

LONG-RANGE PLAN

Grade 8, Mathematics

ORGANIZED BY QUESTIONS

What is a long-range plan and why is it important?

A long-range plan outlines a year-long plan for learning mathematics. It is a living document that is revised as educators become increasingly aware of the abilities, strengths, needs, and interests of their students. A thoughtfully developed long-range plan:

- ensures that instruction is sequenced in a manner that aligns with research about learning mathematics;
- allocates the appropriate time for concepts and skills so that students have multiple opportunities to focus on the overall expectations within the grade;
- ensures that all specific expectations are addressed at least once within the school year; and
- recognizes that some expectations need to be revisited several times throughout the year.

Note: These sample long-range plans outline possible sequences of instruction for the school year. There are many ways to structure an effective plan for learning.

How are these long-range plans structured?

Deep learning occurs when specific expectations are connected, are continuously expanded upon, and are revisited in a variety of contexts throughout the year.

This long-range plan is organized around ten unifying questions. Each question typically involves several strands and draws on big mathematical themes such as quantity, change, equivalence, dimension, pattern, and uncertainty. Often the same question spans several grades.

These ten questions can be sequenced throughout the year as ten blocks of time, as presented here in this long-range plan. Alternatively, the questions could be split into smaller, shorter blocks, with the embedded strands and topics serving as different contexts that would spiral the ten questions throughout the year.

While the long-range plan is presented as month-long blocks, this timing should be held loosely, and adjusted according to the learning readiness of students. The following are other considerations when using this long-range plan.

Considerations

- Sample long-range plans for each grade level include all overall and specific expectations from strands B through F.
- The overall expectation from Strand A (Social-Emotional Learning Skills and the Mathematical Processes) is integrated and taught in connection with the other strands throughout the school year.
- In developing long-range and daily plans, consider opportunities to teach and reinforce social-emotional learning skills and mathematical processes, as well as transferable skills, in order to help students develop confidence, cope with challenges, think critically and creatively, and develop a positive identity as a math learner.
- Mathematical modelling (Algebra, C4) provides opportunities for students to authentically engage in learning with everyday situations that involve mathematics. Tasks that require the process of mathematical modelling can be strategically situated throughout the year to support students in making connections among mathematical concepts, strands, and disciplines, and to provide opportunities for assessing the integration and application of learning.
- Coding (Algebra, C3) can be used to solve problems and help deepen students' understanding of mathematical concepts; it should be strategically addressed and assessed throughout the year, as appropriate.
- Some concepts and skills require ongoing attention so that students can develop proficiency and deep, lasting learning. Number Talks, Number Strings, and other math talk prompts can be used at the beginning of math classes to reinforce and strengthen number relationships, spatial relationships, math facts, mental math strategies, and problem-solving skills.

Reflective questions when planning

- What key concepts, models, and strategies do students need more time to develop?
- Does the long-range plan revisit expectations later? If not, how might I adjust the plan so it does? What prior learning is assumed in order for other expectations to be addressed?
- How can I create opportunities for students to continue to practise and consolidate learning when they are engaged in new learning?

Long-Range Plan: Grade 8

- Each month is organized around a unifying question. Strands connected to each question are listed below. The Social-Emotional Learning (SEL) Skills and the Mathematical Processes are to be integrated throughout each of the topics below as appropriate.

| | Grade 7 | Grade 8 |
|-----|--|--|
| Sep | <p>How do these compare?</p> <p>Number, Algebra, Data, Spatial Sense</p> | <p>How do these compare?</p> <p>Number, Algebra, Spatial Sense</p> |
| Oct | <p>How are things changing?</p> <p>Number, Algebra, Spatial Sense, Financial Literacy</p> | <p>How are things changing?</p> <p>Number, Algebra, Data, Spatial Sense, Financial Literacy</p> |
| Nov | <p>How much is that?</p> <p>Number, Algebra, Data</p> | <p>How much is that?</p> <p>Number, Algebra, Spatial Sense</p> |
| Dec | <p>What's the story?</p> <p>Number, Data</p> | <p>What's the story?</p> <p>Algebra, Data</p> |
| Jan | <p>Scaling & splitting: How much now?</p> <p>Number, Algebra, Data, Spatial Sense</p> | <p>Scaling & splitting: How much now?</p> <p>Number, Financial Literacy</p> |
| Feb | <p>How can we describe the space around us?</p> <p>Number, Algebra, Spatial Sense</p> | <p>How can we describe the space around us?</p> <p>Number, Algebra, Spatial Sense</p> |
| Mar | <p>When are different operations useful?</p> <p>Number, Algebra, Spatial Sense</p> | <p>When are different operations useful?</p> <p>Number, Algebra, Spatial Sense</p> |

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| Apr | <p>Are things in balance?</p> <p>Number, Algebra, Spatial Sense, Financial Literacy</p> | <p>Are things in balance?</p> <p>Number, Algebra, Spatial Sense, Financial Literacy</p> |
| May | <p>How can we make predictions and decide?</p> <p>Number, Algebra, Data, Financial Literacy</p> | <p>How can we make predictions and decide?</p> <p>Number, Algebra, Data, Financial Literacy</p> |
| Jun | <p>Is this statement true?</p> <p>Number, Algebra, Data, Spatial Sense</p> | <p>Is this statement true?</p> <p>Number, Algebra, Data Spatial Sense</p> |

| September | QUESTION: How do these compare? | |
|-----------|--|--|
| | Topics and Specific Expectations | Connecting the Learning |
| | <p>B, E: Very large & small numbers & amounts; scientific notation</p> <p>B1.1 represent and compare very large and very small numbers, including through the use of scientific notation, and describe various ways they are used in everyday life</p> <p>B1.4 use fractions, decimal numbers, and percents, including percents of more than 100% or less than 1%, interchangeably and flexibly to solve a variety of problems</p> <p>E2.1 represent very large (mega, giga, tera) and very small (micro, nano, pico) metric units using models, base ten relationships, and exponential notation</p> <p>E: Very large & small SI units</p> <p>E2.1 represent very large (mega, giga, tera) and very small (micro, nano, pico) metric units using models, base ten relationships, and exponential notation</p> <p>B, E: Area & side length of squares, square roots, and irrational numbers</p> <p>B1.3 estimate and calculate square roots, in various contexts</p> <p>B2.2 understand and recall commonly used square numbers and their square roots</p> <p>E2.1 represent very large (mega, giga, tera) and very small (micro, nano, pico) metric units using models, base ten relationships, and exponential notation</p> <p>B: Compare & order real numbers (rational vs irrational numbers)</p> <p>B1.2 describe, compare, and order numbers in the real number system (rational and irrational numbers), separately and in combination, in various contexts</p> <p>C: Relationships among rational numbers</p> <p>C1.4 create and describe patterns to illustrate relationships among rational numbers</p> <p>C: Various patterns in various forms</p> <p>C1.1 identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts, and compare linear growing and shrinking patterns on the basis of their constant rates and initial values</p> <p>C1.2 create and translate repeating, growing, and shrinking patterns involving rational numbers using various representations, including algebraic expressions and equations for linear growing and shrinking patterns</p> <p>C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in growing and shrinking patterns involving rational numbers, and use algebraic representations of the pattern rules to solve for unknown values in linear growing and shrinking patterns</p> <p>B: Proportional vs non-proportional situations</p> <p>B2.8 compare proportional situations and determine unknown values in proportional situations, and apply proportional reasoning to solve problems in various contexts</p> <p>Number: B1.1; B1.2; B1.3 B1.4; B2.2; B2.8 Algebra: C1.1; C1.2; C1.3; C1.4 Spatial Sense: E2.1</p> | <p>Students compare numbers, metric units, patterns, and situations, and they describe relationships. They use scientific notation to compare very large and very small numbers, and make connections to metric units describing very large and very small units.</p> <p>They compare the areas and side lengths of perfect squares and encounter irrational numbers as they describe side length of imperfect squares</p> <p>They use nested diagrams to describe the relationship within the real number system. They compare and order real numbers and describe equivalent relationships among rational numbers.</p> <p>They compare a variety of patterns, in a variety of forms, and identify equivalent representations. They compare proportional and non-proportional situations and describe the difference.</p> |

| October | QUESTION: How are things changing? | |
|---------|---|---|
| | Topics and Specific Expectations | Connecting the Learning |
| | <p>C: Linear growing & shrinking patterns</p> <p>C1.1 identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts, and compare linear growing and shrinking patterns on the basis of their constant rates and initial values</p> <p>C1.2 create and translate repeating, growing, and shrinking patterns involving rational numbers using various representations, including algebraic expressions and equations for linear growing and shrinking patterns</p> <p>C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in growing and shrinking patterns involving rational numbers, and use algebraic representations of the pattern rules to solve for unknown values in linear growing and shrinking patterns</p> <p>B: Proportional & non-proportional situations</p> <p>B2.8 compare proportional situations and determine unknown values in proportional situations, and apply proportional reasoning to solve problems in various contexts</p> <p>F, D: Simple vs compound interest (growth)</p> <p>F1.4 determine the growth of simple and compound interest at various rates using digital tools, and explain the impact interest has on long-term financial planning</p> <p>D1.1 identify situations involving one-variable data and situations involving two-variable data, and explain when each type of data is needed</p> <p>E: Scale drawing to calculate lengths</p> <p>E1.3 use scale drawings to calculate actual lengths and areas, and reproduce scale drawings at different ratios</p> <p>E: Tessellations & transformations</p> <p>E1.1 identify geometric properties of tessellating shapes and identify the transformations that occur in the tessellations</p> <p>Number: B2.8 Algebra: C1.1; C1.2; C1.3 Data: D1.1 Spatial Sense: E1.1; E1.3 Financial Literacy: F1.4</p> | <p>Students describe ways in which amounts and shapes change. They analyze linear growing and shrinking patterns represented in various forms and compare the rates at which they grow. They use algebraic expressions and equations to describe the increase or decrease. They recognize that linear patterns which pass through the origin are proportional and those that do not are not proportional. They identify the role of the constant when plotting a linear equation on a graph and describe the impact of the multiplier on the rate of growth.</p> <p>They compare graphs showing the growth rates of simple and compound interest They describe the impact that interest can have on long-term financial goals.</p> <p>They describe the change displayed in scale drawings and use the scale to calculate actual lengths and areas. They change the scale, and produce a similar drawing. They analyze and research different types of tessellations, identify the transformations that make up the designs, and create their own tessellating pattern.</p> |

| November | QUESTION: How much is that? | |
|----------|---|--|
| | Topics and Specific Expectations | Connecting the Learning |
| | <p>B: Add & subtract integers</p> <p>B1.2 describe, compare, and order numbers in the real number system (rational and irrational numbers), separately and in combination, in various contexts</p> <p>B2.1 use the properties and order of operations, and the relationships between operations, to solve problems involving rational numbers, ratios, rates, and percents, including those requiring multiple steps or multiple operations</p> <p>B2.4 add and subtract integers, using appropriate strategies, in various contexts</p> <p>B: Multiply & divide integers</p> <p>B2.7 multiply and divide integers, using appropriate strategies, in various contexts</p> <p>C: Add & subtract monomials and add binomials</p> <p>C2.1 add and subtract monomials with a degree of 1, and add binomials with a degree of 1 that involve integers, using tools</p> <p>C: Evaluate expressions</p> <p>C2.2 evaluate algebraic expressions that involve rational numbers</p> <p>C1.4 create and describe patterns to illustrate relationships among rational numbers</p> <p>B, E: Determine perimeter, circumference, area, and volume</p> <p>B1.3 estimate and calculate square roots, in various contexts</p> <p>B2.2 understand and recall commonly used square numbers and their square roots</p> <p>E2.3 solve problems involving the perimeter, circumference, area, volume, and surface area of composite two-dimensional shapes and three-dimensional objects, using appropriate formulas</p> <p>E: Unknown angle measures</p> <p>E2.2 solve problems involving angle properties, including the properties of intersecting and parallel lines and of polygons</p> <p>B, C: Solve algebraic equations</p> <p>B1.4 use fractions, decimal numbers, and percents, including percents of more than 100% or less than 1%, interchangeably and flexibly to solve a variety of problems</p> <p>B2.3 use mental math strategies to multiply and divide whole numbers and decimal numbers up to thousandths by powers of ten, and explain the strategies used</p> <p>C2.3 solve equations that involve multiple terms, integers, and decimal numbers in various contexts, and verify solutions</p> <hr/> <p>Number: B1.2; B1.3; B1.4; B2.1; B2.2; B2.3; B2.4; B2.7; Algebra: C1.4; C2.1; C2.2; C2.3 Spatial Sense: E2.2; E2.3</p> | <p>Students use models, number sense, and spatial reasoning to describe and determine “how much”. They solve problems involving the addition and subtraction of integers. They use concrete materials and number string patterns to explain the result when multiplying and dividing integers.</p> <p>They add and subtract monomials, and add binomials. They evaluate expressions that involve whole numbers and decimals to determine the perimeter, circumference, area, or volume of various objects. They use the properties of angles and the properties of various polygons to determine unknown angles. They solve equations to determine an unknown value.</p> |

| December | | QUESTION: What's the story? |
|--------------------------------------|--|--|
| | Topics and Specific Expectations | Connecting the Learning |
| | <p>D: One- & two-variable data</p> <p>D1.1 identify situations involving one-variable data and situations involving two-variable data, and explain when each type of data is needed</p> <p>D: Collect, organize, visualize & analyze data, including with scatterplots</p> <p>D1.2 collect continuous data to answer questions of interest involving two variables, and organize the data sets as appropriate in a table of values</p> <p>D1.3 select from among a variety of graphs, including scatter plots, 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</p> <p>D1.6 analyse different sets of data presented in various ways, including in scatter plots 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</p> <p>D: Impact of outliers on measures of central tendency</p> <p>D1.5 use mathematical language, including the terms “strong”, “weak”, “none”, “positive”, and “negative”, to describe the relationship between two variables for various data sets with and without outliers</p> <p>D: Tell data story (infographic)</p> <p>D1.4 create an infographic about a data set, representing the data in appropriate ways, including in tables and scatter plots, and incorporating any other relevant information that helps to tell a story about the data</p> <p>C: Algebraic stories (monomials, binomials; evaluating expressions)</p> <p>C2.1 add and subtract monomials with a degree of 1, and add binomials with a degree of 1 that involve integers, using tools</p> <p>C2.2 evaluate algebraic expressions that involve rational numbers</p> | <p>Students ask questions and gather information about areas of interest that involve continuous data and two variables. They organize the data sets in a table of values and represent their findings in appropriate graphs, including scatterplots. They use mathematical language to describe the relationship between the two variables and they create an infographic to share their findings and point of view. They add other relevant information to help tell their story.</p> <p>They also analyze other visual displays of data, and identify any misleading graphs or other strategies that might unfairly persuade an audience.</p> <p>In addition to telling stories with data, students also tell stories with algebraic expressions, including monomials and binomials. They use expressions to represent a given situation, and describe situations that could represent a given expression. They evaluate expressions with quantities that involve rational numbers.</p> |
| | <p>Algebra: C2.1; C2.2 Data: D1.1; D1.2; D1.3; D1.4; D1.5; D1.6</p> | |
| C4: Integrated Modelling Task | | |

| January | QUESTION: Scaling & splitting: How much now? | |
|---------|---|--|
| | Topics and Specific Expectations | Connecting the Learning |
| | <p>B: Multiply & divide integers B2.7 multiply and divide integers, using appropriate strategies, in various contexts</p> <p>B: Multiply & divide fractions B2.6 multiply and divide fractions by fractions, as well as by whole numbers and mixed numbers, in various contexts</p> <p>B: Mentally multiply and divide whole and decimal numbers by powers of 10 B2.3 use mental math strategies to multiply and divide whole numbers and decimal numbers up to thousandths by powers of ten, and explain the strategies used</p> <p>B: Proportional situations (ratios, rates) B2.1 use the properties and order of operations, and the relationships between operations, to solve problems involving rational numbers, ratios, rates, and percents, including those requiring multiple steps or multiple operations B2.8 compare proportional situations and determine unknown values in proportional situations, and apply proportional reasoning to solve problems in various contexts</p> <p>B: Problems involving fractions, decimals, & percents (including <1% and >100%) B1.4 use fractions, decimal numbers, and percents, including percents of more than 100% or less than 1%, interchangeably and flexibly to solve a variety of problems</p> <p>F: Exchange rates & payment methods F1.1 describe some advantages and disadvantages of various methods of payment that can be used when dealing with multiple currencies and exchange rates</p> <hr/> <p>Number: B1.4; B2.1; B2.3; B2.6; B2.7; B2.8 Financial Literacy: F1.1</p> | <p>Students apply their understanding of operations to integers and rational numbers as they solve problems involving scaling and splitting. They represent situations with drawings and algebraic expressions as they solve the equation. They mentally multiply and divide whole numbers and decimals by powers of 10, and describe situations where these strategies could be applied. They compare proportional situations and use ratios and rates to scale up quantities or split them. They use relationships between fractions, decimals, and percents to calculate a percentage increase or decrease and determine percentages greater than 100% and less than 1%. They use this understanding of rates and percentages to describe the advantages and disadvantages of different payment methods when dealing with multiple currencies and exchange rates.</p> |

| February | QUESTION: How can we describe the space around us? | |
|----------|--|--|
| | Topics and Specific Expectations | Connecting the Learning |
| | <p>E: Construct scaled objects and models given 2D views E1.2 make objects and models using appropriate scales, given their top, front, and side views or their perspective views</p> <p>E: Reproduce scaled drawings and objects at different ratios E1.3 use scale drawings to calculate actual lengths and areas, and reproduce scale drawings at different ratios</p> <p>E: Movement & change on a Cartesian plane E1.4 describe and perform translations, reflections, rotations, and dilations on a Cartesian plane, and predict the results of these transformations</p> <p>E: Side lengths of squares & right triangles; the Pythagorean theorem E2.4 describe the Pythagorean relationship using various geometric models, and apply the theorem to solve problems involving an unknown side length for a given right triangle</p> <p>E: Solve measurement problems (length, circumference, area, volume, surface area, & angle) E2.2 solve problems involving angle properties, including the properties of intersecting and parallel lines and of polygons E2.3 solve problems involving the perimeter, circumference, area, volume, and surface area of composite two-dimensional shapes and three-dimensional objects, using appropriate formulas</p> <p>C: Evaluate algebraic expressions B2.1 use the properties and order of operations, and the relationships between operations, to solve problems involving rational numbers, ratios, rates, and percents, including those requiring multiple steps or multiple operations C2.1 add and subtract monomials with a degree of 1, and add binomials with a degree of 1 that involve integers, using tools C2.2 evaluate algebraic expressions that involve rational numbers C2.3 solve equations that involve multiple terms, integers, and decimal numbers in various contexts, and verify solutions</p> <p>Number: B2.1 Algebra: C2.1; C2.2; C2.3 Spatial Sense: E1.2; E1.3; E1.4; E2.2; E2.3; E2.4</p> | <p>Students compare, construct, identify and measure shapes and objects in space. They construct scaled objects and models given different views and perspectives. They reproduce scaled drawings and objects using different ratios. They visualize, construct, and compare dilations, rotations, reflections, and translations on a Cartesian plane, and describe patterns among the coordinates that help predict the location of a transformation. They explain how these spatial operations can be described using algebraic expressions.</p> <p>They compose and decompose composite shapes and objects creatively in order to apply formulas and indirectly measure attributes. When indirect measurement is not possible, they use different strategies to measure attributes directly. They recognize that the side length of a square is equal to the square root of its area. They apply this to find the side lengths of a right triangle and in doing so recognize the Pythagorean relationship. They formalize this as a theorem and apply it to solving real-life problems.</p> |

| March | QUESTION: When are different operations useful? | |
|-------|---|--|
| | Topics and Specific Expectations | Connecting the Learning |
| | <p>B: Add & subtract integers, fractions, & decimals to compare & describe additive change</p> <p>B1.4 use fractions, decimal numbers, and percents, including percents of more than 100% or less than 1%, interchangeably and flexibly to solve a variety of problems</p> <p>B2.1 use the properties and order of operations, and the relationships between operations, to solve problems involving rational numbers, ratios, rates, and percents, including those requiring multiple steps or multiple operations</p> <p>B2.4 add and subtract integers, using appropriate strategies, in various contexts</p> <p>B2.5 add and subtract fractions, using appropriate strategies, in various contexts</p> <p>B: Multiply & divide to make relative comparisons, describe multiplicative change, & solve for proportional situations</p> <p>B2.3 use mental math strategies to multiply and divide whole numbers and decimal numbers up to thousandths by powers of ten, and explain the strategies used</p> <p>B2.6 multiply and divide fractions by fractions, as well as by whole numbers and mixed numbers, in various contexts</p> <p>B2.7 multiply and divide integers, using appropriate strategies, in various contexts</p> <p>B2.8 compare proportional situations and determine unknown values in proportional situations, and apply proportional reasoning to solve problems in various contexts</p> <p>C: Represent situations that involve adding & subtracting monomials & adding binomials</p> <p>C2.1 add and subtract monomials with a degree of 1, and add binomials with a degree of 1 that involve integers, using tools</p> <p>C2.2 evaluate algebraic expressions that involve rational numbers</p> <p>C2.3 solve equations that involve multiple terms, integers, and decimal numbers in various contexts, and verify solutions</p> <p>C2.4 solve inequalities that involve integers, and verify and graph the solutions</p> <p>E: Calculate lengths and areas on scale drawings; apply different scale ratios</p> <p>E1.3 use scale drawings to calculate actual lengths and areas, and reproduce scale drawings at different ratios</p> <p>E2.3 solve problems involving the perimeter, circumference, area, volume, and surface area of composite two-dimensional shapes and three-dimensional objects, using appropriate formulas</p> <p>E: Predict transformations on a Cartesian plane</p> <p>E1.4 describe and perform translations, reflections, rotations, and dilations on a Cartesian plane, and predict the results of these transformations</p> <p>E2.2 solve problems involving angle properties, including the properties of intersecting and parallel lines and of polygons</p> <p>E: Calculate unknown measurements</p> <p>E2.4 describe the Pythagorean relationship using various geometric models, and apply the theorem to solve problems involving an unknown side length for a given right triangle</p> <hr/> <p>Number: B1.4; B2.1; B2.3; B2.4; B2.5; B2.6; B2.7; B2.8 Algebra: C2.1; C2.2; C2.3; C2.4 Spatial Sense: E1.3; E1.4; E2.2; E2.3; E2.4</p> | <p>Students add and subtract integers, fractions, and decimals to make absolute comparisons and describe additive change. They multiply and divide integers, fractions, and decimals to make relative comparisons and describe multiplicative change. They determine the appropriate operations that match a situation, write the equation, and then solve it.</p> <p>They represent and solve problems that involve adding and subtracting monomials and adding binomials. They use multiplication and division to compare proportional situations and the scaling factor or unit rate to determine unknown values. They use multiplication and division to determine the length and area of objects in a scale drawing, and to create drawings and models at different scales.</p> |

| April | QUESTION: Are things in balance? | |
|--------------------------------------|---|--|
| | Topics and Specific Expectations | Connecting the Learning |
| | <p>F: Create long-term plan for financial goal F1.2 create a financial plan to reach a long-term financial goal, accounting for income, expenses, and tax implications</p> <p>F: Maintain balanced budget & track inputs & spending F1.3 identify different ways to maintain a balanced budget, and use appropriate tools to track all income and spending, for several different scenarios</p> <p>B, C, E: Solve for proportional situations (linear patterns; scale drawings; dilations) B2.1 use the properties and order of operations, and the relationships between operations, to solve problems involving rational numbers, ratios, rates, and percents, including those requiring multiple steps or multiple operations B2.8 compare proportional situations and determine unknown values in proportional situations, and apply proportional reasoning to solve problems in various contexts C2.3 solve equations that involve multiple terms, integers, and decimal numbers in various contexts, and verify solutions E1.2 make objects and models using appropriate scales, given their top, front, and side views or their perspective views E1.3 use scale drawings to calculate actual lengths and areas, and reproduce scale drawings at different ratios E1.4 describe and perform translations, reflections, rotations, and dilations on a Cartesian plane, and predict the results of these transformations</p> <p>C: Solve equations with multiple terms C2.1 add and subtract monomials with a degree of 1, and add binomials with a degree of 1 that involve integers, using tools C2.2 evaluate algebraic expressions that involve rational numbers</p> <p>C: Solve & graph inequalities C2.4 solve inequalities that involve integers, and verify and graph the solutions</p> <hr/> <p>Number: B2.1; B2.8 Algebra: C2.1; C2.2; C2.3; C2.4 Spatial Sense: E1.2; E1.3; E1.4 (dilations) Financial Literacy: F1.2; F1.3</p> | <p>Students describe ways to keep things in balance and equal. They create a long-term financial plan and identify ways to maintain a balanced budget that accounts for income, expenses, taxes, and spending, given different scenarios.</p> <p>They solve proportional situations using ratio tables, drawings, algebraic expressions, and graphs. They describe relationships among these representations and demonstrate how the quantities vary at the same rate. They apply this thinking to create dilations, similar shapes, scale drawings, and proportional linear patterns.</p> <p>Students also use a balance model to solve equations involving multiple terms, integers, and decimal numbers. They evaluate algebraic expressions involving rational numbers, and use inverse operations to verify that expressions on both sides of the equal sign in an equation are in balance.</p> |
| C4: Integrated Modelling Task | | |

| May | QUESTION: How can we make predictions and decide? | |
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| | Topics and Specific Expectations | Connecting the Learning |
| | <p>F: Compare rates, fees, & incentives & determine best value & best choice</p> <p>F1.4 determine the growth of simple and compound interest at various rates using digital tools, and explain the impact interest has on long-term financial planning</p> <p>F1.5 compare various ways for consumers to get more value for their money when spending, including taking advantage of sales and customer loyalty and incentive programs, and determine the best choice for different scenarios</p> <p>F1.6 compare interest rates, annual fees, and rewards and other incentives offered by various credit card companies and consumer contracts to determine the best value and the best choice for different scenarios</p> <p>C, D: Represent linear patterns (rates) graphically & identify missing elements</p> <p>C1.2 create and translate repeating, growing, and shrinking patterns involving rational numbers using various representations, including algebraic expressions and equations for linear growing and shrinking patterns</p> <p>C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in growing and shrinking patterns involving rational numbers, and use algebraic representations of the pattern rules to solve for unknown values in linear growing and shrinking patterns</p> <p>D: Scatterplots, relationships & trends</p> <p>D1.3 select from among a variety of graphs, including scatter plots, 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</p> <p>D1.5 use mathematical language, including the terms “strong”, “weak”, “none”, “positive”, and “negative”, to describe the relationship between two variables for various data sets with and without outliers</p> <p>D1.6 analyse different sets of data presented in various ways, including in scatter plots 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</p> <p>D: Independent vs dependent events</p> <p>D2.2 determine and compare the theoretical and experimental probabilities of multiple independent events happening and of multiple dependent events happening</p> <p>D, B: Experimental & theoretical probabilities of multiple independent events & multiple dependent events happening</p> <p>B1.4 use fractions, decimal numbers, and percents, including percents of more than 100% or less than 1%, interchangeably and flexibly to solve a variety of problems</p> <p>B2.1 use the properties and order of operations, and the relationships between operations, to solve problems involving rational numbers, ratios, rates, and percents, including those requiring multiple steps or multiple operations</p> <p>D2.1 solve various problems that involve probability, using appropriate tools and strategies, including Venn and tree diagrams</p> <p>Number: B1.4; B2.1 Algebra: C1.2; C1.3 Data: D1.3; D1.5; D1.6; D2.1; D2.2 Financial Literacy: F1.4; F1.5; F1.6</p> | <p>Students identify patterns, trends, resources, and other factors that inform and influence decision-making and help make predictions. They compare interest rates, service fees, and incentive programs associated with different products and institutions and use this data to decide the best choice for given scenarios.</p> <p>They make predictions about missing elements in a linear pattern by determining the pattern rule, or plotting the data as a broken-line graph. They look at data presented in scatterplots and use the relationship between the two variables to make predictions and generate hypotheses. They describe the impact of outliers on data and adjust their conclusions accordingly.</p> <p>They compare the theoretical and experimental probabilities of multiple independent events happening and multiple dependent events happening. They use these probabilities to describe the degree of uncertainty they have in making a prediction. They also consider other probability scenarios (including those with data presented in Venn and tree diagrams) and describe their strategies for making a prediction.</p> |

| June | QUESTION: Is this statement true? | |
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| | Topics and Specific Expectations | Connecting the Learning |
| | <p>C: Equivalent representations of patterns</p> <p>C1.1 identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts, and compare linear growing and shrinking patterns on the basis of their constant rates and initial values</p> <p>C1.2 create and translate repeating, growing, and shrinking patterns involving rational numbers using various representations, including algebraic expressions and equations for linear growing and shrinking patterns</p> <p>C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in growing and shrinking patterns involving rational numbers, and use algebraic representations of the pattern rules to solve for unknown values in linear growing and shrinking patterns</p> <p>C1.4 create and describe patterns to illustrate relationships among rational numbers</p> <p>C2.2 evaluate algebraic expressions that involve rational numbers</p> <p>C: Solve equations</p> <p>C2.1 add and subtract monomials with a degree of 1, and add binomials with a degree of 1 that involve integers, using tools</p> <p>C2.3 solve equations that involve multiple terms, integers, and decimal numbers in various contexts, and verify solutions</p> <p>C: Solve & graph inequalities</p> <p>C2.4 solve inequalities that involve integers, and verify and graph the solutions</p> <p>C: Write, execute, & alter codes</p> <p>C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves the analysis of data in order to inform and communicate decisions</p> <p>C3.2 read and alter existing code involving the analysis of data in order to inform and communicate decisions, and describe how changes to the code affect the outcomes and the efficiency of the code</p> <p>D: Misleading graphs</p> <p>D1.5 use mathematical language, including the terms “strong”, “weak”, “none”, “positive”, and “negative”, to describe the relationship between two variables for various data sets with and without outliers</p> <p>D: Relationships between 2-variable data</p> <p>D1.6 analyse different sets of data presented in various ways, including in scatter plots and in misleading graphs, by asking and answering questions about the data, challenging preconceived notions, and drawing conclusions, then make convincing arguments and informed decision</p> <p>D: Probability claims and the nature of uncertainty</p> <p>D2.1 solve various problems that involve probability, using appropriate tools and strategies, including Venn and tree diagrams</p> <p>D2.2 determine and compare the theoretical and experimental probabilities of multiple independent events happening and of multiple dependent events happening</p> <p>E: Visual proofs for Pythagorean theorem</p> <p>E2.4 describe the Pythagorean relationship using various geometric models, and apply the theorem to solve problems involving an unknown side length for a given right triangle</p> <hr/> <p>Number: B2.1 Algebra: C1.1; C1.2; C1.3; C1.4; C2.1; C2.2; C2.3; C2.4; C3.1; C3.2 Data: D1.5; D1.6; D2.1; D2.2 Spatial Sense: E2.4</p> | <p>Students analyze a variety of situations to decide whether they are true. They decide if various representations of a pattern or situation are equivalent. They verify that a solution to an equation is true, including equations involving monomials and binomials.</p> <p>They solve and graph inequalities and explain conditions for when an inequality is true or false. They compare two sets of code, determine if they are equivalent, and describe what makes one more efficient than the other.</p> <p>They research and share visual proofs for the Pythagorean theorem and explain what makes the proofs convincing. They analyze misleading graphs and describe how the truth has been distorted. They look at different scatterplots and the relationship between the two variables, and decide whether the conclusions are justified. They examine probability data and decide whether the probability claims are reasonable.</p> |