Planning for the New Math 4 - Session 5

April 16, 2024 - Provincial

Facilitator: Chris Zarski

Alberta Regional Consortia

Land Acknowledgment

In the spirit of reconciliation, we want to acknowledge that this gathering is taking place on traditional lands across the province of Alberta, home to many diverse First Nations, Métis and Inuit peoples. We acknowledge that this land is a traditional meeting ground giving voice to its original peoples and the story of creation of this country in a way that history has forgotten.

The Stories We Tell by Aguenus (Angela Hall) Source: youcubed- Indigenous Mathematical Art

Wrapping Up Grade 4

Algebra

4A1.1 (Order of Operations) & 4A1.2 Equations (preservation of Equality)

Patterns

4P1.1 sequences of triangular and square numbers; increasing and decreasing;Investigate Fibonacci sequence & 4P1.2 - arithmetic and geometric sequences

Statistics

4ST1.1 - statistical problem solving process (engage) & selecting an appropriate scale for graphing

How can equality create opportunities to reimagine number?		
4A1.1 Students represent and apply equality in multiple ways.		
Knowledge	Understanding	Skills & Procedures
An expression can include multiple operations. The conventional order of operations provides a set of rules for evaluating expressions, including the following: • Multiplication and division are performed before addition and subtraction. • Multiplication and division are performed in order from left to right. • Addition and subtraction are performed in order from left to right.	There are infinitely many expressions that represent the same number. The order in which operations are performed can affect the value of an expression.	Evaluate expressions according to the order of operations. Create various expressions of the same number using one or more operations.

Understanding that order makes difference is more important than simply providing an acronym to memorize!

"Why does there have to be an order to solving numerical and algebraic expressions?"

Does $2 + 3 \times 10$ equal 50 because $2 + 3$ is 5 and then we multiply by 10, or do we add 2 to the result of 3×10?

Common Misconceptions

Many students learn the order of operations using PEMDAS (Parentheses, Exponents, Multiplication, Division…) as a memory aid. This very often leads to the misconception that multiplication comes before division and that addition comes before subtraction. Understanding the principle is probably the best memory aid. (Source: Elementary Math at EDC)

Student Slides

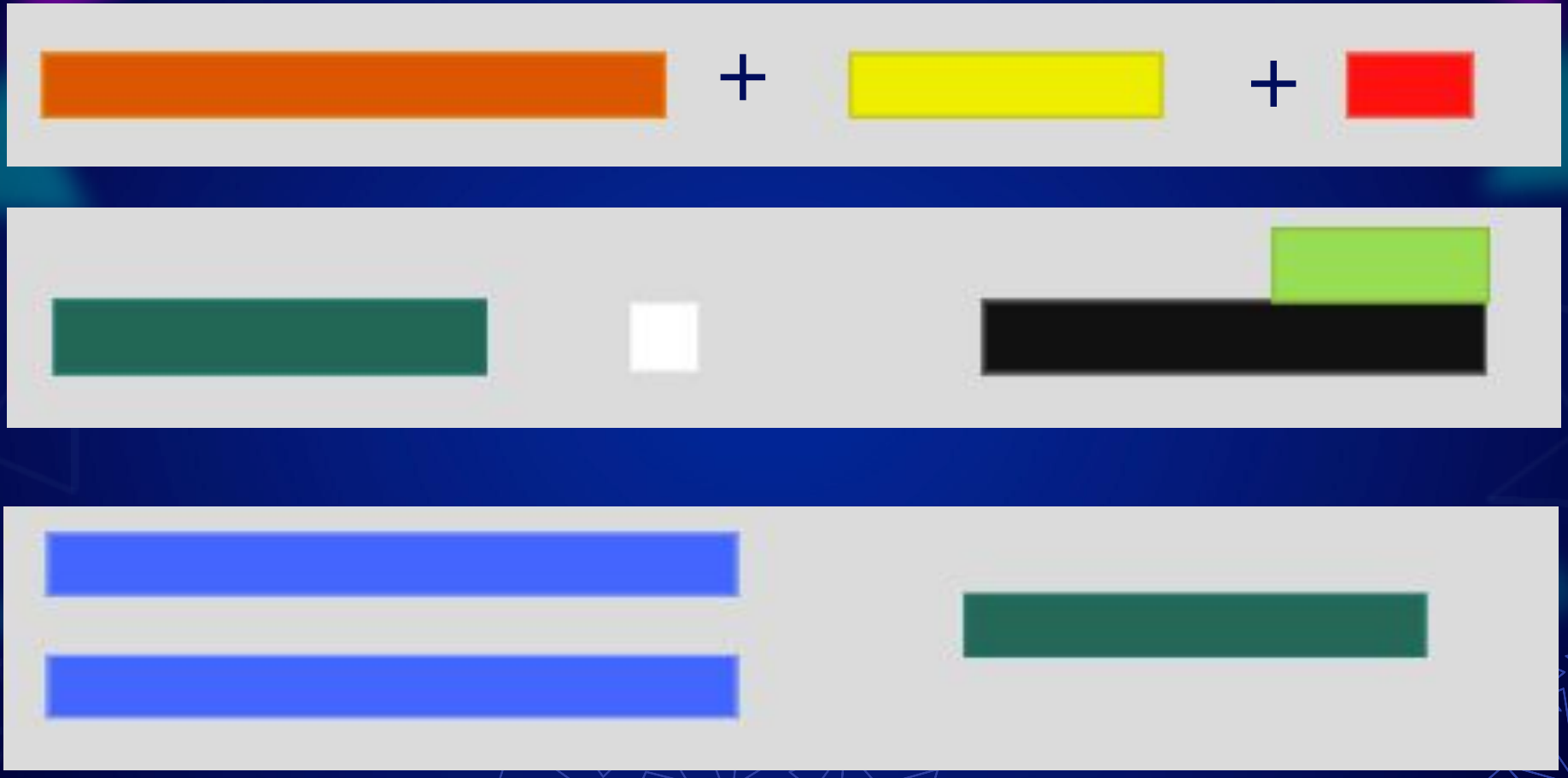
What is the value of 2 x 3

What is the value of 8 x 5

What is the value of 64 ➗ 8

Providing opportunities to write the expression where students can actually count the total first helps to introduce the reason for *Order of Operations*.

Write the numerical expression that is represented by:



What might be the numerical expression that expresses the value for each of the examples below?

What might be the numerical expression for each of the examples below?

2 + 4 x 5 (all cents)

4 x 1 + 3 x 2 (all dollars)

Using the paper you brought, what is the value of

$$2 + 3 \times 10$$

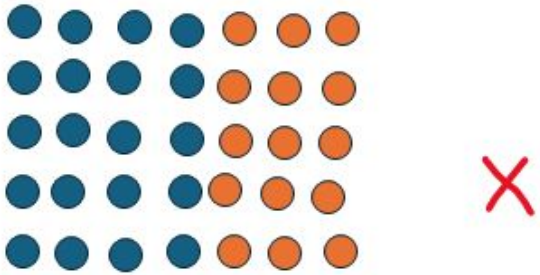
Does 2 + 3 × 10 equal 50 because 2 + 3 is 5 and then we multiply by 10, or do we add 2 to the result of 3 × 10?

4 + 3 x 5 - Using order of

Calculation 1: Using order of operations Multiply 3 times 5 and then add 4 or add 4 to the product of 3 x 5

The value is 19

Calculation 2: Add 4 + 3 then multiply by 5



The value is 35

Symbolically

Correct order	Wrong order (error)
4 + 3 x 5 4 + 15 19	4 + 3 x 5 7 x 5 35
4 + 3 x 5 4 + 15 19	4 + 3 x 5 7 x 5 35

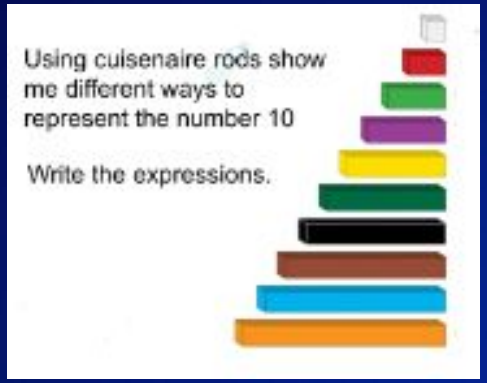
Colour is a powerful way for students to see how operations go together

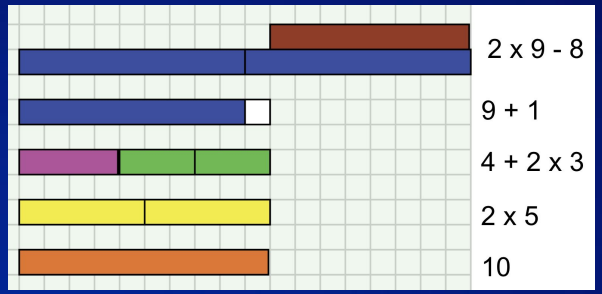
Which solution is correct?

i) 12 - 2 x 5 + 1
10 x 6
60

ii) 4 ÷ 2 x 3 + 20
2 x 3 + 20
6 + 20
26

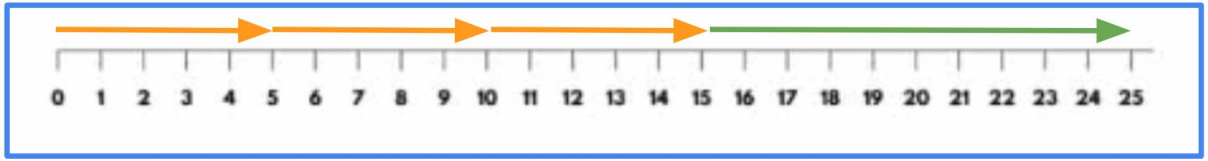
Activity: Equivalent Expressions using Cuisenaire Rods





(diagrams www.hand2mind.com and pbslearningmedia.com)

Show 4 different expressions that will equal 25.



3 x 5 + 10

ARPDC created)

34 + 34 + 34 + 2
34 = 30 + 4

Show how money can represent this.

34 + 34 + 34 + 2
34 = 30 + 4

Show how money can represent this.

3 (30+4) + 2

34 + 34 + 34 + 2
34 = 30 + 4

Show how money can represent this.

3 (30+4) + 2
90 + 12 + 2 = 104

Money App or Cuisenaire rods

Show 4 x 23 +1

Money App

Show 4 x 23 +1

Possible Formatives

Let’s Solve! Make sure your “V” is obvious!

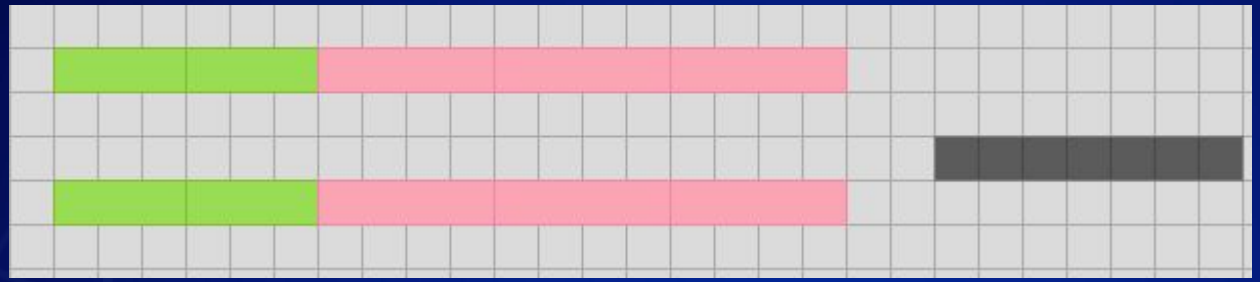
a. $2 + 8 - 6$

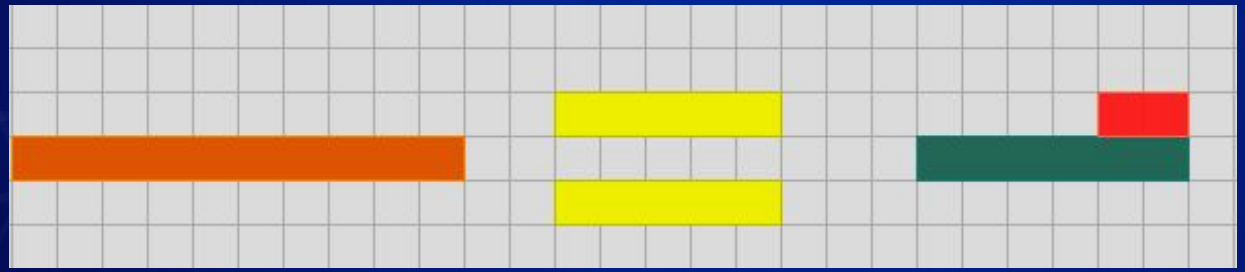
b. $4 \times 6 \div 2$

c. $12 \div 3 \times 2 + 5$

d. $10 - 2 \times 5 + 11$

Write an expression for each example below. Find the value of the expression.





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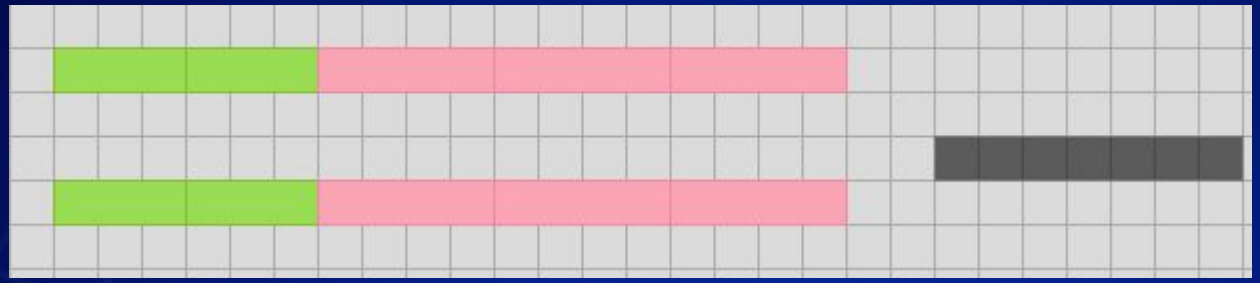
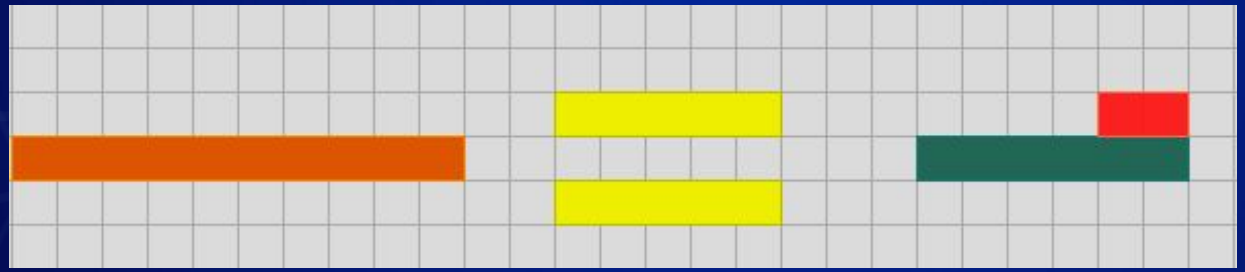


2 x 3 + 3 x 4 + 7



10 + 2 x 5 + 6 - 2

4A1.2 Students represent and apply equality in multiple ways.		
Knowledge	Understanding	Skills & Procedures
Equations can be solved through a process of adding, subtracting, multiplying, or dividing the same number on both sides of the equation (preservation of equality).	An equation is solved by determining an unknown value that makes the left and right sides of the equation equal.	Write equations involving one operation to represent a situation. Investigate preservation of equality using a balance model. Investigate preservation of equality using an equation without an unknown value. Apply preservation of equality to determine the unknown value in an equation, limited to equations with one operation. Solve problems using equations, limited to equations with one operation.

Teacher Notes:

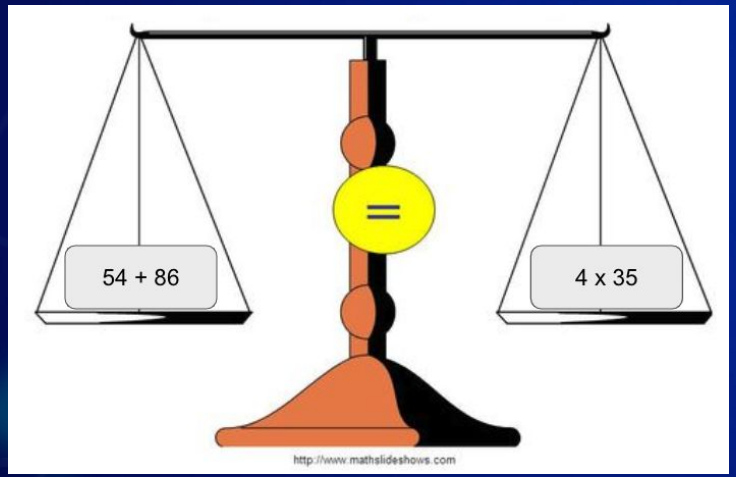
Equations have three necessary components. The most important being an equal sign. There must be an expression on the left hand side and an expression on the right hand side.
To be an equation, those expressions must EQUAL each other in value.

For example: 2 + 3 = 5 is an equation, since 2 + 3 is an expression, 5 is an expression and it has an equal sign that shows that the two sides are equal.

Preservation of Equality: keeping equality by changing each side of an equation in the same way

There are NO variables in Grade 4 Algebra.

Write an equation that represents the amount of money shown below.



a. Explain why this can be considered an equation.
b. If I divide both sides of the scale by 4 is it still an equation?

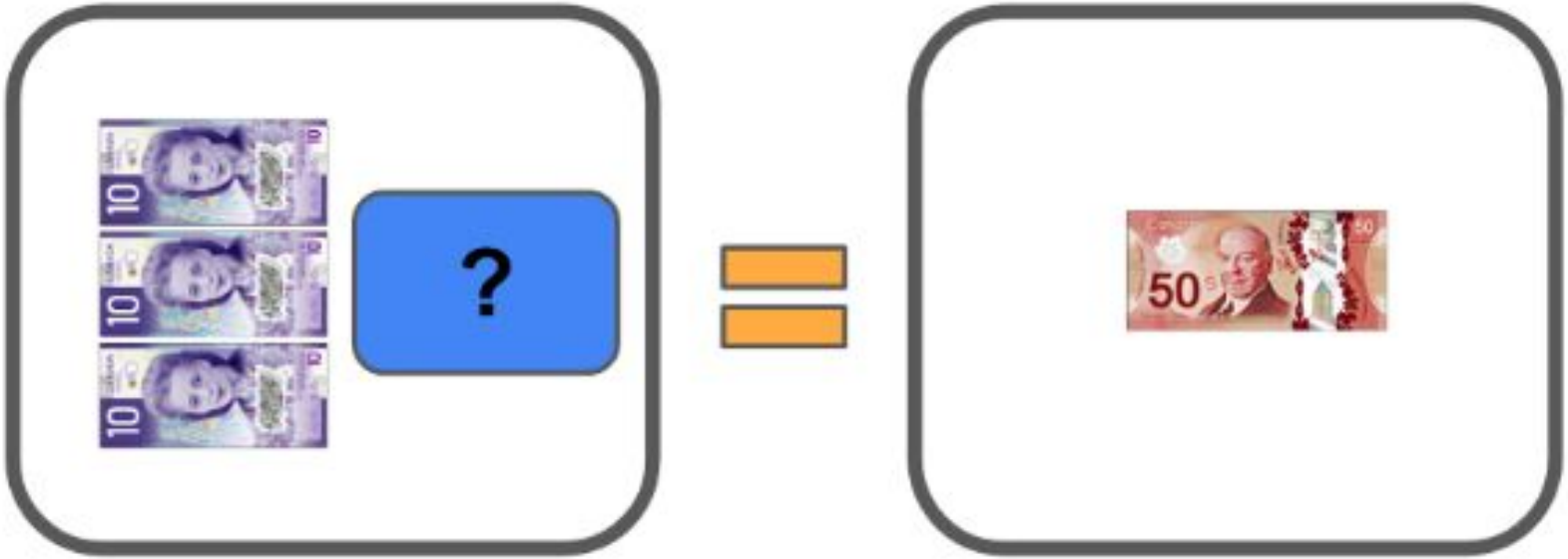
(graphic adapted from math slideshows.com)

Example: Money Mats (Investigation)
Below are two money mats.

a. Do the two money mats equal in value?
b. Write an equation.
c. If I remove 1 loonie from both money mats are they still equal in value?
d. Write the equation.
e. If I add $5.00 to both money mats are they still equal in value?
f. Write the equation.
g. If I divide the value of the money on each mat in ½ are both money mats still equal in value?
h. Write the equation.
i. If I triple the value of each money mat are they still equal in value?
j. Write the equation.

(ARPDC created, graphics from Mathies Money)

Example: Money Mats

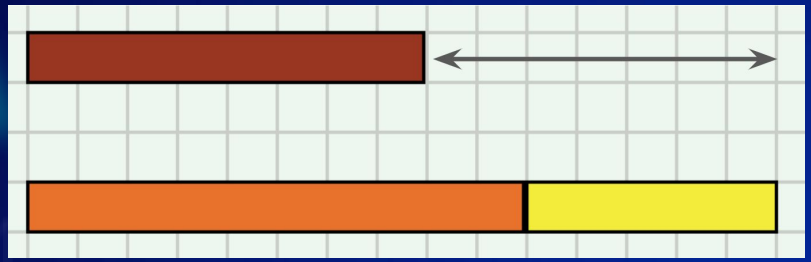


a. Solve for the missing value.
b..Write the equation
c. What strategy did you use?

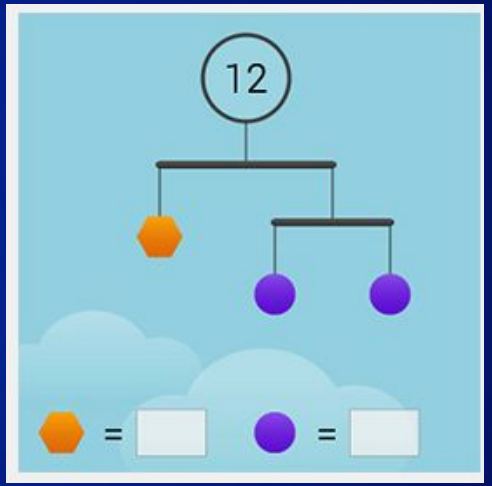
(ARPDC created, graphics from Mathies Money)

There are no variables in grade 4.

Solve for the missing distance.



graphic created using PBSlearningmedia.org)



Nrich Cuisenaire Rods

Freepik.com-pablograph

Patterns

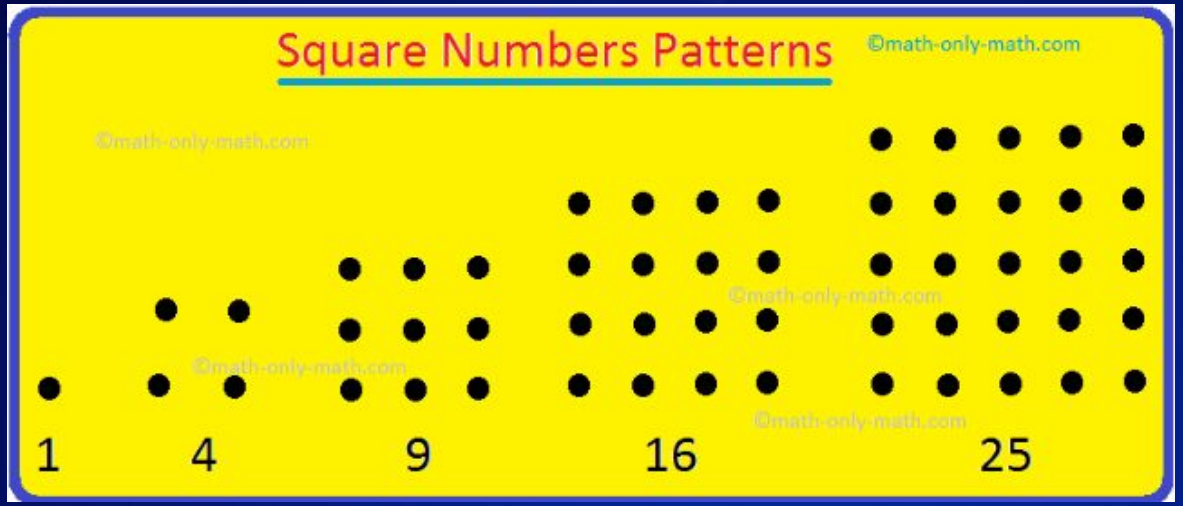
Fibonacci sequence - what is it?

4P1.1 Students interpret and explain arithmetic and geometric sequences.		
Knowledge	Understanding	Skills & Procedures
The sequences of triangular and square numbers are examples of increasing sequences. The Fibonacci sequence is an increasing sequence that occurs in nature.	Sequences may increase or decrease. Different representations can provide new perspectives of the increase or decrease of a sequence.	Investigate increasing sequences, including the Fibonacci sequence, in multiple representations. Create and explain increasing or decreasing sequences, including numerical sequences. Express a numerical sequence to represent a concrete or pictorial sequence.

4P1.2 Students interpret and explain arithmetic and geometric sequences.		
Knowledge	Understanding	Skills & Procedures
An arithmetic sequence progresses through addition or subtraction. A skip-counting sequence is an example of an arithmetic sequence. A geometric sequence progresses through multiplication. A geometric sequence begins at a number other than zero.	An arithmetic sequence has a constant difference between consecutive terms. A geometric sequence has a constant multiplicative change between consecutive terms.	Recognize arithmetic and geometric sequences. Describe the initial term and the constant change in an arithmetic sequence. Express the first five terms of an arithmetic sequence related to a given initial term and constant change. Describe the initial term and the constant change in a geometric sequence. Express the first five terms of a geometric sequence related to a given initial term and constant change.

What is the Fibonacci Sequence & the Golden Ratio? Simple Explanation and Examples in Everyday Life

Nature by Numbers | The Golden Ratio and Fibonacci Numbers
By Knoble Creative



Math-Only-Math, Lewan math step-by-step. Square Numbers

What is the next array?
What is its value?

1x1, 2x2, 3x3, 4x4, 5x 5 ...

Arithmetic or Geometric? What would the 10th term be?

0, 2, 4, 6, 8, 10, ...
5, 10, 15, 20, 25, ...

2, 4, 8, 16, ...

Solutions: 18, 50, 1024

Activity 2: Visual representation of square numbers

Using squared paper, invite children to draw squares ranging from 1×1 to 12×12 in size. Ask pupils to calculate the area of a square they've drawn. Explain that this is a square number. This visual representation deepens pupils' understanding, while exposing the structure of the concept as a calculating area.

X	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Alternatively, provide children with this multiplication grid and invite them to draw squares, starting from one in the top left-hand corner and increasing in size each time. Look at the number in the bottom right-hand corner to identify the square number.

(teachwire.net)

Picture Sequences

Learning Objective: Describe and predict the terms a picture sequence.

Complete the tables to find the rule for each diagram sequence.

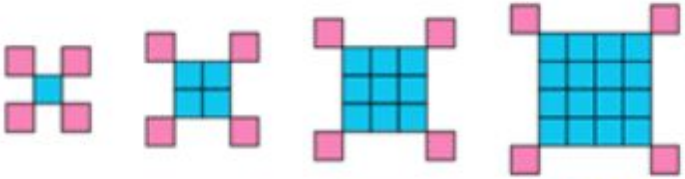


Diagram Number	1	2	3	4	5	6	10
Pink Squares							
Blue Squares							
Total Squares							

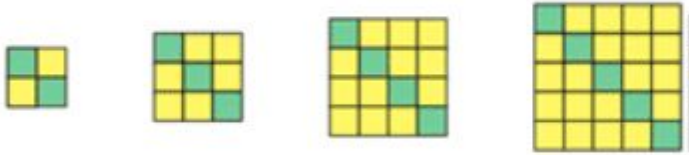


Diagram Number	1	2	3	4	5	6	10
Yellow Squares							
Green Squares							
Total Squares							

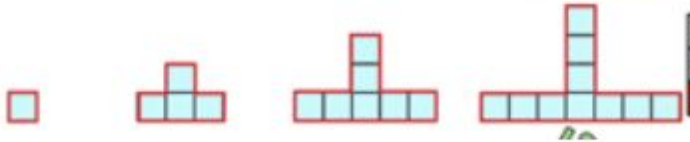


Diagram Number	1	2	3	4	5	6	10
Area							
Perimeter							

Diagram Number	1	2	3	4	5	6	10
Purple Circles							
Green Spoons							

Consider the Activity *Growing Patterns*
NCTM - Illuminations

Mr Mathematics Blog

Statistics

What’s Statistics?

Statistics is a branch of **mathematics**.

- It involves gathering information, summarizing it, and deciding what it means.
- The **numbers** that result from this work are also called statistics. They can help to predict such things as the weather and how sports teams will perform.

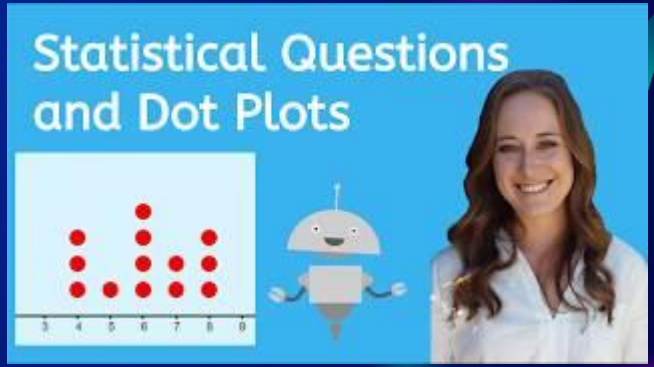
How do we gather information?

The Statistical Process:

A statistical problem-solving process includes

- formulating statistical questions
- collecting data
- representing data
- interpreting data

In what ways can communication be shaped by the choice of representation?		
4ST1.1 Students evaluate the use of scale in graphical representations of data.		
Knowledge	Understanding	Skills & Procedures
A statistical problem-solving process includes • formulating statistical questions • collecting data • representing data • interpreting data	Representation is part of a statistical problem-solving process.	Engage in a statistical problem-solving process.

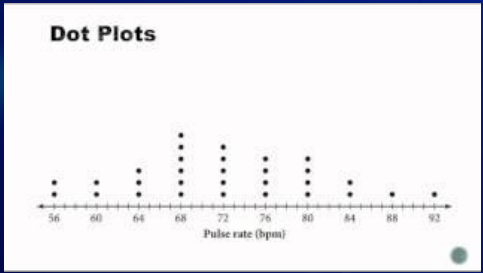


What is Statistical Question?

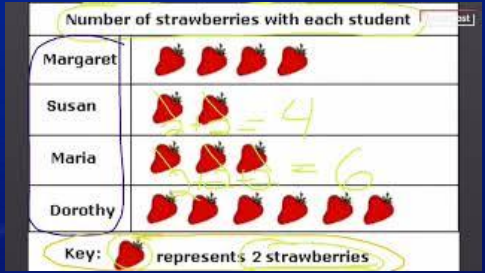
Selecting, describing, justifying,comparing, interpreting

4ST1.2 Students evaluate the use of scale in graphical representations of data.		
Knowledge	Understanding	Skills & Procedures
Many-to-one correspondence is the representation of many objects using one object or interval on a graph. Common graphs include • pictographs • bar graphs • dot plots	Representation can express many- to-one correspondence by defining a scale. Different representations tell different stories about the same data.	Select an appropriate scale to represent data. Represent data in a graph using many-to-one correspondence. Describe the effect of scale on representation. Justify the choice of graph used to represent certain data. Compare different graphs of the same data. Interpret data represented in various graphs.

Use the question generated in the first part of the statistics unit.



Bar Graphs and Dot Plots

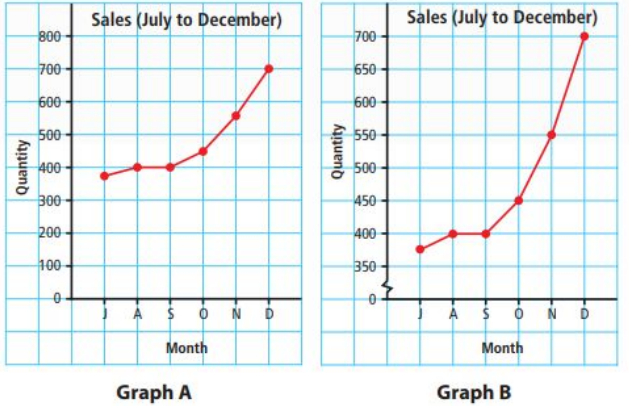


Pictographs and Bar Graphs

4ST1.2 Students evaluate the use of scale in graphical representations of data.

Knowledge	Understanding	Skills & Procedures
Many-to-one correspondence is the representation of many objects using one object or interval on a graph. Common graphs include • pictographs • bar graphs • dot plots	Representation can express many- to-one correspondence by defining a scale. Different representations tell different stories about the same data.	Select an appropriate scale to represent data. Represent data in a graph using many-to-one correspondence. Describe the effect of scale on representation. Justify the choice of graph used to represent certain data. Compare different graphs of the same data. Interpret data represented in various graphs.

These two graphs display the same data in different ways.



Graph A Graph B

MathLinks 8. Nelson Publishing. P 5

What does this mean?

Videos provided students with comparisons and reasons for choosing a particular graph. Good open ended *Exit Ticket.*

Wrapping Up

Survey

Please take a moment to complete this 1 minute survey emailed to you.

What are your needs heading into 2024-2025

As you have now gone through the new Math 4 Curriculums, what are your needs for the coming year. Connect with your local consortia.

CPAR Documents will continue to be posted

Continue to check the arpdc website

Resources

New LearnAlberta

https://curriculum.learnalberta.ca/home/en

ARPDC Resource Site

https://arpdc.ab.ca/focuses/math/?site_language=english&set=1&sort_by=1&grade_level=&media_type=&resource_type=179

Math Verbs

Grades K-3

Grades 4-6

Thank YOU!

It has been a pleasure to work alongside you this school year. Best wishes for the remainder of the year!

Do not hesitate to reach out to local consortia if you have any questions.

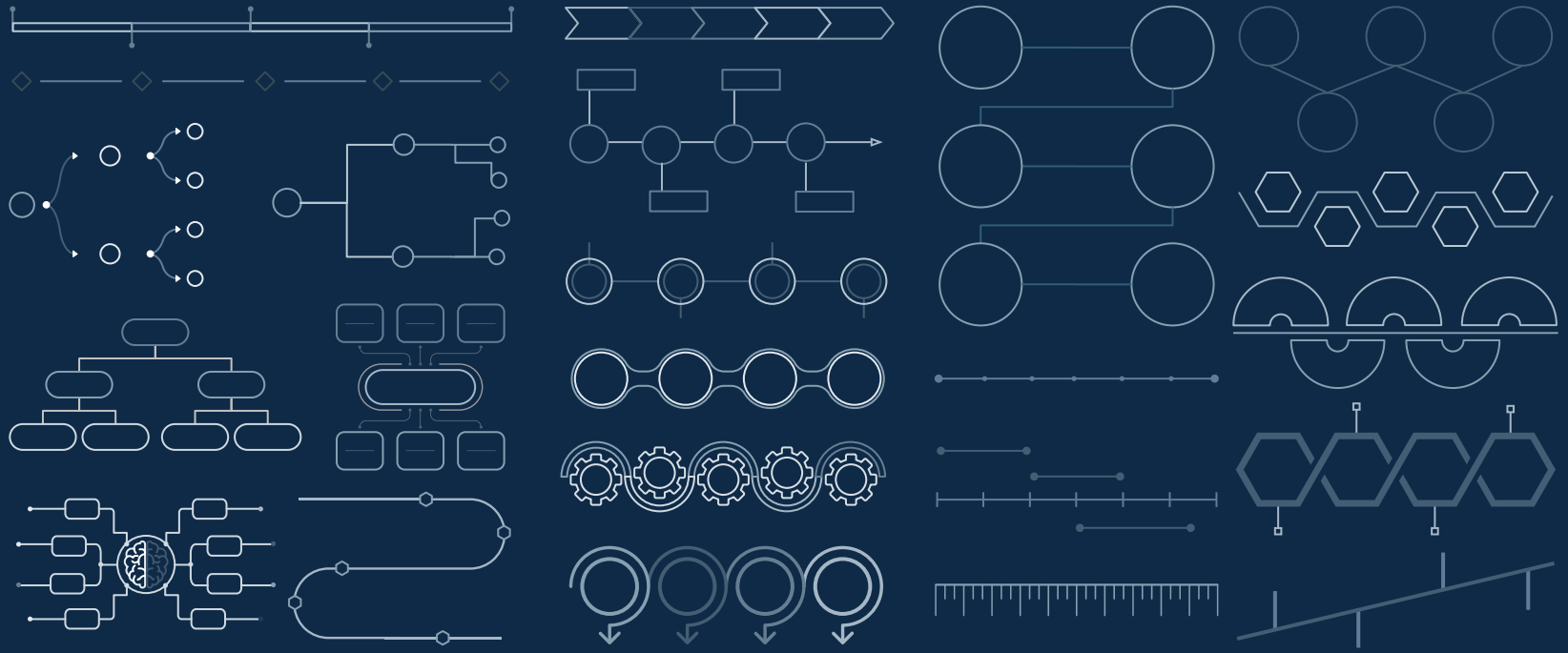
Facilitator: Chris Zarski chris.arski@arpdc.ab.ca

Use our editable graphic resources...

You can easily **resize** these resources without losing quality. To **change the color**, just ungroup the resource and click on the object you want to change. Then, click on the paint bucket and select the color you want. Group the resource again when you're done. You can also look for more **infographics** on Slidesgo.

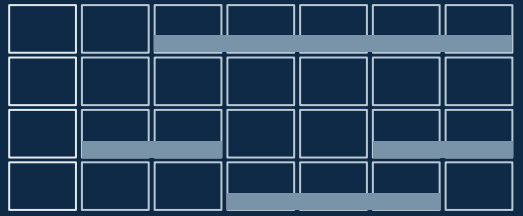


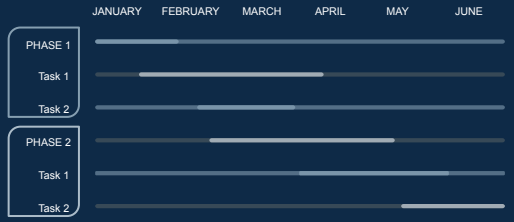


Premium Icons

Digital Marketing

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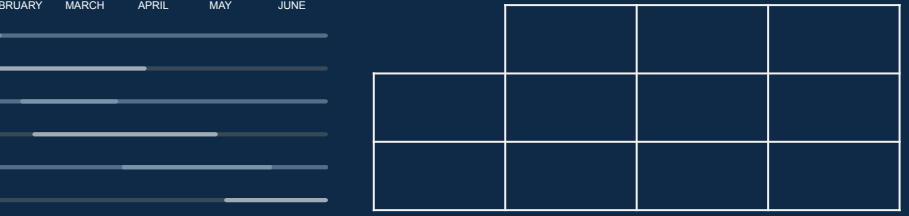

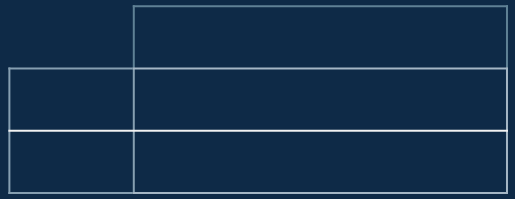

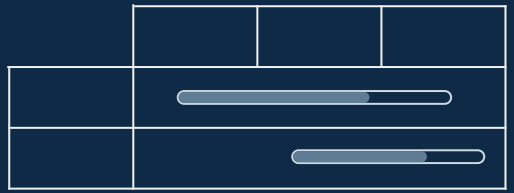

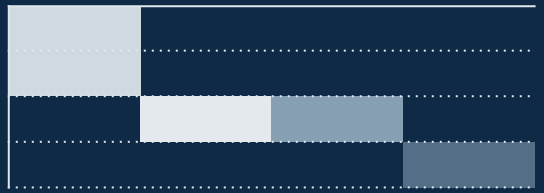

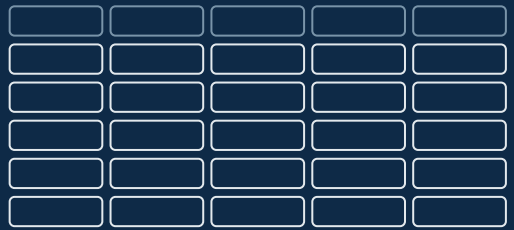

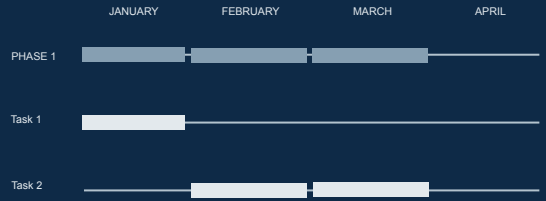
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FEBRUARY
MARCH
APRIL
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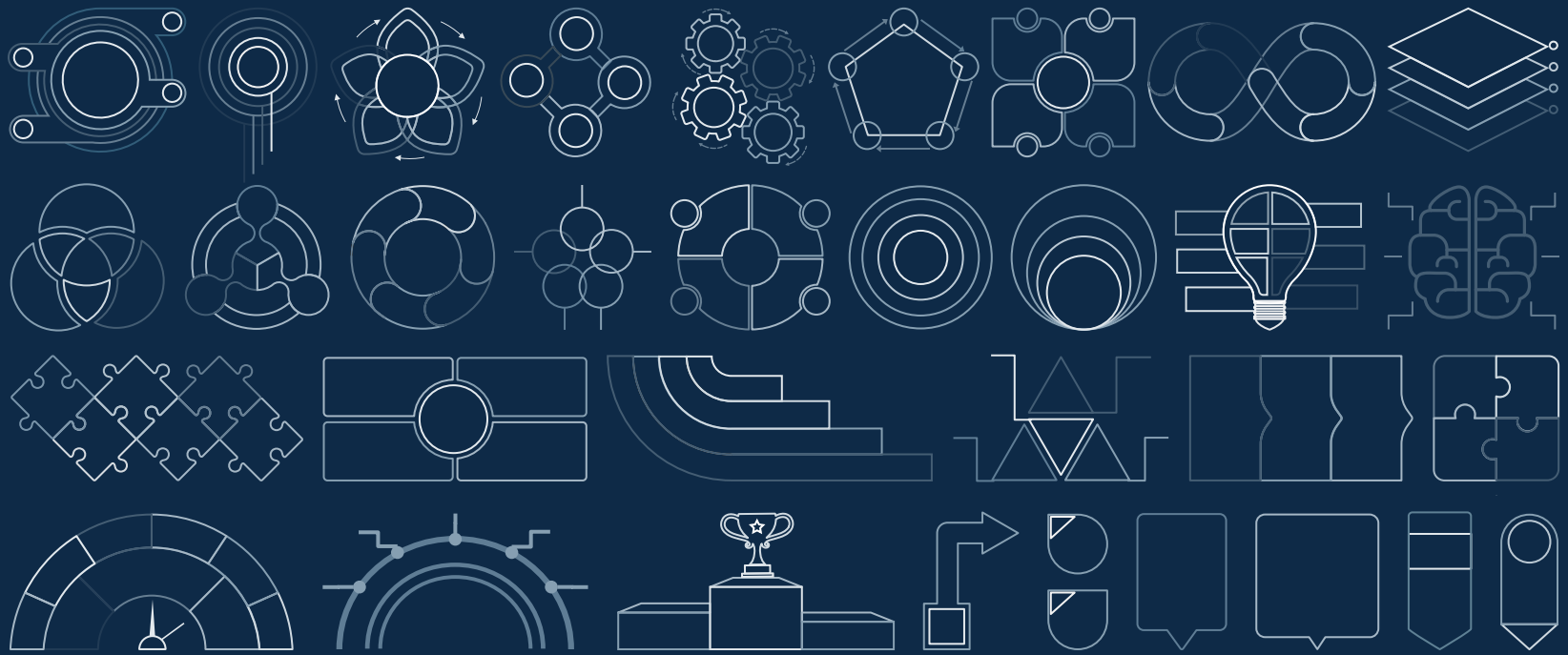
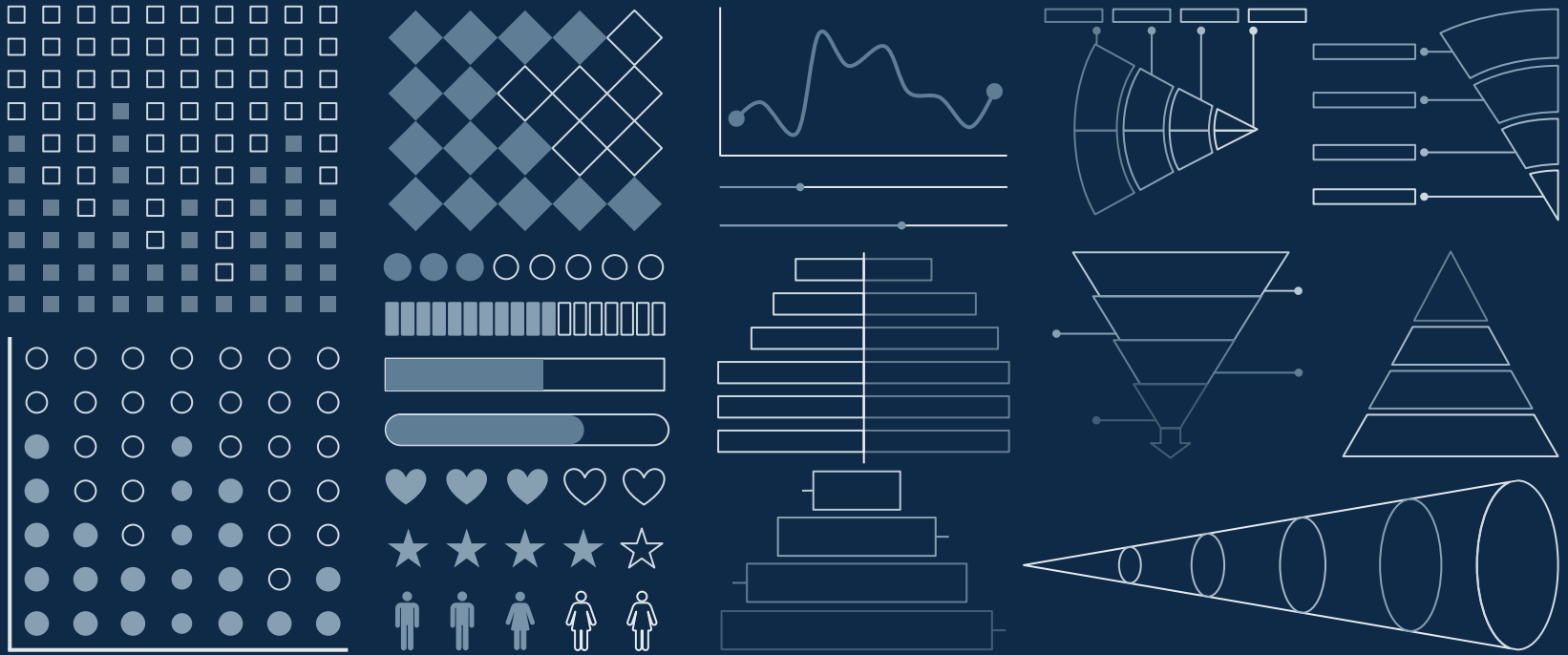
Task 1
Task 2





...and our sets of editable icons

You can **resize** these icons without losing quality.
You can **change the stroke and fill color**; just select the icon and click on the **paint bucket/pen**.
In Google Slides, you can also use **Flaticon's extension**, allowing you to customize and add even more icons.

Educational Icons

Medical Icons

Business Icons

Teamwork Icons

Help & Support Icons

Avatar Icons

Creative Process Icons

Performing Arts Icons

Nature Icons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