions
- C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves sequential, concurrent, repeating, and nested events

Mathematical Areas: Data

Algebra: Probability and Coding

Grade 6: Luck of the Flip!

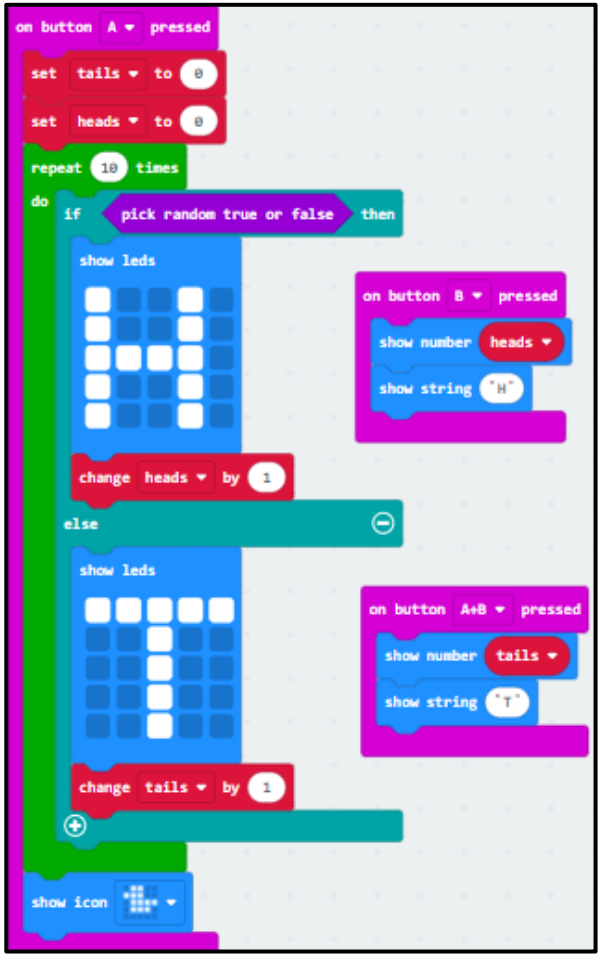
1. What is the **theoretical probability** of getting heads when you flip a coin 1 time? Can you express it as a fraction?
2. What is the **theoretical probability** when you flip a coin 10 times? Can you express it as a fraction?
3. Code a Coin Flip using a Micro:bit
4. Find the **experimental probability** by flipping the coin 10 times.
5. Record the results of your experiment (e.g. 3H, 7T).
6. Conduct the experiment another 8 times and record your results.
7. How many times was your **experimental** close to the **theoretical probability**? Do you have any outliers (eg. 10H, 0T or 2H, 8T)?
8. What is the **theoretical probability** when you flip a coin 100 times? Can you express it as a fraction?
9. Find the **experimental probability** by flipping the coin 100 times.
10. Record your results of your experiment.
11. Conduct the experiment another 8 times and record your results.
12. How many times was your **experimental probability** close to the **theoretical probability**? (Did you have any outliers this time?)
13. What is the **theoretical probability** if you flipped the coin 1000 times? Can you express it as a fraction?
14. Try flipping the coin 1000 times (it takes about 7 minutes).
15. Record your result. Is your result close to the theoretical probability?
16. Congratulations, you just proved the Law of Large Numbers!



Link to an enlarged image of code.

Grade 5: Luck of the Flip!

1. Code a Coin Flip using a Micro:bit
2. Predict how many heads/tails you will get in 10 flips. Can you express it as a fraction?
3. Conduct an experiment by flipping the coin 10 times.
4. Record the results as a fraction (eg. H7/10, T3/10).
5. Conduct the experiment 8 more times.
6. Record the results of your 8 experiments as fractions.
7. Do you have any outliers (e.g. H1/10, T9/10)?
8. Predict how many heads/tails you will get in 100 flips. Express it as a fraction.
9. Conduct an experiment by flipping the coin 100 times.
10. Record the results as fractions.
11. Conduct the experiment 8 more times and record your results.
12. What do you notice? What do you wonder?
13. Do you have any outliers this time?
14. What do you predict would happen if you flipped the coin 1000 times?
15. If you have time, flip the coin 1000 times (it takes about 7 minutes).



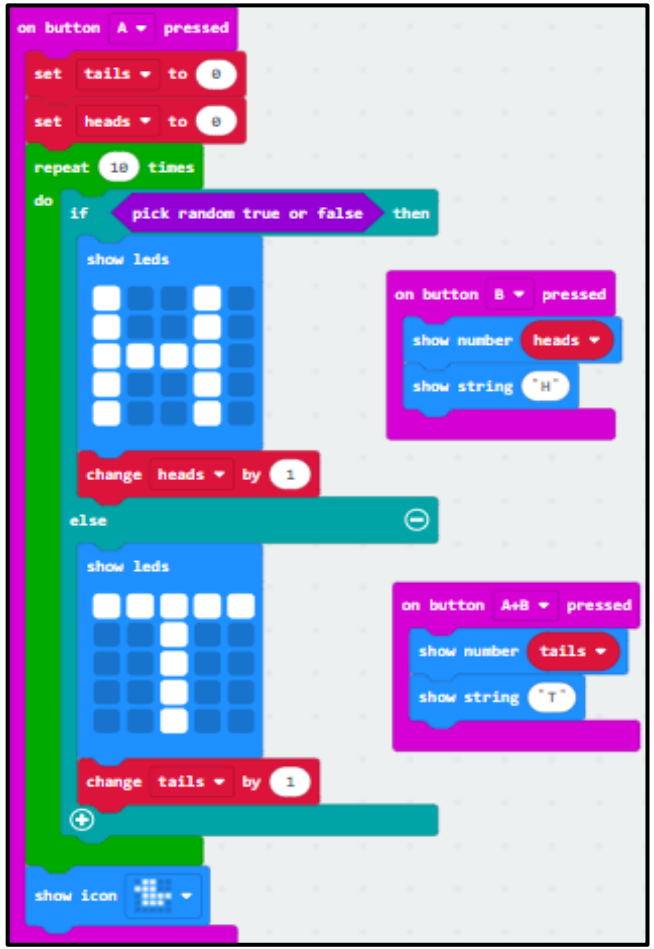
Link to an enlarged image of code.

Grade 4: Luck of the Flip!

1. Code a Coin Flip using a [Micro:bit]
2. Predict how many heads, and how many tails, you'll get in 10 flips.
3. Mark your prediction on the **Probability Line** below with a dot.
4. What combination of heads/tails would you put at **unlikely** on the probability line?
5. What combination of heads/tails would you put at **impossible**?
6. Can you put a prediction at certain? Why or whynot?
7. Flip the coin 10 times.
8. Log your results (e.g. 7H 3T)
9. Do 8 more experiments of 10 flips and log your results.
10. Next, predict how many heads and tails you will get when you flip a coin 100 times.
11. Flip the coin 100 times (it takes about 1 min.).
12. Log your results. (eg. 45H 55T)
13. Do 8 experiments of 100 flips and log your results.
14. What do you notice? What do you wonder?
15. Are your results different from flipping a coin 10 times?

Probability Line

Impossible | Unlikely | Equally Likely | Likely | Certain



[Link to an enlarged image of code.]

Task 4: Sports Report

Overall Expectation

D1. manage, analyse, and use data to make convincing arguments and informed decisions, in various contexts drawn from real life

Grade 6 Specific Expectations

D1.3 select from among a variety of graphs, including histograms and broken-line graphs, the type of graph best suited to represent various sets of data; display the data in the graphs with proper sources, titles, and labels, and appropriate scales; and justify their choice of graphs

B2.3 use mental math strategies to calculate percents of whole numbers, including 1%, 5%, 10%, 15%, 25%, and 50%, and explain the strategies used

Grade 5 Specific Expectations

D1.3 select from among a variety of graphs, including stacked bar graphs, the type of graph best suited to represent various sets of data; display the data in the graphs with proper sources, titles, and labels, and appropriate scales; and justify their choice of graphs

Grade 4 Specific Expectations

D1.3 select from among a variety of graphs, including multiple bar graphs, the type of graph best suited to represent various sets of data; display the data in the graphs with proper sources, titles, and labels, and appropriate scales; and justify their choice of graphs

Mathematical Areas: Data & Number

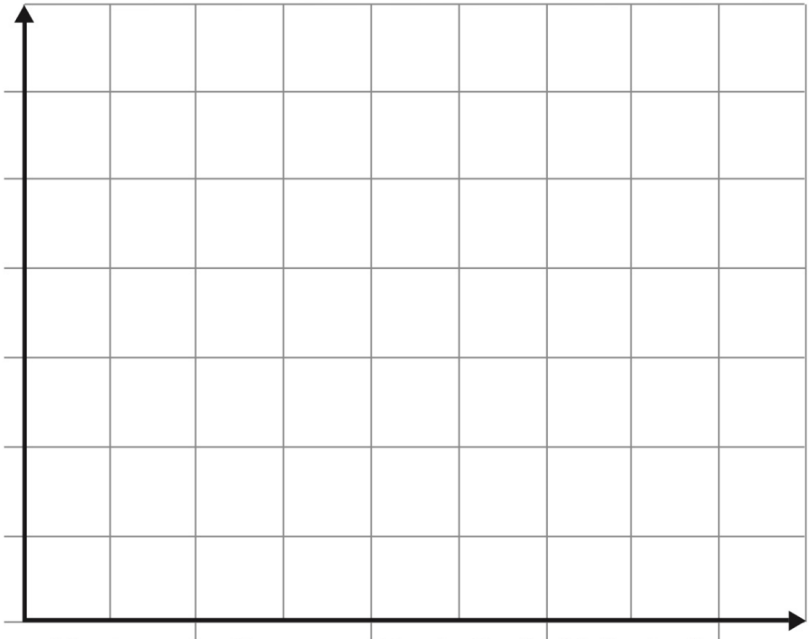
DI- Data Visualization

Grade 6: Sports Report

40 Grade 6 students participated in a survey about their favourite sports. The results are shown in the table below.

Sport	Percentage of Students	Number of Students
Hockey	50	
Soccer	25	
Basketball	15	
Volleyball	10	

Complete the table. Choose a type of graph to display the results by number of students.

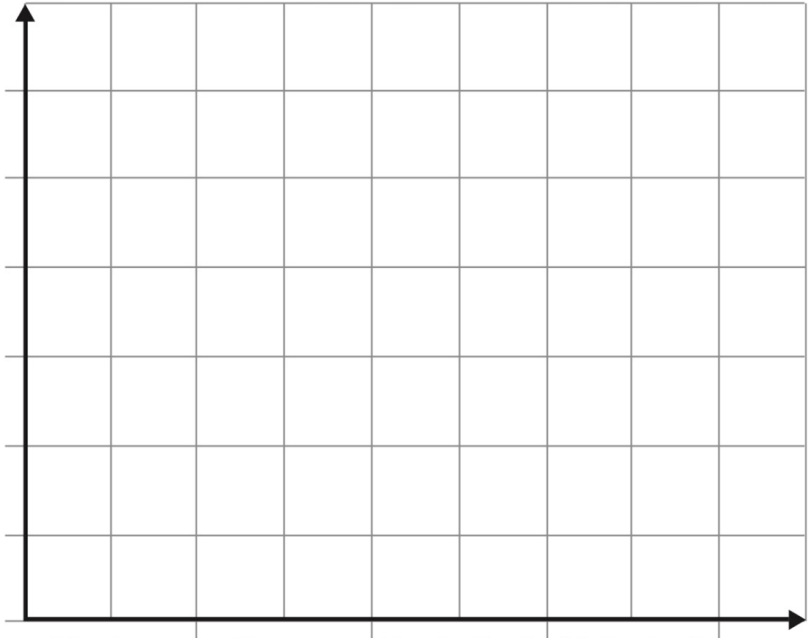


Grade 5: Sports Report

Some Grade 4, 5, and 6 students participate in a survey about their favourite sports. The results are shown in the table below.

Sport	Gr. 4 Students	Gr. 5 Students	Gr. 6 Students
Hockey	10	10	10
Soccer	10	10	4
Basketball	10	5	5
Volleyball	5	5	6

Choose an appropriate graph to display the data from the table.

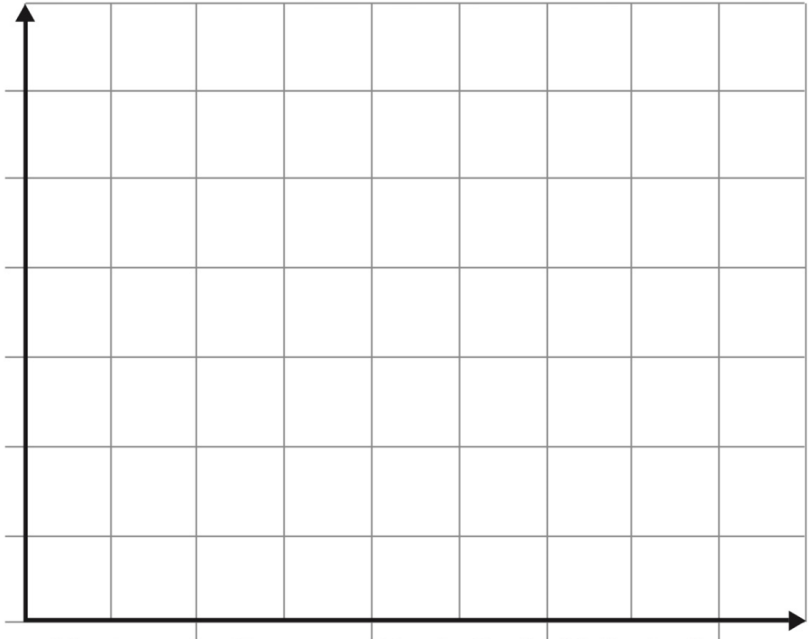


Grade 4: Sports Report

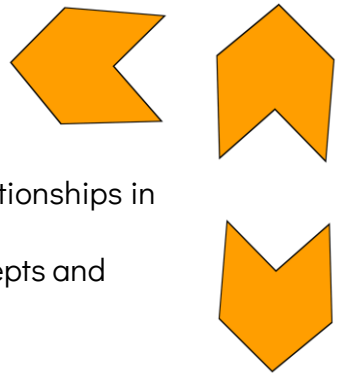
Some Grade 4, and 5 students participate in a survey about their favourite sports. The results are shown in the table below.

Sport	Gr. 4 Students	Gr. 5 Students
Hockey	10	14
Soccer	8	12
Basketball	7	5
Volleyball	3	6

Choose an appropriate graph to display the data from the table.



Task 5: Tricky Transformations



Overall Expectations

E1 describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them

C3 solve problems and create computational representations of mathematical situations using coding concepts and skills

Grade 6 Specific Expectations

E1.4 describe and perform combinations of translations, reflections, and rotations up to 360° on a grid, and predict the results of these transformations

C3.2 read and alter existing code, including code that involves conditional statements and other control structures, and describe how changes to the code affect the outcomes and the efficiency of the code

Grade 5 Specific Expectations

E1.5 describe and perform translations, reflections, and rotations up to 180° on a grid, and predict the results of these transformations

C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves conditional statements and other control structures

Grade 4 Specific Expectations

E1.3 describe and perform translations and reflections on a grid, and predict the results of these transformations

C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves sequential, concurrent, repeating, and nested events

Mathematical Areas: Geometry & Algebra (Coding)

Grade 6: Tricky Transformations

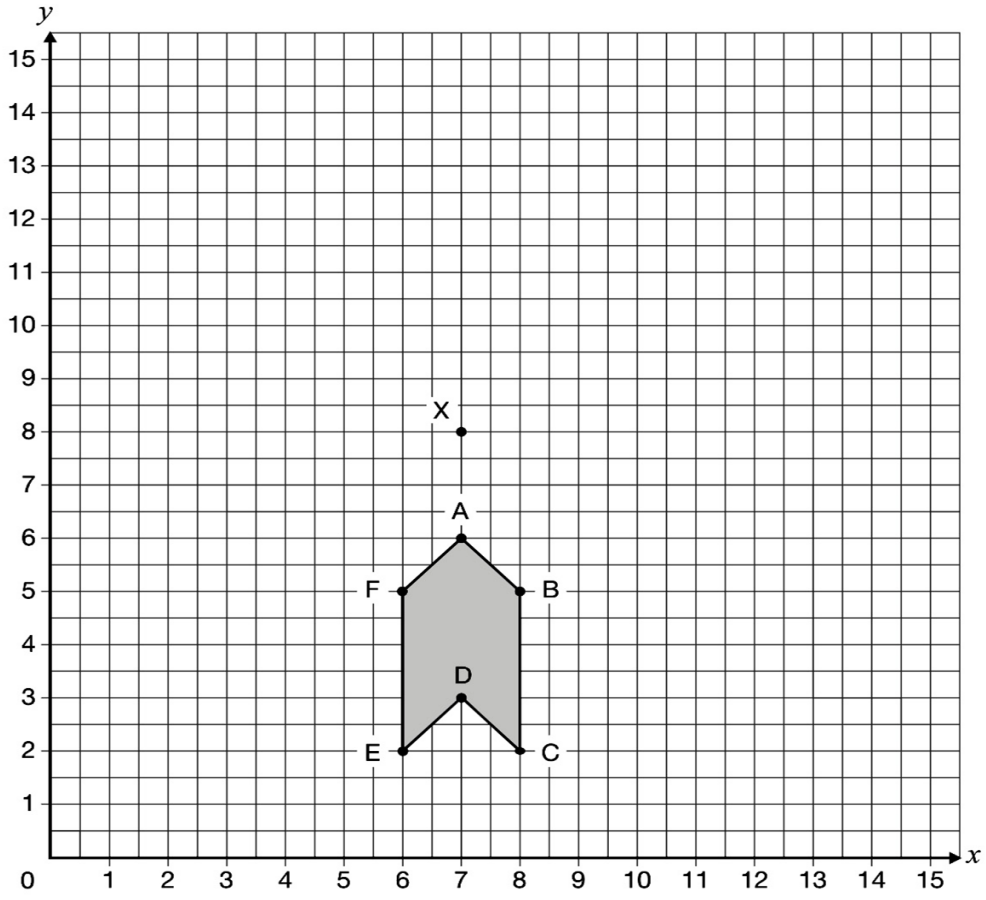
1. Rotate this hexagon **90º counterclockwise** about Point X and draw this image of the hexagon.

1. Record the coordinates of the **image point C** below.

   Image of Point C: (____ , ____)

1. If you were going to tell someone else, or a robot, how to rotate this hexagon 90º counterclockwise about Point X what instructions would you give? **Write your instructions below.**

My instructions: Write your instructions on another piece of paper. Here is an example.



Grade 5: Tricky Transformations

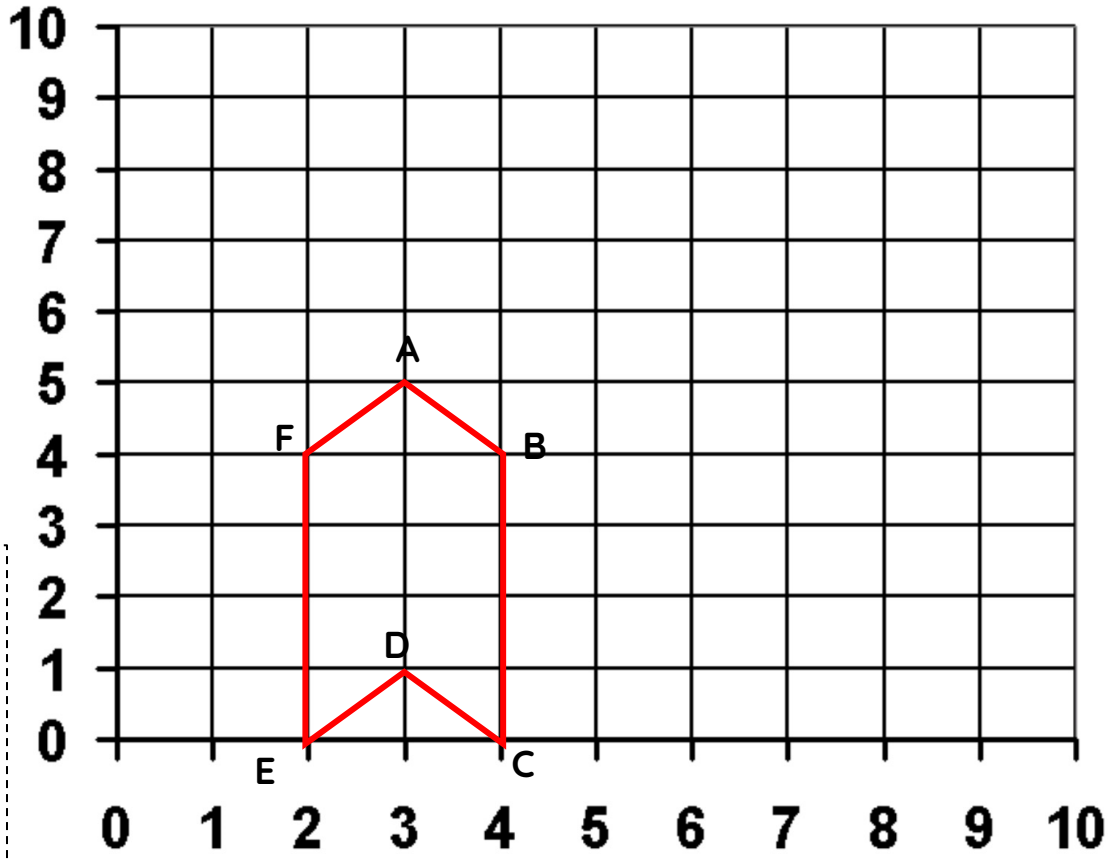
1. Translate this hexagon **4 units right and 5 units up.** Draw this image of the hexagon.

1. Record the coordinates of the image of **Point C** below.

   Image of Point C: (____ , ____)

1. If you were going to tell someone else how to translate this hexagon, what instructions would you give? **Write your instructions as a code below.**

My instructions::



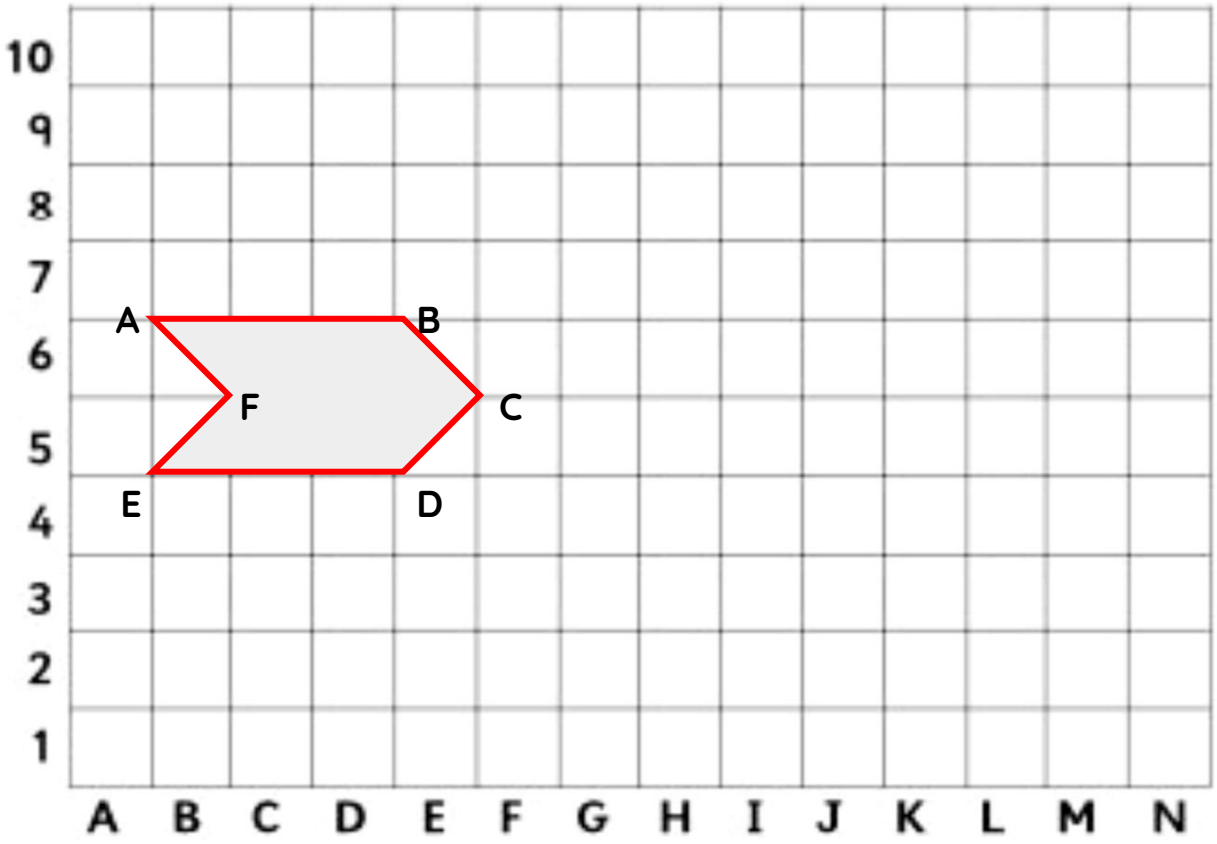
Grade 4: Tricky Transformations

1. Use a ruler to draw a mirror line.

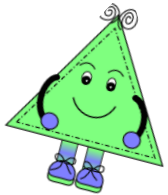
2. Reflect the hexagon across the mirror line and draw the image of the hexagon.

1. If you were going to tell someone else how to draw a reflection of this hexagon, what instructions would you give?

1. Can you write your instructions in a code?



Task 6: Describing Transformations



Overall Expectations

E1. describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them

Grade 6 Specific Expectations

E1.4 describe and perform *combinations of translations, reflections,* and *rotations up to 360°* on a grid, and predict the results of these transformations

Grade 5 Specific Expectations

E1.5 describe and perform *translations, reflections,* and *rotations up to 180°* on a grid, and predict the results of these transformations

Grade 4 Specific Expectations

E1.3 describe and perform *translations* and *reflections* on a grid, and predict the results of these transformations

Mathematical Area: Spatial Sense

E1. Location and Movement

Grade 6: Describing Transformations

Transform object ABC three times, using the directions below. Identify the coordinates of B' in the final image.

Directions:

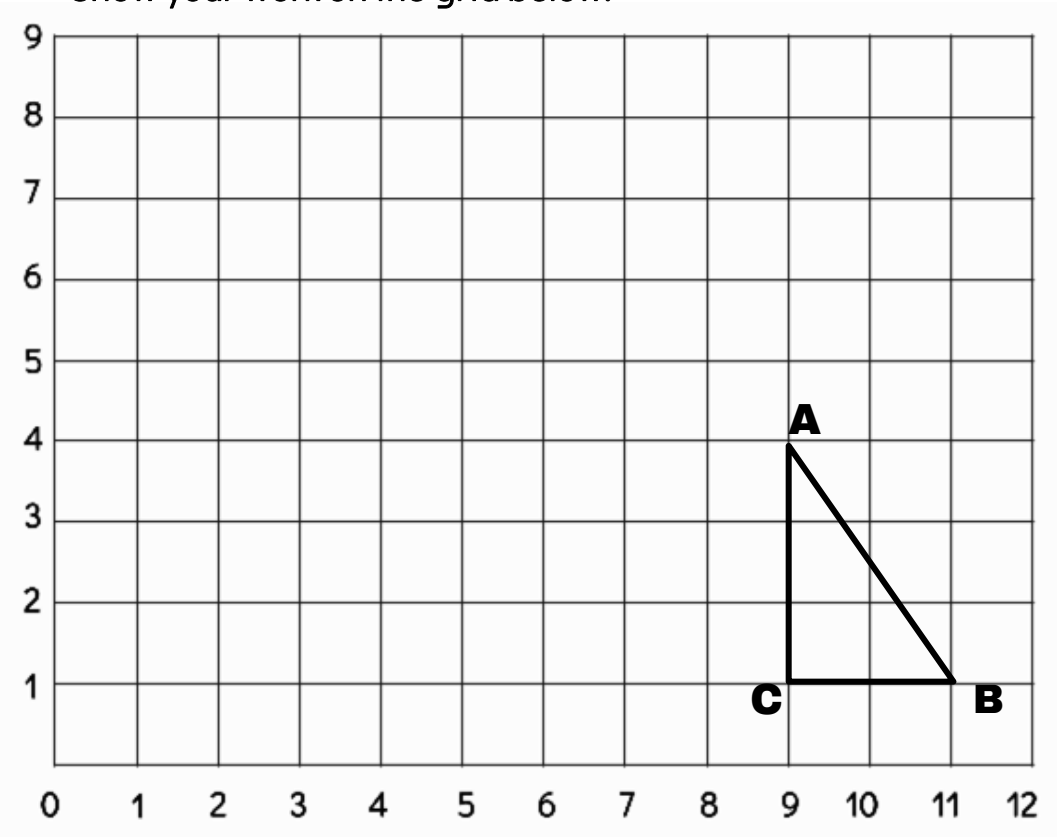
1. First, translate object ABC, 7 left and 2 up.

2. Next, rotate image ABC 180 degrees clockwise about A'.

3. Finally, translate image ABC, 5 right and 1 up.

The coordinates of B' are (_____ , _____) .

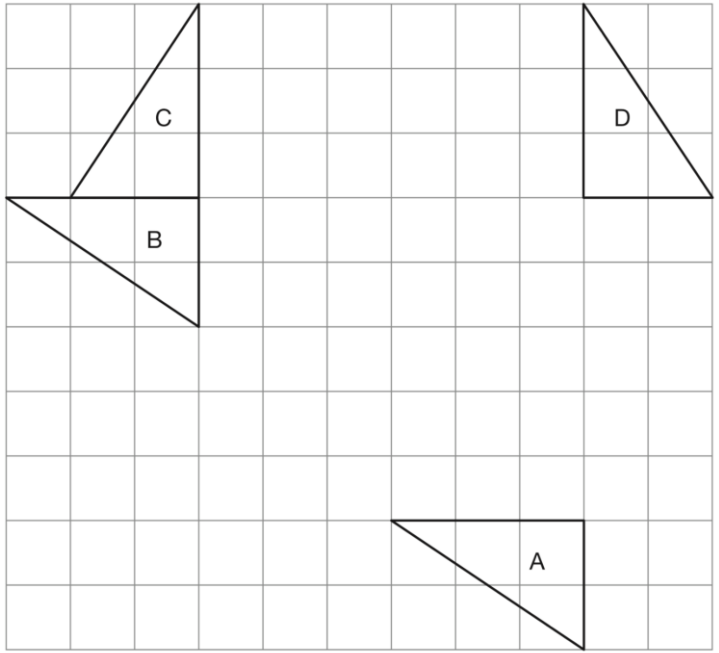
Show your work on the grid below.



Grade 5: Describing Transformations

The grid shows a triangle that has been moved using transformations from position A to B, then from position B to position C and finally from position C to position D.

Complete the chart with descriptions of the transformations needed to move the triangle. Be sure to include all units and directions in the chart. ***Be sure to show any points of rotation with arrows and all lines of reflection on the grid.***

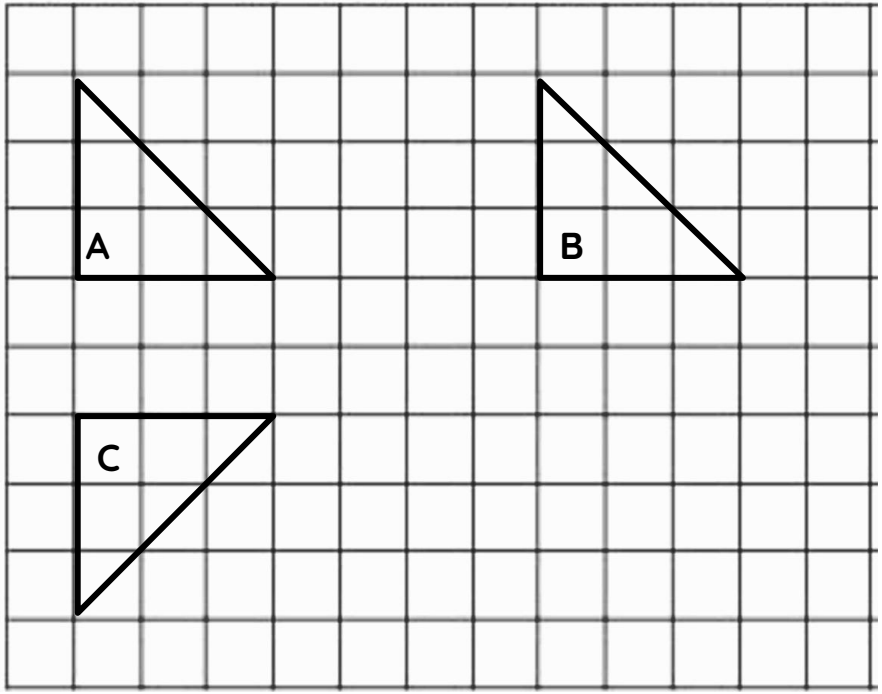


Transformation	Type of Transformation	Description of Transformation
A to B		
B to C		
C to D		

Grade 4: Describing Transformations

The grid shows a triangle that has been transformed.

Colour the two triangles that show a reflection.



How do you know?

Task 7: Pattern Detectives

Overall Expectation

C1 identify, describe, create, and make predictions about a variety of patterns, including those found in real-life contexts

Grade 6 Specific Expectations

C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating, growing, and shrinking patterns, and use algebraic representations of the pattern rules to solve for unknown values in linear growing patterns

Grade 5 Specific Expectations

C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating, growing, and shrinking patterns

Grade 4 Specific Expectations

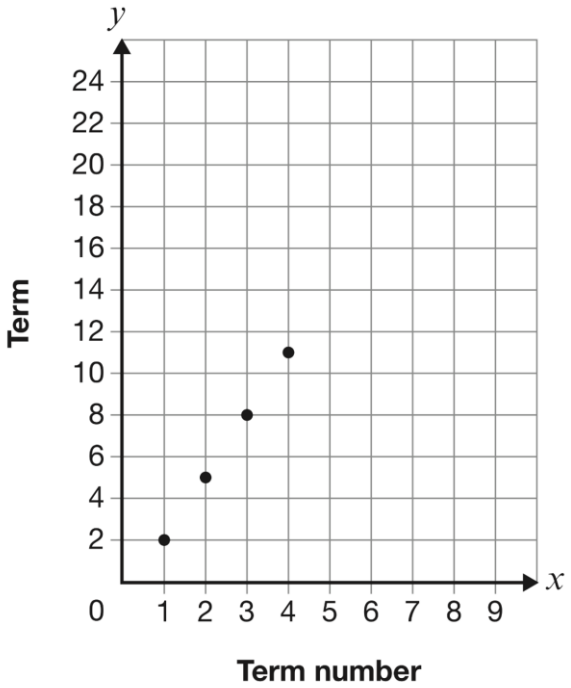
C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating, and growing patterns

Mathematical Area: Algebra
C1: Patterns

Grade 6: Pattern Detectives

If both patterns continue in the same way, which pattern will reach a term with a value of 23 first?

Pattern A



Pattern B

Start with 7 and add 2 to get to the next term.

Explain your thinking.

Grade 5: Pattern Detectives

If both patterns continue in the same way, which pattern will reach a term with a value of 23 first?

Pattern A

Term Number	Term
1	2
2	5
3	8
4	11
5	
6	

Pattern B

Start with 7 and add 2 to get to the next term.

Explain your thinking.

Grade 4: Pattern Detectives

If both patterns continue in the same way, which pattern will reach a term with a value of 23 first? Justify your answer.

Pattern A

Term Number	Term
1	2
2	5
3	8
4	11
5	
6	

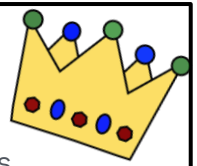
Pattern B

Start with 7 and add 2 to get to the next term.

Term Number	Term

Explain your thinking.

Task 8: Patterns Rule!



Overall Expectations

C1 identify, describe, extend, create, and make predictions about a variety of patterns, including those found in real-life contexts
C3 solve problems and create computational representations of mathematical situations using coding concepts and skills

Grade 6 Specific Expectations

C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating, growing, and shrinking patterns, and use algebraic representations of the pattern rules to solve for unknown values in linear growing patterns
C3.2 read and alter existing code, including code that involves conditional statements and other control structures, and describe how changes to the code affect the outcomes and the efficiency of the code

Grade 5 Specific Expectations

C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves conditional statements and other control structures
C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves conditional statements and other control structures

Grade 4 Specific Expectations

C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating and growing patterns
C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves sequential, concurrent, repeating, and nested events

Mathematical Areas Patterning & Algebra (Coding)

Grade 6: Patterns Rule

Karen and Riley create the shrinking patterns below.

Karen's Pattern

Term number	Term
1	1024
2	512
3	256

Riley's Pattern

Term number	Term
1	111
2	99
3	87

1. What are their pattern rules?

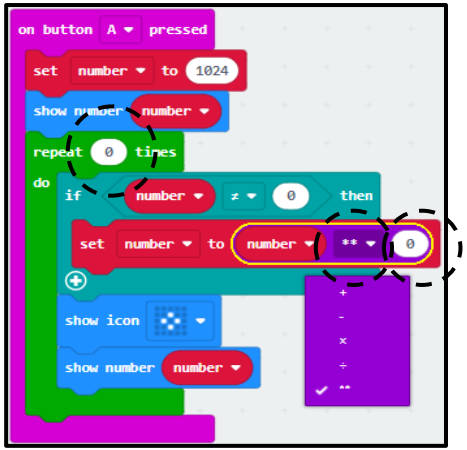
   Karen's Rule: _____

   Riley's Pattern _____

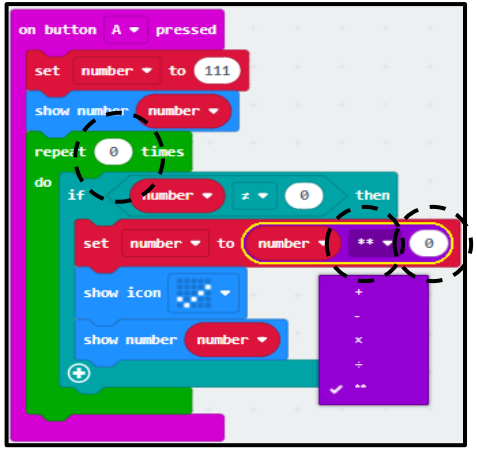
1. Which pattern will be the first to reach a term smaller than 10?_____

1. Click on "Karen's Pattern" and "Riley's Pattern" to open the models on the right in order to create a coding pattern on a micro:bit. Put the operation (addition, subtraction, multiplication, division), in purple, and the number at the end. After you test it, you can put the number of repeats into the loop.

Karen's Pattern



Riley's



Grade 5: Patterns Rule

Karen and Riley create the shrinking patterns below.

Karen's Pattern

Term Number	Term
1	114
2	105
3	96

Riley's Pattern

Term Number	Term
1	111
2	99
3	87

1. What are their pattern rules?

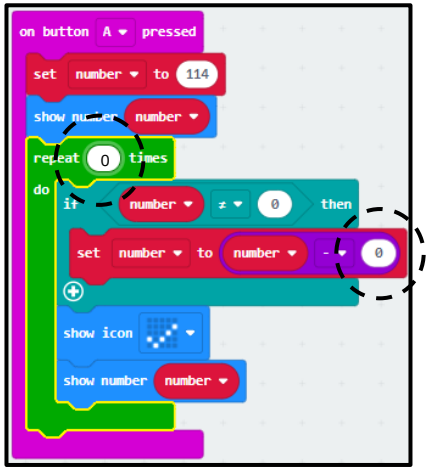
   Karen's Rule: _____

   Riley's Pattern _____

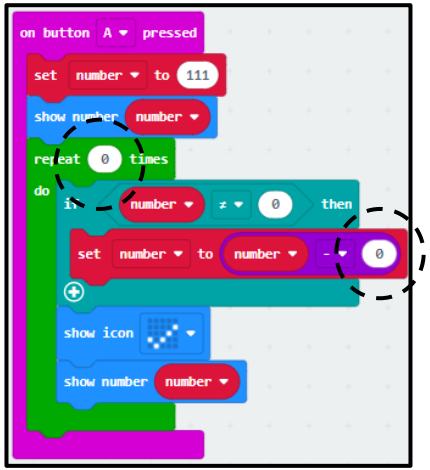
1. Which pattern will be the first to reach 51? _____

1. Click on "Karen's Pattern" and "Riley's Pattern" to open the models on the right and create a coding pattern on a micro:bit. Put the amount you are subtracting by in the purple area and the number of repeats you need in the green area.

Karen's Pattern



Riley's Pattern



Grade 4: Patterns Rule

Complete each table of values below.

Karen's Pattern

Term Number	Term
1	48
2	39
3	30
4	
5	

Riley's Pattern

Term Number	Term
1	36
2	31
3	26
4	
5	

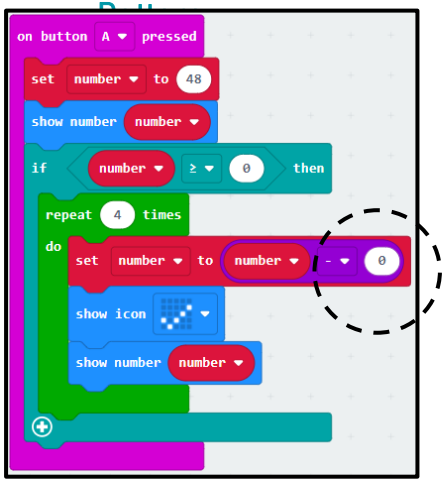
1. What are their pattern rules?

   Karen's Rule: _____

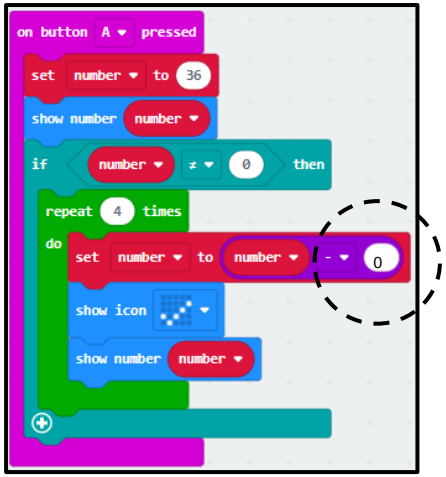
   Riley's Rule: _____

1. Click on "Karen's Pattern" and "Riley's Pattern" to open the models on the right and create a coding pattern on a micro:bit. Put the amount you are subtracting by in the purple area.

Karen's



Riley's Pattern



Task 9: Popcorn Power

Overall Expectations

E2 compare, estimate, and determine measurements in various contexts

Grade 6 Specific Expectations

E2.6 determine the surface areas of prisms and pyramids by calculating the areas of their two dimensional faces and adding them together

Grade 5 Specific Expectations

E2.6 show that two dimensional shapes with the same area can have different perimeters, and solve related problems

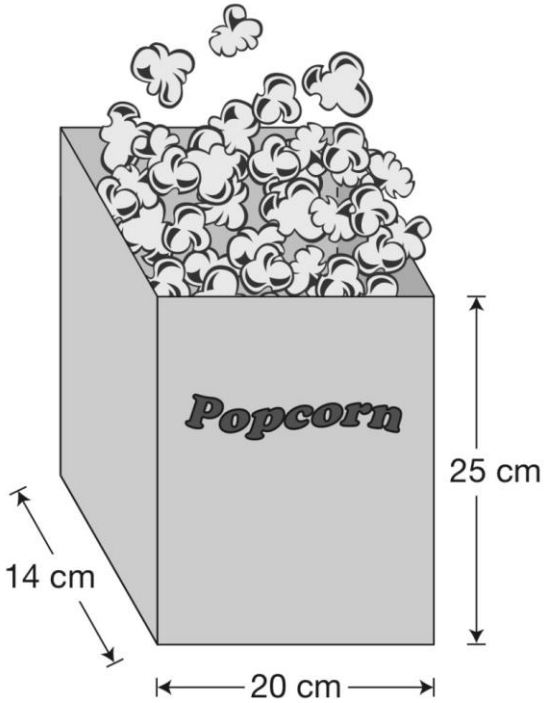
Grade 4 Specific Expectations

E2.6 apply the formula for the area of a rectangle to find the unknown measurement when given two of the three

Mathematical Areas: Number & Spatial Sense
B2. Multiplication & Division
E2. Area & Surface Area

Grade 6: Popcorn Power

The container of popcorn pictured below is in the shape of a rectangular prism.

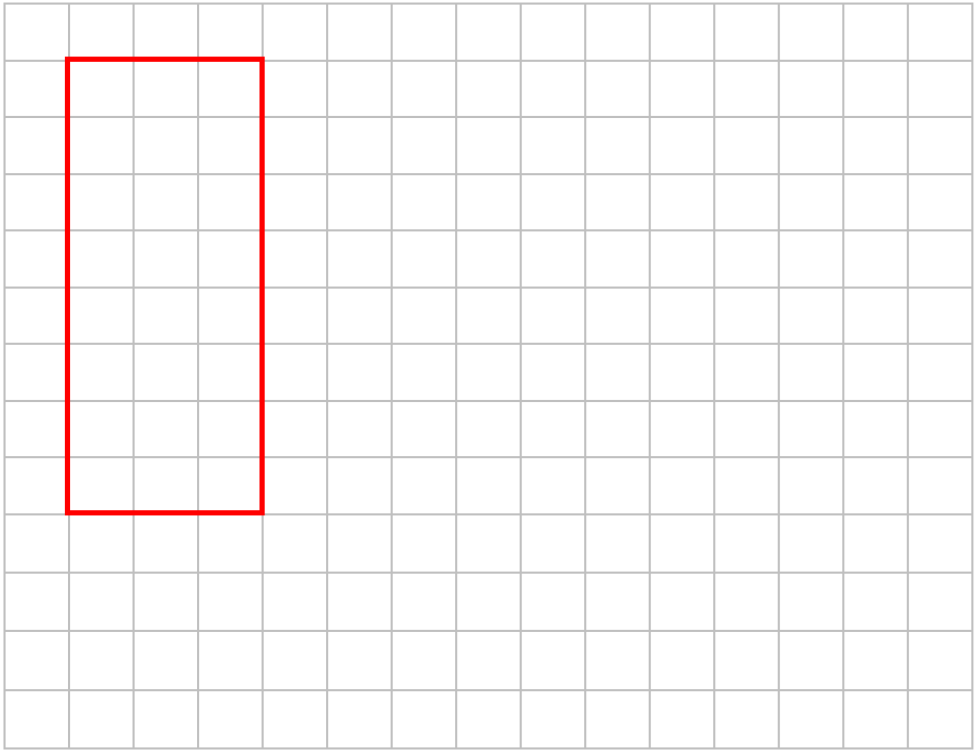


What is the smallest amount of paper needed to make this container?

Show your thinking.

Grade 5: Popcorn Power

The rectangle below has the area of 24 units ^{2}.
Create other rectangles with the same area, but a different perimeter. (Use addition grid paper if necessary.)



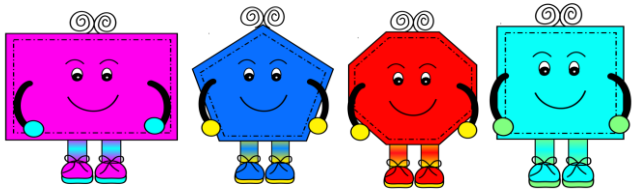
Prove your thinking here.

Grade 4: Popcorn Power

The front of a popcorn bag is shown below. It has an area of 300 cm^2 and a width of 20 cm. What could its length be?

Show your work.

Task 10: Shape Shifters



Overall Expectation

E1 describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them

Grade 6 Specific Expectation

E1.1 create lists of geometric properties of various types of quadrilaterals, including the properties of the diagonals, rotational symmetry, and line symmetry

Grade 5 Specific Expectation

E1.1 identify geometric properties of triangles, and construct different types of triangles when given side or angle measurements

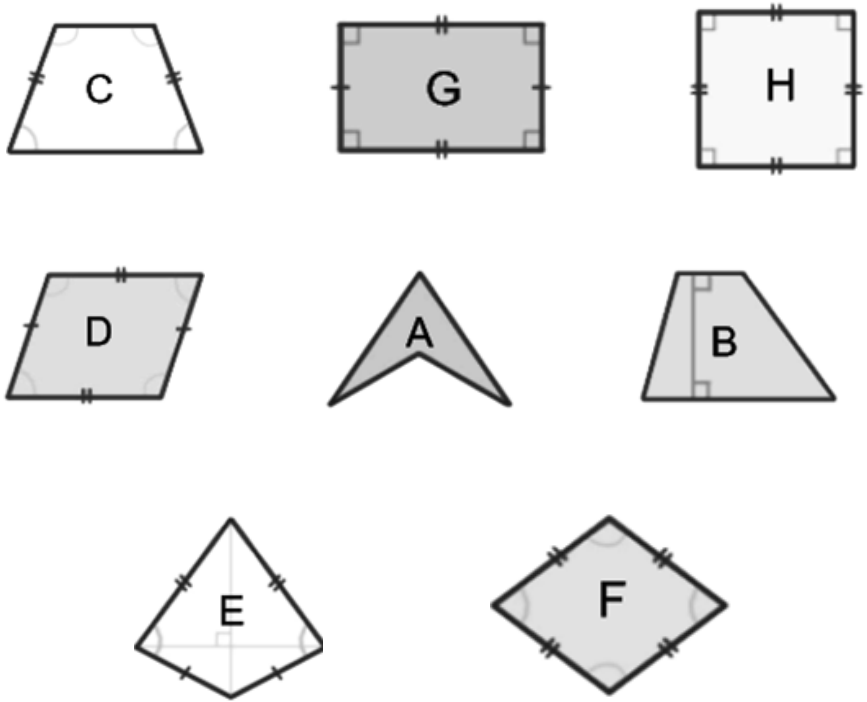
Grade 4 Specific Expectation

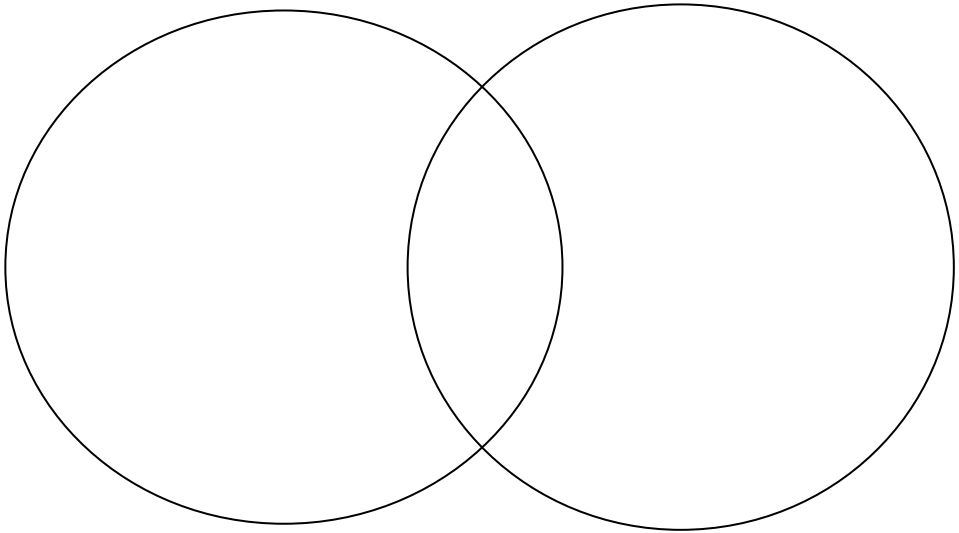
E1.1 identify geometric properties of rectangles, including the number of right angles, parallel and perpendicular sides, and lines of symmetry

Mathematical Area: Spatial Sense
E1. Geometric Reasoning

Grade 6: Shape Shifters

Write the letter of each of these polygons in the appropriate section of the Venn diagram.



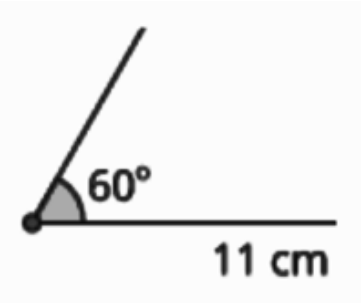


At least 2 lines of symmetry

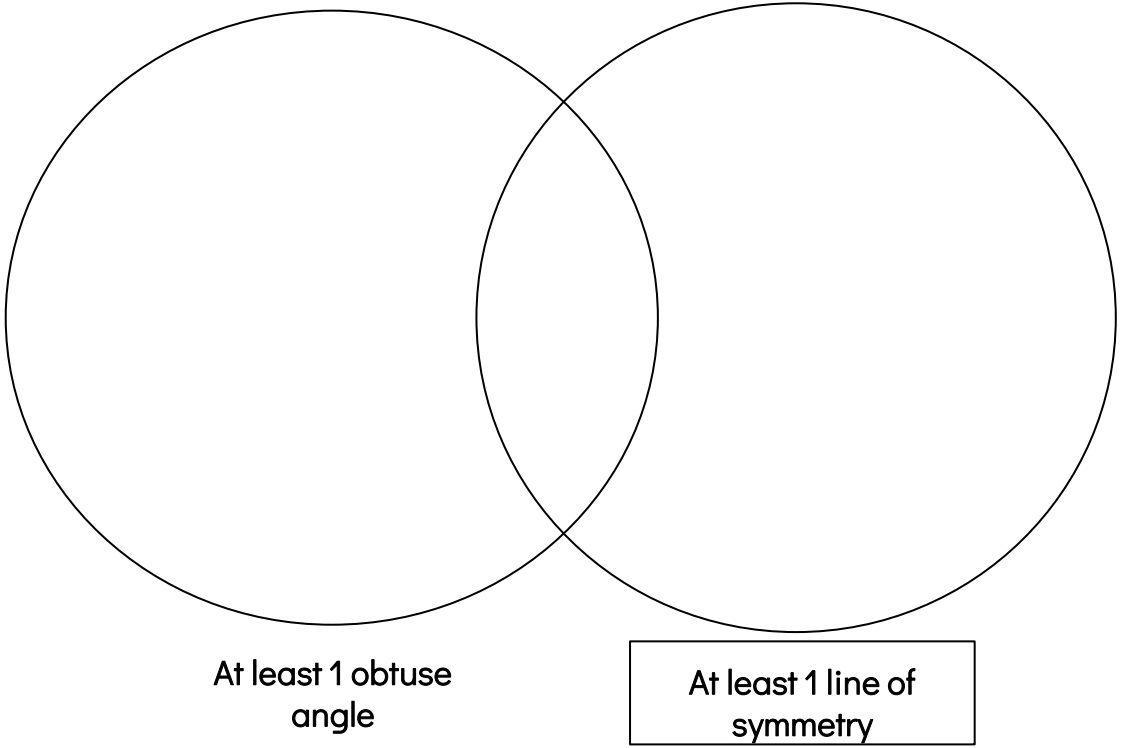
Order of rotational symmetry of at least 2

Grade 5: Shape Shifters

1. Create a triangle given the following side length and angle measurement.

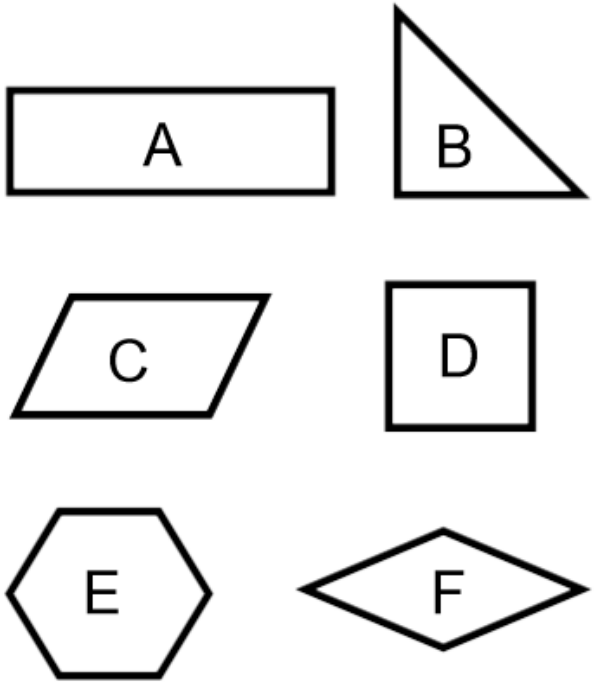


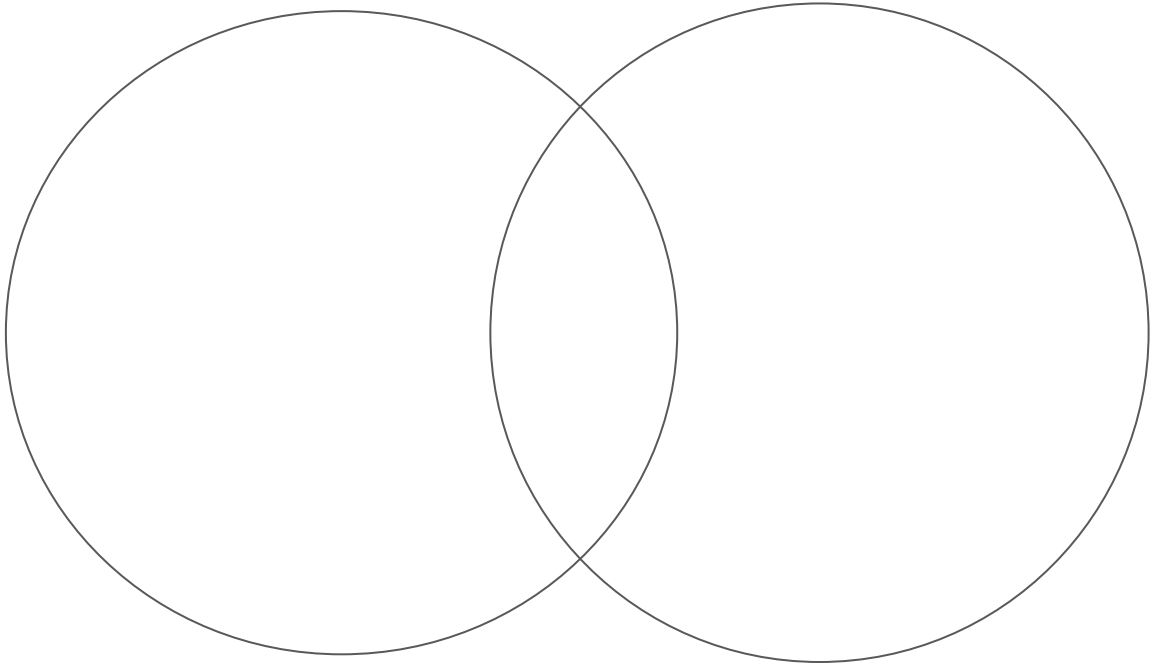
2. Where would the triangle you drew in question 1 be placed in the Venn diagram below?



Grade 4: Shape Shifters

Sort the following polygons. Write the letter of each of these polygons in the appropriate section of the Venn diagram.





Task 11: A Fair Price

Overall Expectation

B2 use knowledge of numbers and operations to solve mathematical problems encountered in everyday life

Grade 6 Specific Expectations

B2.7 represent and solve problems involving the multiplication of three-digit whole numbers by decimal tenths, using algorithms

Grade 5 Specific Expectations

B2.7 represent and solve problems involving the multiplication of two-digit whole numbers by two-digit whole numbers using the area model and using algorithms, and making connections between the two methods

Grade 4 Specific Expectations

B2.7 represent and solve problems involving the multiplication of two- or three-digit whole numbers by one-digit whole numbers and by 10, 100, and 1000, using appropriate tools, including arrays

Grade 6: A Fair Price

Alex is selling homemade friendship bracelets at the town fair for $0.70 each. Every 5 min. she sells 12 bracelets. How much money will she make in an hour?

_____

Show your thinking.

Grade 5: A Fair Price

Alex is selling homemade cookies at the town fair in packages of 10 for $12. At the end of the first day, she has sold 23 packages. She is at the fair for 3 days and sells the same amount each day.

How much money did she make?

_____

Show your thinking.

Grade 4: A Fair Price

Alex is selling homemade cookies at the town fair in packages of 10 for $7. At the end of the first day, she has sold 23 packages.

How much money did she make?

_____

How many cookies in total did she sell at the fair?

_____

Show your thinking.

Task 12: Snow Day

Overall Expectations

B2. use knowledge of numbers and operations to solve mathematical problems encountered in everyday life

Grade 6 Specific Expectations

B2.4 represent and solve problems involving the addition and subtraction of whole numbers and decimal numbers, using estimation and algorithms

Grade 5 Specific Expectations

B2.4 represent and solve problems involving the addition and subtraction of whole numbers that add up to no more than 100 000, and of decimal numbers up to hundredths, using appropriate tools, strategies, and algorithms

Grade 4 Specific Expectations

B2.4 represent and solve problems involving the addition and subtraction of whole numbers that add up to no more than 10 000 and of decimal tenths, using appropriate tools and strategies, including algorithms

Mathematical Area: Number
B2.4 Addition & Subtraction

Grade 6: Snow Day

The table below shows the changes in the amount of snow on the ground over 10 days.

Ali estimates that the total change is an increase of **30 cm.

Nadia estimates that the total change is an increase of **25 cm.

Which student makes a more accurate estimate?

- ❑ Ali
- ❑ Nadia

Day	Change
1	15 cm new snow
2	7.5 cm new snow
3	no change
4	4.5 cm melted
5	3.5 cm melted
6	4 cm melted
7	no change
8	12 cm new snow
9	2.5 cm new snow
10	8 cm new snow

Justify your thinking.

Grade 5: Snow Day

The table below shows the changes in the amount of snow on the ground over 10 days.

Ali estimates that the total change is an increase of **35 cm.

Nadia estimates that the total change is an increase of **29 cm.

Which student gives the most accurate estimate?

- ❑ Ali
- ❑ Nadia

Day	Change
1	15 cm new snow
2	7.5 cm new snow
3	no change
4	4.5 cm melted
5	3.5 cm melted
6	4 cm melted
7	no change
8	12 cm new snow
9	2.5 cm new snow
10	8 cm new snow

Justify your thinking.

Grade 4: Snow Day

The table below shows the changes in the amount of snow on the ground over 10 days.

Ali estimates that the total change is an increase of **30 cm.

Nadia estimates that the total change is an increase of **35 cm.

Which student makes a more accurate estimate?

- ❑ Ali
- ❑ Nadia

Day	Change
1	15 cm new snow
2	7 cm new snow
3	no change
4	5 cm melted
5	4 cm melted
6	4 cm melted
7	no change
8	12 cm new snow
9	2 cm new snow
10	8 cm new snow

Justify your thinking.

Task 13: Patterns Around Us

Overall Expectations

C1. identify, describe, extend, create, and make predictions about a variety of patterns, including those found in real-life contexts

Grade 6 Specific Expectations

C1.1 identify and describe repeating, growing, and shrinking patterns, including patterns found in real-life contexts, and specify which growing patterns are linear

Grade 5 Specific Expectations

C1.1 identify and describe repeating, growing, and shrinking patterns, including patterns found in real-life contexts

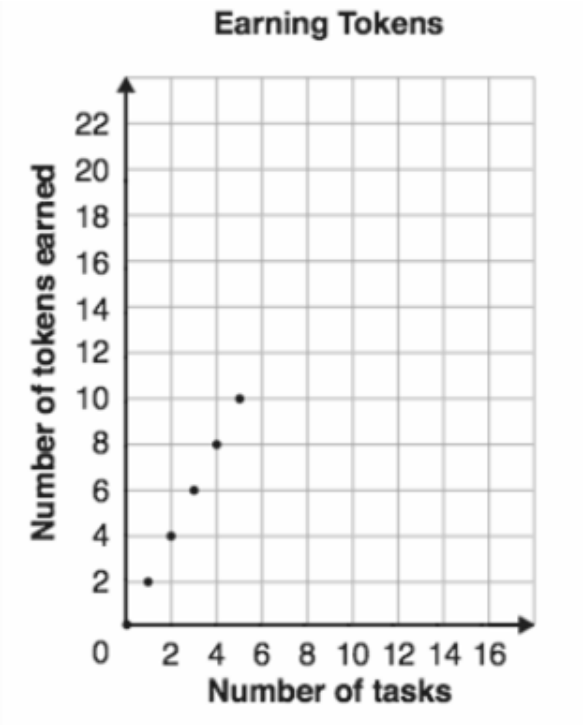
Grade 4 Specific Expectations

C1.1 identify and describe repeating and growing patterns, including patterns found in real-life contexts

Mathematical Areas: Algebra

Grade 6: Patterns Around Us

The graph below shows the relationship between the number of chores that Amna completes and the number of token that she earns.

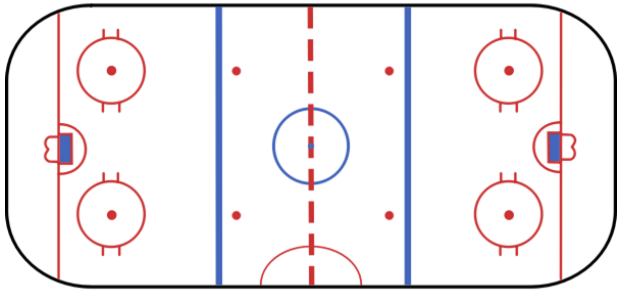


How many tokens will Amna earn if she completes 18 tasks? Explain your reasoning.

Grade 5: Patterns Around Us

A hockey arena has 10 rows of seats. The first row has 250 seats, the second row has 262 and the third row has 274 seats. Each subsequent row continues to increase by the same number of seats.

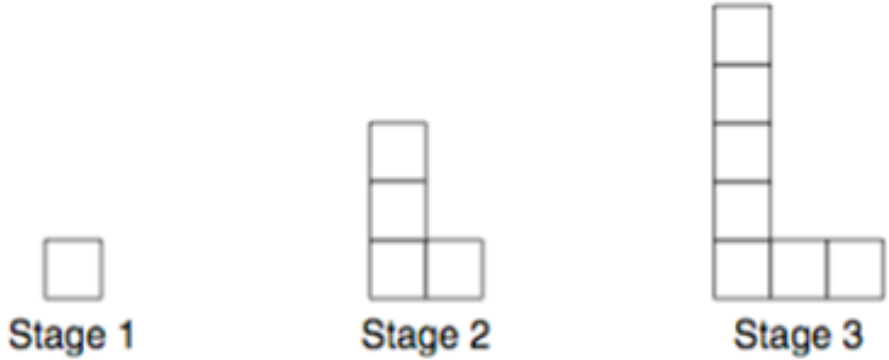
How many seats does the hockey arena have in all?



Show your thinking.

Grade 4: Building With Patterns

Sam is creating a pattern with blocks. He has 60 blocks in all. Below are the first 3 stages of his pattern, in which he has already used 12 blocks.



How many stages can he complete using *all* of his blocks? Explain your answer.

Task 14: It's all about the Area

Overall Expectations

E2. compare, estimate, and determine measurements in various contexts

Grade 6 Specific Expectations

E2.4 determine the areas of trapezoids, rhombuses, kites, and composite polygons by decomposing them into shapes with known areas

Grade 5 Specific Expectations

E2.5 use the area relationships among rectangles, parallelograms, and triangles to develop the formulas for the area of a parallelogram and the area of a triangle, and solve related problems

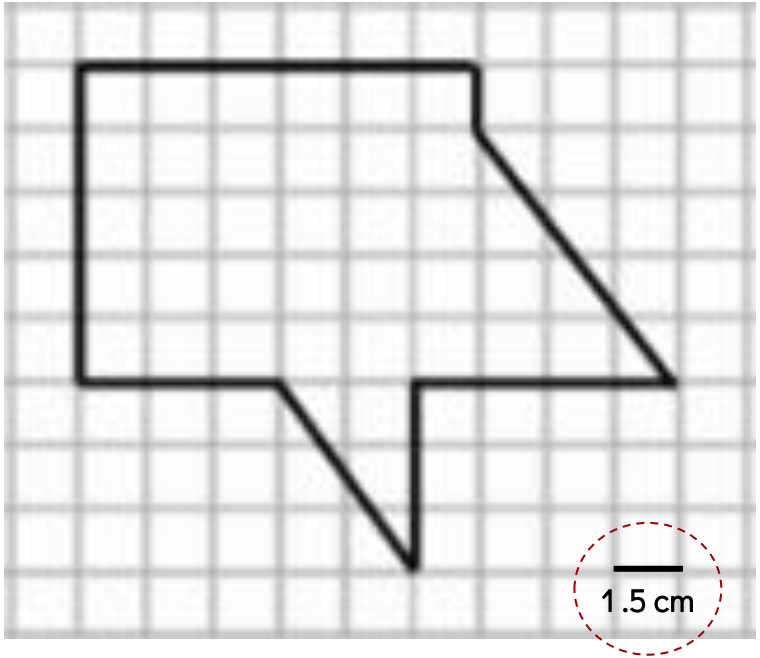
Grade 4 Specific Expectations

E2.5 use the row and column structure of an array to measure the areas of rectangles and to show that the area of any rectangle can be found by multiplying its side lengths

Grade 6: It's All About the Area

Using your prior knowledge of *rectangles* and *triangles*, decompose and calculate the area of this composite polygon.

Use a *ruler* and *pencil* to decompose the polygon below.

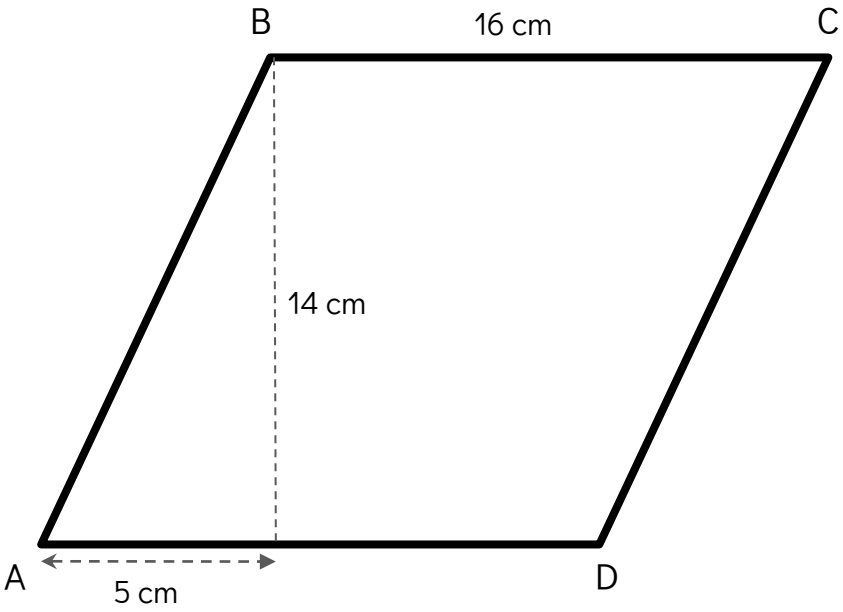


Show all your thinking here.

Total area: _____

Grade 5: It's All About the Area

Use your prior knowledge of *rectangles* and/or *triangles* to calculate the area of this parallelogram.

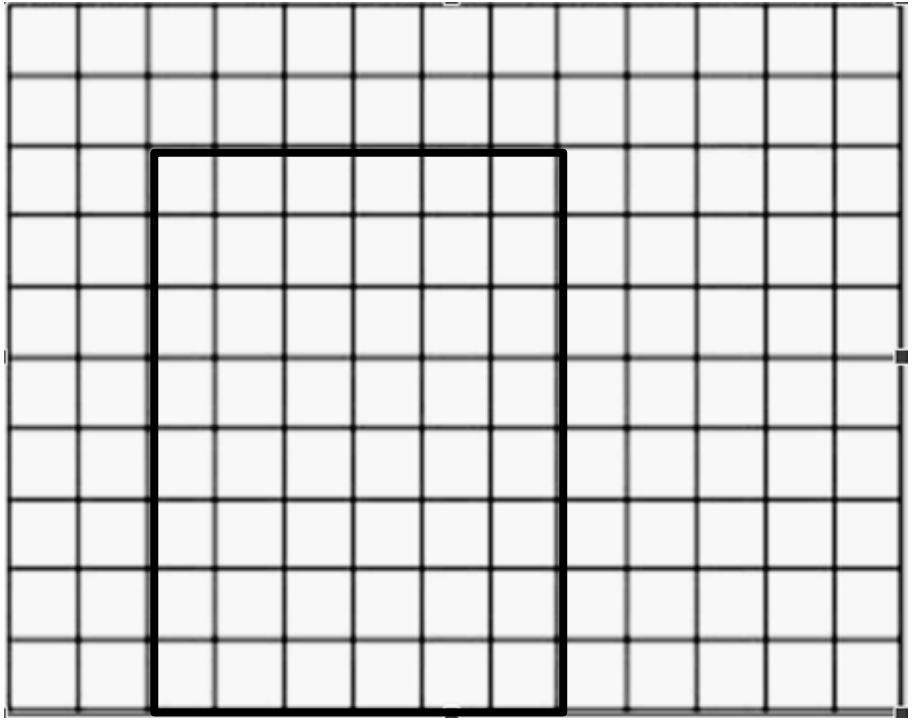


Area of ▱ ABCD is _____.

Explain your thinking.

Grade 4: It's All About the Area

Explain how an array can help you calculate the area of the rectangle below.



Share your thinking here.

Task 15: Analyze This!

Overall Expectations

D1. manage, analyse, and use data to make convincing arguments and informed decisions, in various contexts drawn from real life

Grade 6 Specific Expectations

D1.6 analyse different sets of data presented in various ways, including in histograms and broken-line graphs and in misleading graphs, by asking and answering questions about the data, challenging preconceived notions, and drawing conclusions, then make convincing arguments and informed decisions

Grade 5 Specific Expectations

D1.6 analyse different sets of data presented in various ways, including in stacked-bar graphs and in misleading graphs, by asking and answering questions about the data, challenging preconceived notions, and drawing conclusions, then make convincing arguments and informed decisions

Grade 4 Specific Expectations

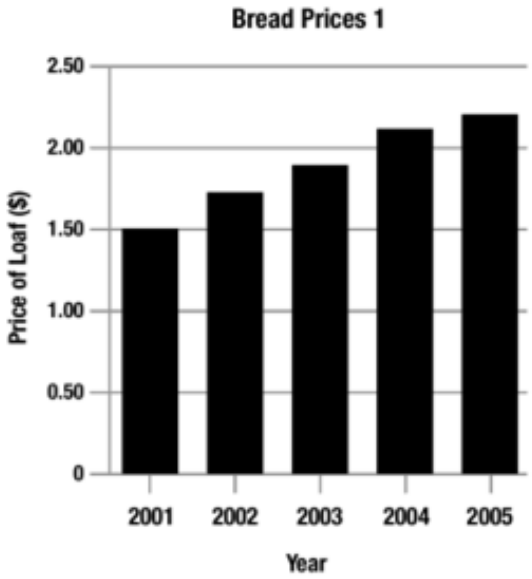
D1.6 analyse different sets of data presented in various ways, including in stem-and-leaf plots and multiple-bar graphs, by asking and answering questions about the data and drawing conclusions, then make convincing arguments and informed decisions

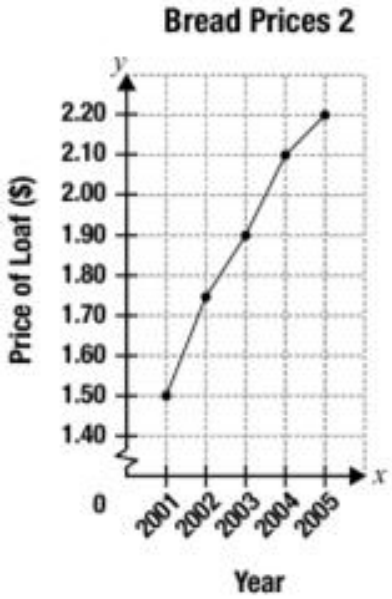
Mathematical Areas: Data

D1. Data Visualization

Grade 6: Analyse This!

The two graphs show the same data about the mean price of a loaf of bread for each year over the span of 5 years.

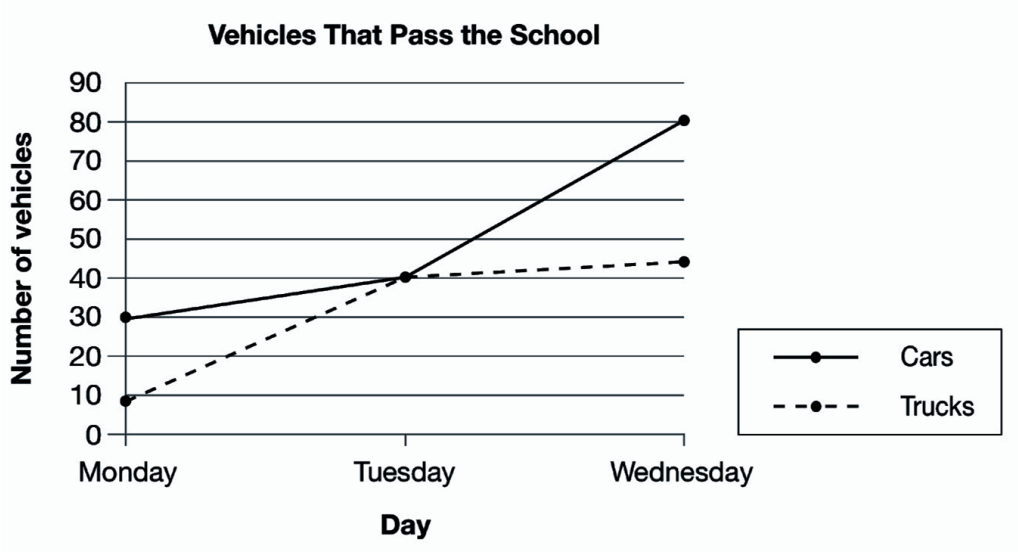




Compare the two graphs on the left.
Which parts of the graph are most important in making the graphs appear to show different things.

Grade 5: Analyse This!

Matthew collects data about the vehicles that pass his school over three days. He makes the graph below.



Matthew concludes that about twice as many cars as trucks pass the school over the 3-day period. Is his conclusion correct?

- ❑ Yes
- ❑ No

Explain your thinking.

Grade 4: Analyse This!

The graphs show the popcorn sales for Henry and Simon during a four week period.

What 3 conclusions can draw from the data.

Additional Resources to Support Math Instruction

Key Ministry Resources

- Link to Ontario Math Curriculum - provided by the Government of Ontario
- Link to Overview of Math Processes - by EduGains
- Guides to Effective Instruction in Mathematics
- K-8 Ontario Mathematics Continuums:
  - A. Social Emotional
  - B. Number
  - C. Algebra
  - D. Data
  - E. Spatial Sense
- Growing Success

Teacher Resources

- Jo Boaler and Growth Mindset
- Unplugged Coding Courses
- Unplugged Coding Lessons
- CS Unplugged Coding Resource
- CS Unplugged PDF

Sample Assessment Tool

Areas for Improvement	Curriculum Expectation(s): Mathematics	Strengths
	Write or copy and paste expectation(s) here, found on the slide before your chosen question.	

Student goals for next mathematics task:

Mathematics

May not teach us how to

+ love or - hate.

But it gives us every reason to hope

That every problem has a solution.

(Author unknown)