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Overall Curriculum Expectations:
• Solve problems involving the addition and subtraction of single-digit whole numbers, using a variety of strategies.

Specific Curriculum Expectations:
• Solve a variety of problems involving the addition and subtraction of whole numbers to 20, using concrete materials and drawings (e.g., pictures, number lines).
• Solve problems involving the addition and subtraction of single-digit whole numbers, using a variety of mental strategies (e.g., one more than, one less than, counting on, counting back, doubles).

Introduction to Lesson

Teacher Background:
Please review the teacher notes from the eBook. This is located in Mathletics Teacher Console > eBooks > Grade 1 > Lady Bug Crawl > Teacher notes.

On the interactive whiteboard, play video from “Lady Bug Crawl,” located in the Mathletics Teacher Console under eBooks. This will initiate the thought process based on a visual for computational learning. Pause during the questions asked in the video.

Ask students for further elaboration:
• Why was it more useful to move 2 lady bugs than just 1?
• Why was the total of 14 the same in both of your number sentences?
• Could you have predicted that? How would the number sentences have been alike and different if 6 lady bugs had crawled from the right to the left?
• What types of mental math strategies did you use?

ITEMS NEEDED
• Interactive whiteboard
• Mathletics teacher logins
• Mathletics student logins
• Manipulatives
• Teacher notes from “Lady Bug Crawl”
• Student handout: “Lady Bug Crawl”
• Computers/tablets

ASSESSMENTS
• Observation
• Participation
• Review of completed student “Lady Bug Crawl” worksheet
• Results from curriculum activities within Mathletics teacher account
• Student-created number sentences

ACCOMMODATIONS/ MODIFICATIONS
• Concept Search: “Number line for addition”
• Students who are having difficulty could be given smaller numbers or asked to find fewer combinations.
• Encourage students to click on “Something Easier” and “Something Harder” within the curriculum activities of Mathletics.

EXTENSION OF LEARNING
• Problem solving game “Honey Money”
• Curriculum activities
• Live Mathletics levels 1 & 2
• “Rainforest Maths” Grade 1: Number
The Lesson

**eBook: Lady Bug Crawl**

- Hand out the student sheet and have them complete the student question. Give students enough time to brainstorm as many number sentences as possible. Provide students with manipulatives and have the students colour and cut out the lady bugs and leaves.

- Display "Lady Bug Crawl" interactive on the interactive whiteboard. Have the students show/share the number sentences they created. Ask prompt questions such as How many lady bugs are on each leaf at the start? At the end? Were there more or fewer lady bugs at the end? Why is this? Why couldn’t both numbers increase? Why couldn’t both decrease?

- **Reinforcement:** Have the students complete curriculum activities in the Student Console. Suggested activities: Model Addition; Model Subtraction; Fact Families: Add and Subtract; All About Twenty; Doubles and Halves to 10; Doubles and Halves to 20; Add and Subtract Problems.

- **Extra-time activity/cross-curriculum activity:** Have the students create their own problem using construction paper and bugs or animals as the visual. Students should create a number sentence by colouring their bugs or animals and cutting and pasting them onto a strip of paper. Students should write one sentence about their number sentence using terms such as less than, more than, doubled, etc.

After the lesson

- Have the students journal or share the learning that took place during this session. They should use what was learned today, and be specific with their examples. Students can show/share some of the number sentences they created.

- **Reflection Questions:** What did you learn about your number sentences? What did you find easy about creating your number sentence? What did you find hard? Did you have to count backward or forward? What would happen if we had doubled the number you started with?
Overall Curriculum Expectations:
• Compose and decompose two-dimensional shapes and three-dimensional figures.

Specific Curriculum Expectations:
• Identify and describe various three-dimensional figures (i.e., cubes, prisms, pyramids) and sort and classify them by their geometric properties.
• Create models and skeletons of prisms and pyramids using concrete materials and describe their geometric properties.
• Build a structure using three-dimensional figures and describe the two-dimensional shapes and three-dimensional figures in the structure.

Teacher Background:
Ask the class, What does 3-dimensional mean? This will allow students to bring up their prior knowledge. Students can also fill out a KWL chart for further extension. On the interactive whiteboard, go to
Mathletics Teacher Console > Demonstrations > Concept Search > Animated Math Dictionary > search for “three-dimensional”

Discuss with the students the definition and the picture displayed. Click back to Concept Search within Demonstrations, and click on the Concept Search icon. Enter 3D objects in the Search field on the top left. It will bring up a few different slides; click on the first slide, which displays multiple objects. There are ten slides here and not all will apply to the lesson (slides 2, 3, 5, 7 are applicable). To further the extension, teachers can search each object in the Search field.

For further extension, ask students:
• What objects in the classroom have the same shape?
• How are these shapes similar or different?
• Why do you think these are 3D shapes?
• What could these shapes be used for (buildings, household products)?
• What 2D shapes do you see in these 3D shapes?

ITEMS NEEDED
✓ Interactive whiteboard
✓ Mathletics teacher and student logins
✓ eBook student pages from Grade 2, Space and Shape
✓ Shape manipulatives
✓ Math journals
✓ Computers/mobile devices

ASSESSMENTS
✓ Observation and participation
✓ Reviewing completed student worksheet
✓ Results from the Mathletics curriculum activities, located under Reports in Teacher Console
✓ Assessment from teacher eBook under Assessment; pages 44–49

ACCOMMODATIONS/MODIFICATIONS
✓ Provide students with extra worksheets about 3D shapes from grade 1 or grade 3 Shape and Space.
✓ Encourage students to click on “Something Easier” and “Something Harder” within the curriculum activities of Mathletics.

EXTENSION OF LEARNING
✓ Curriculum activities
✓ Explore more in Concept Search and “Rainforest Maths.”
✓ Students can record 3D objects they come across over the next couple of days.
The Lesson

**eBook: Space and Shape**

- In the Grade 2 "Space and Shape" student eBook, refer to pages 18–19 and 24–25. Students will carry out these activities with partners. Students will need items listed, along with shape manipulatives. Have students discuss vertices, edges, and faces using 3D shapes. After they complete the pages, have students search the classroom of other objects they believe to be 3-dimensional. They can record these objects in their journals. If there is time, show and share with the class.

- **Reinforcement:** Using computers or mobile devices, students complete curriculum activities in the Student Console. Suggested activities: Collect the Objects, Collect the Objects 2, Relate Shapes and Solid, How Many Faces?, How Many Corners?, How Many Edges? In Rainforest Math, under Grade 2, 3D shapes, students can explore several different options, including a quiz they can complete with a partner.

- **Extra-time activity/cross-curriculum activity:** Students can create 3D shapes using straws/toothpicks and play dough. They are to pick a shape and create it using the materials provided. This can be conducted as an individual or partner activity. Students can write a display card for their shape, naming their shape and describing its geometric properties. (Sephora Sphere; she has no vertices, no edges, and no faces. She is round and rolls.)

After the lesson

- Show two different objects and ask students, How are they similar? How are they different? They can refer to some of the strategies they used while completing the activities earlier. Have the students indicate the name for each of the objects they came across today (cubes, spheres, cones, cylinders, pyramids).

- On the interactive whiteboard, bring up "Rainforest Maths" from the Teacher Console. Click on Grade 2, 3D Shapes. Complete the quiz as a class.
Overall Curriculum Expectations:
• Solve problems involving the addition and subtraction of one- and two-digit whole numbers, using a variety of strategies, and investigate multiplication and division.

Specific Curriculum Expectations:
• Solve problems involving the addition and subtraction of whole numbers to 18, using a variety of mental strategies.
• Describe relationships between quantities by using whole-number addition and subtraction.
• Solve problems involving the addition and subtraction of two-digit numbers, with and without regrouping, using concrete materials.

Teacher Background:
Please review the teacher notes from the eBook. This is located in Mathletics Teacher Console > eBooks > Grade 2/3 > Ribbons > Teacher notes.

Play "3 Ribbons" video on the interactive whiteboard. (This is located in the Teacher column on the far-right side of the screen. This will initiate the thought process for computational learning based on a visual. This is to start a discussion but not to solve the question. Students will have the opportunity to solve the question during the lesson.

Ask students for further extension to get them to start thinking how they can solve the problem:
• Do you think that the shortest ribbon could be 80 cm long? Why or why not?
• Do you think that the longest ribbon could be 50 cm long? Why or why not?
• Could one ribbon be 5 cm long? Why or why not? Could one ribbon be twice as long as another?
• What strategy did you use to come up with solutions?
• Once you have a solution, how could you use it to create another one?

ITEMS NEEDED
✓ Interactive whiteboard
✓ Teacher/ student Mathletics logins
✓ Teacher notes—"3 Ribbons"
✓ Student handout—"3 Ribbons"
✓ Math journals
✓ Computers/mobile devices.

ASSESSMENTS
✓ Observation and participation
✓ Reviewing completed “3 Ribbons” student worksheet
✓ Reporting results within the Mathletics Teacher Console for curriculum and Live Mathletics results.

ACCOMMODATIONS/ MODIFICATIONS
✓ Provide students with ribbons for manipulatives.
✓ Encourage students to click on the “Something Easier” and “Something Harder” within the Mathletics curriculum activities.

EXTENSION OF LEARNING
✓ Problem-solving game under subtraction “Monkey 1” or “Monkey 2” [EDITOR: IS THIS SUPPOSED TO BE IN PROBLEM SOLVING IN DEMONSTRATIONS?]
Marian Small’s “3 Ribbons” eBook

- Within the “3 Ribbons” eBook in the Teacher Console, click on “3 Ribbons” under “Interactives” on the far right. This can be displayed on the interactive whiteboard. Click on “See question.” Discuss some strategies students can use to solve the problem. Teachers can access problem-solving strategies under eBooks, Problem Solving on the far right of the Grade bar. Click on Problem Solving. There will be three books to choose from. For grade 2, click on Problem Solving Level 1. The strategies discussed in the Problem Solving eBook are Read, plan, work and check; Draw a diagram; Look for patterns; Act it out; Trial and error; Make a list; Estimation, Work backwards; and Open ended. Discuss strategies with students and allow them to work in groups/pairs to solve the problem.

- Reinforcement: Using computers or mobile devices, students complete curriculum activities in the Student Console. Suggested activities: Addition; Additive addition; Simple Subtraction; Subtraction Facts to 18; Problems; Add and Subtract; 1 More 2 Less; Doubles and Halves to 20.

- Extra-time activity/cross-curriculum activity: Mystery Number—Pick a two-digit number and create hints for students to figure out the number. Have the students create a poster displaying hints on what the number could be. Encourage students to use number sentences, pictures, or words. Teachers can implement rules such as a minimum of 4 hints, you cannot use any numbers from your mystery number, has to be at least a 2-digit number, etc.

After the lesson

- Have the students reflect in their journals about the lesson. What strategies did they use? Which ones did they find to be helpful to solve this problem? Or create a “What stuck with you today” board. Students write their responses on sticky notes and place them on this board. Review these sticky notes at the end of the week and share the process/thoughts with the class.
Overall Curriculum Expectations:
• Demonstrate an understanding of the concept of equality between pairs of expressions, using concrete materials, symbols, and addition and subtraction to 18.

Specific Curriculum Expectations:
• Demonstrate an understanding of the concept of equality by partitioning whole numbers to 18 in a variety of ways using concrete materials.
• Represent, through investigation with concrete materials and pictures, two number expressions that are equal, using the equal sign.

Introduction to Lesson

Teacher Background:
Display this on a whiteboard/poster paper. On the interactive whiteboard, from your Teacher Console go to

Demonstrations > Concept Search > Concept Search.

Search equal and unequal. These slides will display the definition and symbol, and give examples. Have the students brainstorm situations where they could use these symbols or where they have seen them before. Display examples on the board and have students figure out which symbol to use.

Ask students for further elaboration:
• When is something balanced or unbalanced?
• Prompt questions about a scale with weighed objects.
• Then have a class discussion about what they think/know about the terms equality and inequality.

ITEMS NEEDED
• Interactive whiteboard
• Mathletics teacher login
• Mathletics student logins
• Student handouts from eBooks
• Problem-solving page
• Classroom manipulatives
• Computers/tablets
• Math journals

ASSESSMENTS
• Observation and participation
• Review completed worksheets
• Review journal responses

ACCOMMODATIONS/MODIFICATIONS
• Allow student to use manipulatives to help create patterns.
• Create heterogeneous grouping.
• One-on-one with the teacher

EXTENSION OF LEARNING
• Problem-solving games
• Curriculum activities
• Explore “Rainforest Maths.”
• Live Mathletics
• Weigh different substances in science. Discuss mass and different types of materials. Create balanced and unbalanced scales. Have students write an expression to describe the equality or inequality.
Problem Solving Level 1 eBook


Go to Open ended on the right side of the page. Go to Worksheet 6. This worksheet will allow students to solve a problem based on something being balanced or equal. Have students record their answers. Open class discussion about answers and strategies.

Extension questions:
What if we wanted to make the scale unbalanced or unequal?
What if we doubled the pile of books? What pile of books can be added to balance it now?
Can you re-create this problem using only numbers? What would that look like? What symbols can we use while solving this problem?
Ask students to flip the page over and create their own problem using pictures. They can have a problem that will be either equal or unequal.

• Explore: Mathletics—Students can explore within Mathletics. The areas they should focus on are “Rainforest Maths,” Grades 2 and 3, Algebra; Concept Search; and Problem Solving, Balance.

• Reinforcement: eBooks—Students are to complete the pre-selected pages. Teacher can use manipulatives to help support various learning styles. Recommend: eBooks, Grade 2, Patterns and Relationships, pages 18–25; and Grade 3, Patterns and Algebra, pages 13–18.

• Extra-time activity/cross-curriculum activity: Students can create their own balance scale. This is created with a hanger, hanging a cup from a string on each end of the hanger. Students can place various classroom objects on the scale and record what is equal and unequal.

After the lesson

• Review the symbols for equal and unequal. What strategies should students use? How can they use these symbols with numbers, words, pictures, and sounds?

• Have students write a number expression that shows equality. Students must write this on chart paper or the interactive whiteboard. Discuss the different statements and how they show equality.

For more information contact our friendly team...
Email: customerservice@3plearning.ca | Tel: +1 877 467 6851
Overall Curriculum Expectations:
• Collect and organize categorical or discrete primary data and display the data, using tally charts, concrete graphs, pictographs, line plots, simple bar graphs, and other graphic organizers, with labels ordered appropriately along horizontal axes, as needed.

Specific Curriculum Expectations:
• Gather data to answer a question, using a simple survey with a limited number of responses.
• Collect and organize primary data that is categorical or discrete and display the data using one-to-one correspondence in concrete graphs, pictographs, etc.

Teacher Background:
On the whiteboard, write down the term increasing patterns and ask what they think this term might mean.

Ask students what they think a pictograph is:
• Why would it be used?
• What kind of information can it display?
• On the interactive whiteboard, bring up Animated Math Dictionary by going to
  Teacher Console > Demonstrations > Concept Search > Animated Maths Dictionary.

Search for pictograph and discuss the definition. If students have individual journals or dictionaries, have them enter the definition.

ITEMS NEEDED
✓ Interactive whiteboard
✓ Mathletics teacher login
✓ Mathletics student login
✓ Manipulatives
✓ Student handout from eBooks pp. 14–16
✓ Math journals
✓ Computers/mobile devices

ASSESSMENTS
✓ Observation
✓ Participation
✓ Reviewing completed worksheets.
✓ Reporting results within the Teacher Console of Mathletics for curriculum.
✓ Graphs created by the students.
✓ Teacher assessments within the teacher eBook: Grade 1, Data and Chance, page 29

ACCOMMODATIONS/ MODIFICATIONS
✓ Create center groups according to heterogeneous grouping.
✓ Encourage students to click on “Something Easier” and “Something Harder” within the Mathletics curriculum activities
✓ Print off student worksheets from lower or higher grades.
✓ Provide various manipulatives.

EXTENSION OF LEARNING
✓ Curriculum activities
✓ Extra worksheets from eBooks.
✓ “Rainforest Maths,” Grade 1—Data
The Lesson

Centres

• **Background for teacher**—Teachers can add more centres to the ones indicated below: for example, the main resource used in the classroom. For the eBook centre, review the pages you would like the students to complete. Depending on how much work students can get done with each centre, rotation can occur about every 10 minutes. Groups will vary depending on class size.

  - **Centre 1:** Computers/tablets—Have students complete curriculum activities within the student Mathletics site. Suggested activities under Data and Probability: Pictographs and Making Graphs.

  - **Centre 2:** eBooks—Pages 14–16 in the Grade 1 Chance and Data student booklet. Student can work as partners or complete individually.

  - **Centre 3:** Creating a Graph—Have the students formulate their own question and collect their data within the classroom. Students then can display the data with manipulatives provided by the teacher. This centre is for the construction of concrete graphs. If students need help with a model, have them click on Concept Search within their student console and search pictograph.

• **Extra-time activity/cross-curriculum activity:** Collect Mathletics certificate data—Have the students collect the Mathletics certificates they earned. Brainstorm as a class on best way to display this data in the classroom. Students can create their own pictures of the certificates they earned and place them on the classroom chart.

After the lesson

Think, Pair, Share

• Have the students share with a partner beside them what they learned today. Have them discuss key concepts, such as how they collect the data, what is a pictograph, how they created their graphs, did they find anything interesting in the data, and so forth.

• Teachers can also close the lesson with a one-page assessment. This is located in eBooks/Grade 1/Chance and Data/ page 29.
Overall Curriculum Expectations:
• Compare two-dimensional shapes and three-dimensional figures and sort them by their geometric properties.

Specific Curriculum Expectations:
• Compare and sort prisms and pyramids by geometric properties (i.e., number and shape of faces, number of edges, number of vertices), using concrete materials.
• Construct rectangular prisms (e.g. using given paper nets, using Polydrons) and describe geometric properties (i.e. number and shape of faces, number of edges, number of vertices) of the prisms.

Teacher Background:
Recall prior information by having a class discussion about 3D objects and their characteristics. To prompt students’ prior learning, ask questions like; I am shaped like a soccer ball, I have a pointy top and I can roll. On the board, write down faces, edges and vertices. On the Interactive whiteboard bring up Concept Search located under Teacher Console > Demonstration > Concept Search.

Click on Concept Search and search the words edges, faces, and vertex. Each slide will show a definition, along with pictures. Discuss while viewing all slides, or have students write down the definitions in the math dictionaries.

Questions to ask:
• How are the shapes similar or different?
• What 2D shapes do you see in these objects?
• How can you describe a face, edge, or vertex to a partner?
• How many vertices, edges, and faces does a sphere have? Cylinder? Cone?

ITEMS NEEDED
✓ Interactive whiteboard
✓ Mathletics teacher and student logins
✓ eBook student pages from Grade 3, Space and Shape
✓ Shape manipulatives/nets
✓ Math journals
✓ Computers/mobile devices.

ASSESSMENTS
✓ Observation and participation.
✓ Reviewing completed student worksheets.
✓ Results from the Mathletics curriculum activities, located under reports in Teacher Console.

ACCOMMODATIONS/ MODIFICATIONS
✓ Provide students with manipulatives
✓ Provide Students with extra worksheets from grade 2 or grade 4 Shape and Space around 3D shapes.
✓ Encourage students to click on “Something Easier” and “Something Harder” within the curriculum activities of Mathletics.

EXTENSION OF LEARNING
✓ Curriculum activities
✓ Explore more in Concept Search and “Rainforest Maths.”
✓ Live Mathletics
The Lesson

**Rainforest Maths**

- **Investigate:** “Rainforest Maths”—Students are to investigate further within “Rainforest Maths.” Have students work with partners.
  - Teachers can encourage students to record their information in the math journals.
  - Direct them to click on Rainforest Maths > Grade 3 > 3D shapes.
  - There are several options for them to explore. Students can review 3D shapes first by clicking on the “3D” and “about” icons on the left side and then carry on with the other areas.
  - After students have had time to explore, have them share with the class the information they found.

- **Apply:** eBooks—Students complete the student pages within eBooks > Grade 3 > Space and Shape. Recommended pages: 14–24.

- **Reinforcement:** Using computers or mobile devices, students complete curriculum activities in the Mathletics student console.

- **Extra-time activity/cross-curriculum activity:** Nets—Students can create 3D nets to further their extension. Students can label and record all the edges, faces, and vertices.

**After the lesson**

- Hold up objects found in the classroom and have the students identify where the edges, vertices, and faces are.
- Have students bring in disposable objects from home that are three-dimensional. Students will disassemble the boxes that were brought from home. This will allow students to view the structure of these objects and analyze the edges, faces, and vertices.
Overall Curriculum Expectations:
• Describe, extend, and create a variety of numeric patterns and geometric patterns.

Specific Curriculum Expectations:
• Extend repeating, growing, and shrinking number patterns
• Create a number pattern involving addition or subtraction, given a pattern represented on a number line or a pattern rule expressed in words.
• Represent simple geometric patterns using a number sequence, a number line, or a bar graph.

Introduction to Lesson

Provide students with manipulatives and ask them to create patterns.
• Ask what kind of patterns they can create.
• Give students some time to create and discuss their patterns.
• On the whiteboard, write down the term increasing patterns and ask what they think this term might mean.
• How can we create increasing patterns or growing patterns?
• Create a pattern on your interactive whiteboard showing the first two figures and ask if they know what the next two figures should be.

ITEMS NEEDED
- Interactive whiteboard
- Mathletics teacher and student logins
- Student handout from eBooks
- Classroom manipulatives
- Computers/tablets
- Math journals

ASSESSMENTS
- Observation and participation
- Reviewing completed worksheets or reviewing journaling responses
- Group participation
- Curriculum activities results

ACCOMMODATIONS/MODIFICATIONS
- Allow student to access manipulatives to help create patterns.
- Encourage students to click on the “Something Easier and Something Harder”, within the curriculum activities of Mathletics.
- eBooks from Grade 2 or Grade 4 from Patterns

EXTENSION OF LEARNING
- Problem solving from the student Mathletics center.
- Curriculum activities
- Explore “Rainforest Maths” (Grade 3, Algebra, Patterns) within Mathletics.
- Live Mathletics.
The Lesson

Centres

• Background for teacher—For the eBook centre, please review which pages you would like the students to complete. Depending on how much work students can get done with each centre, rotation can occur about every 10 minutes. Groups will vary depending on class size.

  o Centre 1: “Rainforest Maths”—Under Algebra, Patterns, 10s, 100s and other number patterns. These show patterns with numbers. On the interactive whiteboard, place the “Rainforest Maths” Grade 3 selection from the demonstration tab within the Teacher Console. Have students take turns answering the questions on the whiteboard. Students record the questions and answers in their journals.

  o Centre 2: Computers/iPads/Tablets—Mathletics Student Console, under the Pattern curriculum activities (these activities are located in the middle of the Student Console, under “Patterns”) Suggested activities: Counting Forward Patterns, Describing Patterns and Increasing Patterns.

  o Centre 3: eBooks—Students are to complete the pre-selected pages. Teachers can place manipulatives to help support various learning styles. Students can complete in pairs or individually, recommended pages from 1–9.

• Extra-time activity/cross-curriculum activity: “Things That Grow” — Students create artwork of things that grow. Students can paint or use construction paper to display this artwork. They are to create a few stages of the thing to show how it’s growing. For example, a student can display the first stage of a flower growing without petals, the next image with 3 petals, the next with 6 petals, and so forth...

After the lesson

• Discuss some of the patterns students came across during today’s lesson. What are some strategies you used to help you solve the questions?

• Exit card: Have each student create an increasing body percussion pattern as they leave the room.
LESSON PLANS: ONTARIO
Grade 3: Statistics and Probability
Introduction to Graphing

Overall Curriculum Expectations:
• Collect and organize categorical or discrete primary data and display the data using charts and graphs, including vertical and horizontal bar graphs, with labels ordered appropriately along horizontal axes, as needed.

Specific Curriculum Expectations:
• Collect data by conducting a simple survey about themselves, their environment, issues in their school or community, or content from another subject.
• Collect and organize categorical or discrete primary data and display the data in charts, tables, and graphs with appropriate titles and labels ordered appropriately along horizontal axes, as needed, using many-to-one correspondence (e.g., in a pictograph, one car sticker represents 3 cars).

Teacher Background:
This lesson will allow students to research, collect, record, and share. Please have various resources for the students to explore along with their student Mathletics account.

If you have not introduced the term data you can view the concept in Concept Search. Ask the class,
• What are some ways we can display data?
• How can we collect the data?
• What are some types of graphs?
• The students are going to research tally marks, charts, lists, bar graphs, and line plots.
• Have the students fill out a KWL chart before they start.

ITEMS NEEDED
✓ Interactive whiteboard
✓ Mathletics teacher login
✓ Mathletics student logins
✓ Classroom manipulatives
✓ Computers/tablets
✓ KWL chart handout
✓ Resources for students to explore

ASSESSMENTS
✓ Observation
✓ Participation
✓ Group work
✓ Completion of the research project
✓ Reviewing the KWL chart
✓ Extra assessments are within the teacher eBooks/Chance and Data, pages 26–32.

ACCOMMODATION/ MODIFICATIONS
✓ Create heterogeneous grouping and assigning students with certain roles.
✓ Provide students with certain resources to limit research.
✓ Provide visual models of the graphs and questions.

EXTENSION OF LEARNING
✓ eBooks/Grade 3/ Chance and Data, pages 10–21.
✓ Curriculum activities
✓ Explore Rainforest Math (Grade 3, graphs)
The Lesson

Research
• **Background for teacher**—The first part of the lesson will introduce the graphs/charts that students will research. The second part of the lesson for students to collect and create a chart based on the charts they research.

• **Before starting the lesson**: Discuss ways students can display their research, such as using posters, journals, or pictures. For this project, teachers can implement requirements for students: for example, they need to define all the charts, must use pictures, and describe what data is best represented in each chart. Students can work in pairs or groups.

  o For the research, students can explore within the Mathletics Student Console. Encourage students to use Concept Search and “Animated Maths Dictionary.” Student can also access other resource in the classroom, such as the main math resource.

  o The second part of the lesson is for students to collect data and represent that data in one of the charts they researched. They must create a question about Mathletics. For example What is your favorite part of Mathletics? What is your favorite item to buy with credits? What countries have you played against in Live Mathletics? What Times Table Toons video do you like the most? What type certificates have you earned?

• **Reinforcement**: Student can work on curriculum activities within Mathletics. Suggest activities are, Reading from a Bar Chart, Sorting Data 1, Making Graphs, Bar Graphs, Pictographs.

• **Extra-time activity/cross-curriculum activity**: Provide each group of students with a bag of M&M’s or Skittles. Have the students sort and display their data in the graph they think would work best.

After the lesson

• Discuss with students, what are some interesting facts they learned during their research.

• Do they have similarities or differences? Review the chart names and the key differences.

• Students can finish KWL chart.
Overall Curriculum Expectations:
• Solve problems involving the addition and subtraction of single- and multi-digit whole numbers, using a variety of strategies, and demonstrate an understanding of multiplication and division.

Specific Curriculum Expectations:
• Multiply to 7 x 7 and divide to 49 ÷ 7 using a variety of mental strategies.
• Relate multiplication of one-digit numbers and division by one-digit divisors to real-life situations, using a variety of tools and strategies (e.g., place objects in equal groups, use arrays, write repeated addition and subtraction sentences).

Introduction to Lesson

Teacher Background:
Review the teacher notes located in Teacher Console > eBooks > Grade 3 > Build a Number.

Click on the book—options will show up on the far right. Click on Teacher Notes.
Play video from “Build a Number” on the interactive whiteboard for the class. This is located in the Mathletics Teacher Console under eBooks. During the video, pause and discuss the key words, which are underlined in red. If students are not aware of the fraction 1/4, please clarify. Discussion of the video is not meant to solve the question. Students will have the opportunity to solve the question during the lesson.

Ask students for further extension to get them to start thinking how they can solve the problem:
• Were you free to choose the number of flats?
• How about the number of rods?
• Why did the number of rods have to be even?
• What did you notice about the number of unit blocks?

ITEMS NEEDED
✓ Interactive whiteboard
✓ Mathletics teacher and student logins
✓ Teacher notes from “Build a Number”
✓ Base ten blocks
✓ Student handout for “Build a Number”
✓ Math journals
✓ Computers/mobile devices

ASSESSMENTS
✓ Observation and participation
✓ Reviewing completed “Build a Number” student worksheet.
✓ Reporting results within the Teacher Console of Mathletics for curriculum.

ACCOMMODATIONS/ MODIFICATIONS
✓ Provide manipulatives.
✓ Encourage students to click on “Something Easier” and “Something Harder” within the curriculum activities of Mathletics.
✓ Teacher can work with a small group of students.

EXTENSION OF LEARNING
✓ “Rainforest Maths,” Grade 3, Number
✓ Curriculum activities
✓ Live Mathletics levels 3 and 4.
Marian Small’s “Build a Number” eBook

- Provide students with the “Build a Number” student handout. Teachers can provide students with the base ten blocks sets as well. Have the students come up with many possible solutions. If students need help with ways to solve this problem, teachers can review the Problem Solving booklets within eBooks. The strategies discussed in the Problem Solving eBook are; Read, Plan, Work and Check; Draw a diagram; Look for patterns; Act it out; Trial and error; Make a list; Estimation; Work backwards; and Open Ended.

- Within the Teacher Console and the “Build a Number” eBook, click on “Build a Number” under Interactive on the far right. This can be displayed on the interactive whiteboard. Double clicking on a flat, rod, or unit block on the left will add it to the centre of the screen. Have the students come up and share some of the solutions they found, along with a strategy they used to solve this problem. As each group comes up and shares, click the Store button, which will store the solutions on the right side. After all the groups have shared, review all the solutions.

- Reinforcement: Using computers or mobile devices. Students complete curriculum activities in the Student Console. Suggested activities: any activities in the Multiplication/Division strand. Or, for review, students can try activities in the Addition/Subtraction strand before trying Multiplication Arrays.

- Extra-time activity/cross-curriculum activity: Number Cubes—Students can play a game using 2 or 3 dice. Students roll the dice and then decide whether to use the multiplication or addition symbol. They will display the answer using the base ten blocks and have the partner figure out what symbol they used. For example, a student rolls three dice and gets the numbers 3, 4, 2. Students can add or multiply the numbers and display the answer using the base ten blocks.

After the lesson

- Have students reflect in their journals about the lesson. What strategies did they use? Which ones did they find to be helpful to solve this problem? Or create a “What stuck with you today?” board. Students write their responses on sticky notes and place them on this board. You can review these at the end of the week and share the process/thoughts with your students.
LESSON PLANS: ONTARIO
Grade 4: Data Management and Probability
Probability

45 MINS

Overall Curriculum Expectations:
• Read, represent, compare, and order whole numbers to 10 000, decimal numbers to tenths, and simple fractions, and represent money amounts to $100.
• Solve problems involving the addition, subtraction, multiplication, and division of single- and multi-digit whole numbers, and involving the addition and subtraction of decimal numbers to tenths and money amounts, using a variety of strategies.

Specific Curriculum Expectations:
• Read and represent money amounts to $100 (e.g., five dollars, two quarters, one nickel, and four cents is $5.59).
• Add and subtract money amounts by making simulated purchases and providing change for amounts up to $100, using a variety of tools (e.g., currency manipulatives, drawings).

Teacher Background:
Log in to
Teacher Console > Demonstrations > Concept Search.
Type money into your search bar. Other suggested words are coins, cents, equivalent, and dollar. Review these words with students and add to your math word wall or math journals.

Play Marian Small’s video, “Coin Count,” found in
Teacher Console > eBooks > Grade 4 > Marian Small's Coin Count > Videos > Coin Count.
Pause during the video to explain each monetary value. Pause at the end of the video and have students come up with as many answers as they can in their table groups. Use the teacher notes for questions to prompt students.

ITEMS NEEDED
✓ Mathletics teacher login
✓ Interactive whiteboard
✓ Mathletics eBooks
✓ Marian Small’s Coin Count eBook
✓ Die
✓ Coin manipulatives
✓ Samples of real coins

ASSESSMENTS
✓ Participation and group work checklist

ACCOMMODATIONS/ MODIFICATIONS
✓ Change monetary values to accommodate various learners.
✓ Use as centres for kinesthetic learners.
✓ Use ability groups; modify coin count problem to calculate change with easier or more difficult values.

EXTENSION OF LEARNING
✓ Mathletics eBook: Addition and Subtraction “Money” worksheets.
✓ Give students flyers from local grocery stores. Have students plan a meal (health) and determine how much that meal would cost. How many different ways could they pay for it?
The Lesson

Coin Count Problem:
• Go to Mathletics Teacher Console > ebooks > Grade 4 > Marian Small’s Coin Count > Interactives Coin Count. Display problem on interactive whiteboard.
• Use printable problem with cut-and-paste coins for students to follow along.
• Have students work with partners or in groups to solve the problem in as many ways as they can.
• Try changing the problem and have students determine a new answer. In the Teacher Notes, the “Extending the learning” section has a new problem-solving question to use.

High Life Mathletics Problem-Solving Game:
• Open the “High Life” Mathletics problem-solving game. Sign in to Mathletics Teacher Console > Demonstrations > Problem Solving > Money > High Life.
• Work through the problem-solving activity together, calculating money and introducing change. Explain to students that when we pay for something, we have to give money of a certain value (which can be represented in many different ways) and then we may receive change in return. Ask students: What coins or bills could we use to make this change? What if we only had coins and no bills? Suppose you have 4 nickels—how many dimes would you need? How many quarters? What is this worth?

Calculate the Change:
• Use the Grade 4 Mathletics eBook “Addition and Subtraction.” From the Teacher Console go to eBooks > Grade 4 > Addition and Subtraction. In the Student, column, click on Money. Go to "Calculate the change" on pages 40–41. Print game sheets to give to students. Each partner/group will need two die.
• Students roll the die and using the number they roll, they need to determine how much change would be given according to the problem. Winner has the most money at the end of the game.

After the lesson

Think, Pair, Share
• Think about how often we use money. When do we have to make change?
• Pair up with a person of the opposite sex.
• Share your real life experience of using money.
Overall Curriculum Expectations:
• Describe, extend and create a variety of numeric and geometric patterns, make predictions related to the patterns.

Specific Curriculum Expectations:
• Extend, describe, and create repeating, growing, and shrinking number patterns.
• Create a number pattern involving addition, subtraction, or multiplication, given a pattern rule expressed in words.

I am Thinking of a Number...
• To encourage students to begin thinking about patterns, introduce the activity “I am Thinking of a Number” in the Grade 4 Ontario curriculum under the Patterning and Algebra strand. Display this activity on the interactive whiteboard. You can work through all 10 questions with students, or use as many as you see fit.

Ask students prompting questions:
○ What function are you using to determine the number?
○ Is your number increasing or decreasing?
○ If we were to make a pattern, what rule could we use?

• To build on students’ knowledge, display the curriculum activity “Pick the Next Number.”

Ask students “What rule could be given for this pattern?”
○ Is you pattern increasing or decreasing?
○ How do you know?
○ If the pattern were 10 numbers, could we determine the last number in the sequence?
○ How would you describe this pattern?

ITEMS NEEDED
✓ Mathletics teacher login
✓ Interactive whiteboard
✓ Mathletics eBook handouts
✓ Hundreds charts
✓ Counters
✓ Marian Small handouts

ASSESSMENTS
✓ Have students write out their reflections.
✓ Participation
✓ Collect and assess Marian Small handout.

ACCOMMODATIONS/ MODIFICATIONS
✓ Teacher can choose to use the interactive opposed to handout.
✓ Change number to skip count to determine easier or harder patterns.
✓ Encourage students to use hundreds charts or number lines for skip counting and determining pattern rules.

EXTENSION OF LEARNING
✓ Describing Patterns, Table of Values, I’m Thinking of a Number, Pick the Next Number (students will get different questions)
✓ “Rainforest Maths,” Grade 4: Patterns.
The Lesson

**eBook: Describing Patterns in a Hundreds Chart**
- On the interactive whiteboard, log in to Teacher Console > eBooks > Grade 4 > Patterns and Algebra. In the Student Book column, click Patterns and relationships. Go to page 3. Show students the hundreds charts. If you have a hundreds chart in the classroom, you could use this as well. Ask students, Can we skip count using a hundreds chart? What could we skip count by? Shade the numbers in as you skip count.
- Using the questions on page 3, skip count together using the hundreds chart. Students should look at the hundreds chart and investigate what patterns they see. Students can follow along using their own hundreds charts. Ask students, What patterns can you begin to see? Are the patterns increasing or decreasing? Can you see other patterns besides horizontal ones? What could be the pattern rule? What could the next numbers in the pattern be? Look at all four hundreds charts and discuss how the patterns are similar and how they differ.

**Odd or Even Apex? Marian Small Video**
- Play the Marian Small video through the Teacher Console by going to eBooks > Grade 4 > Odd or Even Apex? Go to Videos and click Odd or Even Apex. Play the video once through from beginning to end, allowing students to formulating their own ideas. Play the video again, pausing to ask the prompting questions that are throughout the video. Allow students time to investigate in their groups and determine a pattern rule. Ask students, Why is it difficult to determine a pattern rule? What do we have to consider when creating a pattern rule? What happens if the 3 base numbers are changed? Discuss what strategies and reasoning students used and developed to determine their patterning rules.

**Marian Small Interactive/Handout**
- Print the Marian Small student handout from the eBook above. Have students begin to work through their own patterns and write out their patterning rules. On the interactive whiteboard, the teacher can use the interactive problem with a guided math group while others are working on the handouts, or you can do a whole-class discussion and begin generating ideas before students work independently.

After the lesson

**Discussions Questions:** Teacher can use his/her discretion and have a whole-group discussion or discussions in table groups. **Questions to discuss:** Where can you see number patterns in real life? How do all your patterns that you did today relate? Was the hundreds chart or the number pyramid an easier way to see a pattern? What did you do when you were trying to determine a pattern rule?
LESSON PLANS: ONTARIO
Grade 4: Measurement
Perimeter and Area

50 MINS

Overall Curriculum Expectations:
• Determine the relationships among units and measurable attributes, including the area and perimeter of rectangles.

Specific Curriculum Expectations:
• Estimate, measure using a variety of tools and strategies, and record perimeter and area of polygons.
• Pose and solve meaningful problems that require the ability to distinguish perimeter and area.

Teacher Background:
Log in to Teacher Console > Demonstrations > Concept Search.

Type perimeter, and then area, into your Search bar. Have students determine the difference between the two terms.

Ask students:
• When would we need to measure perimeter?
• When would we need to know the area of something?
• How could we measure the perimeter of our classroom?
• What units of measurement would work best?

Students should write perimeter and area with definitions in their math journals or add to a math word wall.

ITEMS NEEDED
✓ Mathletics teacher login
✓ Interactive whiteboard
✓ Mathletics eBooks
✓ Ruler
✓ Geoboards
✓ Graph paper
✓ Blocks

ASSESSMENTS
✓ Collect and assess "Claim your Path" group handouts.
✓ Check Results section for curriculum activity marks.

ACCOMMODATIONS/MODIFICATIONS
✓ Ability/levelled groups.
✓ Encourage students to use the "Something Easier" or "Something Harder" options when completing curriculum activities.

EXTENSION OF LEARNING
✓ Have students draw a room with its dimensions. Students should include pictures, rugs, windows, and other objects whose perimeter and area can be determined.
✓ Curriculum activities
✓ "Rainforest Maths": additional area and perimeter practice. Encourage students to try a grade level above or below based
LESSON PLANS: ONTARIO
Grade 4: Measurement
Perimeter and Area

The Lesson

30 MINS

Perimeter Word Problem with Geoboards
• Log in to your Teacher Console > eBooks > Grade 4 > Length, Perimeter and Area. In the Student Book column, click Perimeter and go to page 12. Hand out students' geoboards and the printed handout from the eBook. Have students start working through the word problems by creating polygons on their geoboards. For further practice ask students, If the perimeter of a polygon was 25 cm, what shape could it be? What would be the lengths of the sides? How many sides would your polygon have? What shape could it not be? How do you know?

Area—Square Centimetres
• Hand grid paper to students. Students can use their pencils to shade in irregular polygons or use blocks to fill in the shape. Use page 16 in the Area section of the eBook used for the perimeter activity. Display the questions on the board and have students create many different shapes with the proposed area. Prompt students by asking: How many different polygons can have an area of 8 square centimeters? What all sides had to be equal lengths? Can you make an irregular polygon? What would the area and perimeter of one of your polygons be?

Problem Solving: Claim Your Patch
• Students need to be in groups of 4 for this problem-solving activity. Go to eBooks > Problem Solving > Level 2. Click Logical reasoning and go to Worksheet 4. Print off one playing card per group. Students’ task for this game is to create polygons with an area greater than 1 but less than 13 sq. cm and a perimeter of 20 cm. Students will need to use their problem-solving skills to determine what different shapes could be made. Each person in the group should use a different colour to draw the shapes. The teacher can click on Demonstrations > Rainforest Maths > Grade 4 > Area. Draw your own shapes and display them on the interactive whiteboard. Students who are having difficulty can work one-on-one with the teacher to identify different polygons. Students are able to draw the shapes on graph paper and interactively determine area and perimeter.

After the lesson

10 MINS

• Have students begin working on assigned tasks. Suggested activities to assign for students to complete: Area of Shapes, Equal Areas, and Perimeter of Shapes. These are good activities for an introduction to perimeter and area.

• Students can play the problem-solving game “Making Tracks.”
LESSON PLANS: ONTARIO
Grade 4: Data Management and Probability
Experimenting with Probability

45 MINS

Overall Curriculum Expectations:
• Predict the results of a simple probability experiment then conduct
  the experiment and compare the prediction to the results.

Specific Curriculum Expectations:
• Predict the frequency of an outcome in simple probability experiment,
  explaining their reasoning; conduct the experiment; and compare the
  result with the prediction.
• Determine through investigation, how the number of repetitions of a
  probability experiment can affect the conclusions drawn.

Introduction to Lesson 10-15 MINS

Discuss with students what is meant by the terms likely and unlikely.
• In the Animated Math Dictionary, look up the term “Probability”.
• Show students the chart and have them come up with different real-
  life scenarios that could be likely or unlikely.
• Table groups should come up with one example for each possibility
  on the chart.
• Discuss ideas.

Create spinners as a class.
• Using the Grade 4 eBook “Chance and Data” click on Chance, go to
  page 4, and copy this page for each student.
• Have students cut and colour the spinners to use for the probability
  unit.

ITEMS NEEDED
✓ Mathletics teacher login
✓ Interactive whiteboard
✓ Mathletics eBook handouts
✓ Die
✓ Counters
✓ Spinners
✓ Cards
✓ Coins

ASSESSMENTS
✓ Assess spinners and questions.
✓ Self-assess/peer assess spinner work.
✓ Group work and participation.

ACCOMMODATIONS/ MODIFICATIONS
✓ Ability/levelled partners.
✓ Limit the number of questions on the spinner handout.
✓ Teacher can play the “Roll and Release”
  game with students who need extra
  support.

EXTENSION OF LEARNING
✓ Create a probability game. Students
  should create their own probability game
  of chance. (Dice game, spinners, cards,
  colours, etc.). They can then present
  this game to a younger grade or have a
  math fair.
✓ Curriculum activities
✓ “Rainforest Maths,” Grade 4: chance/
  probability activities.
The Lesson

**eBook: Spinners**
- Students should use their spinners and make a prediction about the possibility of landing on a specific colour. Have students write down their predictions using the handout on page 5. **Prompting Questions:** Do your chances change with the number of spins? How many times would you expect to land on red? Students can then conduct their experiment by spinning the spinner and recording their results. Ask students, How did your results change from your predictions? Were your predictions correct? Why or why not? What did you learn about your predictions?

**Problem Solving: Combinations/Outcomes**
- On the interactive whiteboard, click on Demonstrations > Problem Solving > Combinations > I-scream Lady.
- Work through the problem solving game. Or, have students log into their student consoles and try this game individually. Ask students, “What strategies did you use to determine the possible outcomes?”, “If I don’t like chocolate, how many other possible choices do I have?”

**eBook: Roll and Release**
- Students will need 2 dice and 12 counters for this game.
- In eBooks > Grade 4 > Chance and Data click on Chance.
- Print and copy the “Roll and Release” game on pages 10–11 for each student. Students can play this game in pairs and should make a prediction about which prisoner they think will be released first.
- Ask students, Does one counter have a better chance of being released than others? Do they all have a fair chance? What strategy are you using? Is there a way to determine the expected outcome for both dice?
- Students can play this game multiple times. Have students reflect on their learning, and determine where they should put their counters next time, based on what they learned in the previous game. Have partners discuss their thinking about fairness and what numbers are more likely or less likely to be rolled.

After the lesson

- Use one of the one-page assessments to determine where the students are currently at with the concepts of "likely" and "unlikely", and with predicting frequency of an outcome and conducting a probability experiment.
- Go to eBooks > Grade 4 > Chance and Data.
- Click Assessment.
- There are simple, concise rubrics to use at the bottom of each page.
LESSON PLANS: ONTARIO
Grade 4: Geometry and Spatial Sense
Symmetry

45 MINS

Overall Curriculum Expectations:
• Identify quadrilaterals and three-dimensional figures and classify them by their geometric properties and compare various angles to benchmarks.

Specific Curriculum Expectations:
• Draw the lines of symmetry of two-dimensional shapes, through investigation using a variety of tools (e.g., Mira, grid paper) and strategies (e.g., paper folding).

Teacher Background:
Students should log in to their own Student Consoles on laptops or in the computer lab. Introduce the topic of symmetry to students. Have them explore Mathletics to investigate and determine what it means for a shape to be symmetrical or non-symmetrical. Then introduce the term parallel. Have students investigate this term and discuss in their table groups what it means for a shape to have parallel sides.

Ask prompting questions:
• How do you know if a shape is symmetrical?
• How could we test this?
• What would make a shape non-symmetrical?
• What shapes have parallel sides?
• What does this mean?
• How can you determine what shapes do not have parallel sides?
• Have students explore 2D quadrilaterals and 3D shapes, journals or add to a math word wall.

Introduction to Lesson

10 MINS

ITEMS NEEDED
✓ Mathletics teacher login
✓ Interactive whiteboard
✓ Mathletics eBooks
✓ Dot paper
✓ Rulers
✓ Paper for folding
✓ Computers/tablets

ASSESSMENTS
✓ View “Are You Ready?” results for a pre-assessment of learning.
✓ Check Results section for curriculum activity marks.
✓ Group work and participation.

ACCOMMODATIONS/ MODIFICATIONS
✓ Ability/levelled groups.
✓ Encourage students to use the “Something Easier” or “Something Harder” options when completing curriculum activities.

EXTENSION OF LEARNING
✓ Art: Draw a symmetrical picture using only 2D shapes.
✓ Curriculum activities: Angles, nets, and other geometry topics.
✓ Grade 4: Shape, Space and Position.
The Lesson

Centres

• Teachers can add more centres to the ones indicated below; for example, the main resource used in the classroom. For the eBook centre, please review which pages you would like the students to complete. Depending on how much work students can get done with each centre, rotation can occur about every 10 minutes. Groups will vary depending on class size.

○ Centre 1: Symmetry Folding—Print out page 8 of the Grade 4 “Shape, Space, and Position” eBook. Students should have two copies of this page. For question 1, students need to cut out the shapes and fold them in half as many times as they can. They can then draw the number of lines of symmetry the shape has on their second copy of that page. Ask students, Can we fold the shape any way we want? Why do we have to fold it in half? How do you know this is a line of symmetry? What makes it symmetrical? If there is time, have students complete the symmetrical challenges on page 9 of the same eBook.

○ Centre 2: Math Journals/Word Wall Creation—Have students log in to their student consoles and look up symmetry, parallel, perpendicular, 3D shape, vertices, edges, transformation, tessellation, rotation, etc. in Concept Search and Animated Math Dictionary. If using journals, students should write down their own definition of the word and an example, and draw a picture. If journals are not used in your classroom, students can generate a word wall of specific terms and concepts that will be covered during this unit. Each group can be responsible for 1-3 words to look up on Mathletics, and find a definition, an example, and a picture. Students can write these on blank pieces of paper or index cards and add them to the word wall. Note: If laptops are not available for all students, have groups explore these concepts on the interactive whiteboard using the teacher login.

○ Centre 3: Rainforest Maths/Activities—Students should log in to their Student Console and work in “Rainforest Maths” for review and practice. Have students work on Grade 3 for review, and then try Grade 4, 2D shapes. On the left-hand side, there are different sections they can try. Once they feel comfortable, students should begin completing some activities in Geometry and Spatial Sense. Suggested activities: Are you Ready?, Symmetry or Not?, Collect the Shapes 2. This will give you a good understanding of where students are currently at and allow students to practice what has been introduced today.

After the lesson

Students should find objects in the classroom that have lines of symmetry. Have them trace with their hands where the line of symmetry could be. Challenge students by asking them, Can you find an item that has more than 1 line of symmetry? What shape could it be? Can you find an irregular polygon? Do you think this shape/object will have a line of symmetry? Where can you find symmetry on your body? Is it perfect symmetry?
Overall Curriculum Expectations:
• Read, represent, compare and order whole numbers to 100 000, decimal numbers to hundredths, proper and improper fractions, and mixed numbers.

Specific Curriculum Expectations:
• Represent, compare, and order fractional amounts with like denominators, including proper and improper fractions and mixed numbers, using a variety of tools.
• Demonstrate and explain the concept of equivalent fractions, using concrete material (e.g., fraction strips to show that ¾ is equal to 9/12).

Introduction to Lesson

Teacher Background:
• Play Dr. Marian Small’s Pattern Blocks video to introduce pattern blocks and discussion around fractions. Log in to Teacher Console > eBooks > Grade 5 > Marian Small’s Pattern Blocks #1. Click on Videos > Pattern Blocks #1.

Pause during the questions asked in the video. Discuss various responses.
• Hand out pattern blocks to students, as a manipulative to begin thinking about how they could create a shape that is one half yellow.
  o Display Pattern Blocks in Concept Search for an added visual for students.
  o In your Teacher Console go to Demonstrations > Concept Search.
  o In Search bar, search pattern blocks.
  o Have students begin to manipulate the blocks and create different fractional numbers.

Items Needed

• Interactive whiteboard
• Mathletics teacher login
• Marian Small’s printed student problems
• Pattern block manipulatives
• Laptops

Assessments

• Observation of students working together to create fractions.
• Participation in interactive

Accommodations/Modifications

• Can practice easier/harder activities.
• Can use “Rainforest Maths” at a level below or above.

Extension of Learning

• Search number lines and/or fractions in Concept Search. Show students how to use a number line to represent and compare fractional amounts.
• So students can have extra practice, log in to Student Console > Rainforest Maths > Grade 5 > Fractions. Students can extend their learning of fractions and practice questions for reinforcement.
LESSTON PLANS: ONTARIO

Grade 5: Number Sense and Numeration
Using Pattern Blocks to Teach Fractions

The Lesson

Interactive Pattern Blocks—Marian Small’s Activity

• Hand out printed Marian Small’s Student Problem: Pattern Blocks. Log in to Teacher Console > eBooks > Grade 5 > Marian Small’s Pattern Blocks #1 > Student > Printable Problem. Have students work together to complete the question. Students can work with partners or in small groups to determine various answers. Give students enough time to explore various possibilities and use a variety of different shapes, patterns, and numbers of blocks.

• Display interactive problem on the interactive whiteboard. In your Teacher Console, click on eBooks > Grade 5 > Marian Small’s Pattern Blocks #1 > Interactives > Problem. Students can then come up to the interactive whiteboard and display their answers. Discuss with students how there are various answers to this problem. Fractions can be represented in a variety of ways.

Ask Students,
  • What would happen if we could only use red and yellow blocks?
  • How could we represent ½ using the fewest blocks?
  • What different colour combinations could you use?
  • Did your pattern have a line of symmetry?
  • Did it need to have one?

NOTE: Try Extension of Learning task to introduce fractions on a number line, if students are grasping this concept well.

Reinforcement: Equivalent Fraction Activities

• Assign students curriculum activities to complete in the Student Console. Suggested activities include Shading Equivalent Fractions, What Mixed Number Is Shaded?, Equivalent Fractions on a Number Line 1, Equivalent Fractions on a Number Line 2.

• Students can use the “Rainforest Maths” Grade 5 fractions section for extra practice. It can also be displayed on the interactive whiteboard for students to reference while completing their assigned tasks.

Extra-time/cross-curriculum activity: Have students create fraction art. Have students represent a fractional amount and show an equivalent fraction. Students can represent their fractions by using paper and glue, drawing pattern blocks, creating two real-life objects, etc.

After the lesson

• Play a game of Live Math as a whole class. Log in to your Teacher Console and click on Demonstrations > Live Mathletics > Level 6 > World > Go. Level 6 has some fraction computation questions.

• Have students complete an “exit slip” card before they leave class.

• Ask students, What did you learn about fractions? How do you best represent fractions? Share your learning.
Overall Curriculum Expectations:
• Collect and organize discrete or continuous primary data and secondary data and display the data using charts and graphs, including broken-line graphs.

Specific Curriculum Expectations:
• Collect and organize discrete or continuous primary data and secondary data and display the data in charts, tables and graphs that have appropriate titles, labels and scales.
• Read, interpret, and draw conclusions from primary and secondary data.

Introduction to Lesson

Teacher Background:
Students should have prior knowledge of line graphs and broken-line graphs from Grade 4. Conducting surveys and recording data in line graphs should have been taught prior to this lesson. This lesson's main focus is reading, interpreting data, and drawing conclusions from graphs. It also includes, correctly labelling, using proper scales, and choosing titles for specific types of graphs.

To introduce how to properly read and interpret data from a line graph. Show students the video "Introducing Distant Time Graphs." Log in to your Teacher Console > Toolkit. Type line graphs into your search bar. Click Presentations tab on the left side. Choose "Introducing Distant Time Graphs." This video will introduce students to a line graph and how to set up vertical and horizontal axes with a proper scale. Pause during the video to discuss what is being shown on the line graph.

Ask students
• Why do we use this scale for time?
• Is there another range we could use?
• Where is the highest point on the graph?
• Why do you think they chose this measurement?
• Tell a story about how this data could have been collected?

NOTE: There are a variety of other videos related to interpreting graphs, scatter plots, and other areas of data management you can explore with your students.

ITEMS NEEDED
✓ Interactive whiteboard
✓ Mathletics teacher login
✓ Laptops
✓ eBook worksheet printed
✓ Graph paper for practice

ASSESSMENTS
✓ Group work
✓ Oral presentation
✓ Review graphs

ACCOMMODATIONS/ MODIFICATIONS
✓ Create ability or leveled groups.
✓ Data disaster problem could be done individually and assessed.
✓ Give students the option to submit their work or do an oral presentation.
✓ Have students watch the video at the beginning of class together, allow students to formulate questions. Lead your lesson by following their inquiries.

EXTENSION OF LEARNING
✓ Mathletics Grade 5 eBook: Data Representation, Types of Graphs 3 activity. This includes line graphs and broken-line graph practice.
✓ Assign curriculum activities
✓ “Rainforest Maths” Grade 4—Data
The Lesson

Open-Ended Problem Solving—The Story of a Graph
• Display open-ended problem on the interactive whiteboard.
• Log in to your Teacher Console > eBooks > Problem Solving > Problem Solving Level 3 Book.
• Click on Open ended, Open-ended problem solving, Worksheet 5.
• Review the line graph with students. Ask prompting questions like, Why is this an appropriate scale to measure water on? What information can you tell from this graph? Why was a line graph chosen to organize the data? How could we graph all months of the year? What would be different about that graph?
• Have students work in their table groups or with partners to brainstorm and explore various ideas for the line graph and pie graph. Ask students prompting questions like, What would be an appropriate title? How could this data have been collected? What data would not work on these graphs? Discuss various responses from different groups.

eBook—Data Disaster
• Divide your students into leveled groups. Print the “Data Disaster” eBook problem sheet so each group can work collaboratively on this section. Teacher can read aloud the “Getting Ready” section of the worksheet.
• Students should then begin entering data, labels, and titles in their graphs and working collaboratively to determine possible solutions for the graphs.

Extra-time/cross-curriculum activity:
• Have students collect data prior to this lesson about some aspect of their community, an experiment, an issue in the school, or another subject. Have students record their observations or measurements over time.
• Students can then use a line graph to represent the data and show a trend over time.

After the lesson

Oral Presentation
• Give students time at the end of the lesson to prepare a quick one-minute share-aloud.
• Have students present their stories related to the graphs. Formulate class discussion based on student responses.
Overall Curriculum Expectations:
• Determine through investigation using a table of values, relationships in growing and shrinking patterns, and investigate through repeating patterns involving translations.

Specific Curriculum Expectations:
• Create, identify, and extend numeric and geometric patterns using a variety of tools.
• Extend and create repeating patterns that result from translations, through investigation using a variety of tools.

Introduction to Lesson
Teacher Background:
• Give students a blank piece of paper.
• Have students create as many different number or geometric patterns as they can.
• Their number patterns can increase or decrease.
• Have students represent number patterns in as many ways as they can, working collaboratively in their table groups.

ITEMS NEEDED
✓ Interactive whiteboard
✓ Mathletics teacher login
✓ Student handouts from eBooks
✓ Computers/tablets
✓ Toothpicks
✓ Chart paper
✓ Markers
✓ Geometric pattern blocks

ASSESSMENTS
✓ Observations
✓ Collaborative/group work
✓ Assess patterns on chart paper
✓ Assess patterns made with toothpicks

ACCOMMODATIONS/MODIFICATIONS
✓ Allow students to use translucent geometric pattern blocks to help create their patterns.
✓ Encourage students to click on the “Something Easier” and “Something Harder” within the curriculum activities of Mathletics.

EXTENSION OF LEARNING
✓ Curriculum activities
✓ Grade 5 eBook Patterns and Algebra, additional pages on patterns and functions.
✓ Grade 5 “Rainforest Maths,” Number Sequences section for extra practice.
LESSON PLANS: ONTARIO
Grade 5: Patterning and Algebra
Repeating Patterns

The Lesson

30 MINS

Collaborative Group Work

• Group 1—Matchstick Problems
  Print student handouts from eBooks > Grade 5 > Patterns and Algebra > Patterns and functions. Print out matchstick patterns on pages 5–6. Have students use toothpicks to practice making a repeating geometric pattern. Students can complete a few of the tables found on these handouts. Ask students to then use the toothpicks to create their own geometric patterns and determine the function rule. Students should work together to create their pattern and glue it onto cardstock, displaying their rule at the bottom. These can then be displayed around the classroom for future reference.
  Note: Students can also experiment with growing and shrinking patterns. Can students add on to their existing shape? How would the pattern look if the shape were repeated with flips, slides, and turns?

• Group 2—The Odd One Out
  On the interactive whiteboard, log in to your Teacher Console > Demonstrations > Activities > "The Odd One Out" activity. Have students practice locating and recognizing the pattern occurring with the geometric shapes. After working through the questions collaboratively in their groups, students should create their own repeating patterns based on shapes or colours only. Have students create these on chart paper and circle the odd one out (the geometric shape or colour that does not fit), explaining the rule at the bottom.
  • With collaborative group work, students should be working together to come to a conclusion. All members of the team should be communicating and contributing to the group's mark. You can have students switch groups once they have completed one task, and instruct students to complete the second task. This time should allow for both tasks to be completed.

After the lesson

10 MINS

Discussion

• Have a quick discussion with your students about repeating patterns. Prompting questions: Where have you seen geometric patterns in real life? How do we grow or shrink a pattern? Where have you seen a numerical pattern? How did you know the function rule?
• Ask students to go home that night and log in to their Mathletics Student Console. Have students search the term translation the Animated Math Dictionary. Students can also look up flips, slides and turns in their Concept Search. Have students report back the following day on their learning to introduce this new concept. (You may give students time at the end of class, if homework is not implemented in your school.)
**Overall Curriculum Expectations:**
- Estimate, measure and record perimeter, area, temperature, change and elapsed time, using a variety of strategies.

**Specific Curriculum Expectations:**
- Estimate, measure and represent time intervals to the nearest second.
- Estimate and determine elapsed time, with and without using a time line, given the durations of events expressed in minutes, hours, days, weeks, months or years.
- Solve problems involving the relationship between a 12-hour clock and a 24-hour clock.

**Teacher Background:**
Students should be familiar with reading and using a 12-hour clock prior to this lesson.

**Prompt students:**
- How do we measure time?
- What types of time are there?
- When/Where do we use time?
- Discuss a variety of answers.
- Introduce 24-hour time and when we generally measure time using the 24-hour clock.

**Log in to Teacher Console > Demonstrations > Concept Search > Concept Search.** Enter time in the search bar. Display the 12-hour clock on the interactive whiteboard and review it with students. Then click on the 24-hour clock, and explain how to convert the time.

**Ask students questions like,**
- What type of activity would you do at 18:00?
- What types of activities would you not do at 23:00?
- What could be done between 9:00 and 13:00?
- How much time has elapsed?

**ITEMS NEEDED**
- Interactive whiteboard
- Mathletics teacher login
- Student handouts from eBooks
- Computers/tablets
- 12-hour and 24-hour clocks

**ASSESSMENTS**
- Observations
- Collaborative
- Group work
- Collect and assess time wheel

**ACCOMMODATIONS/ MODIFICATIONS**
- Allow students to make their own clocks with both 24-hour and 12-hour time intervals. Students can use this as a math manipulative.
- Encourage students to click on “Something Easier” and “Something Harder” within the curriculum activities of Mathletics.

**EXTENSION OF LEARNING**
- Measure time in phys. ed and record with a stopwatch. Students can then determine total elapsed time to complete an activity.
- Curriculum activities
- Grade 5 eBook: Time
- Grade 5, Time section in “Rainforest Maths” for extra practice.
The Lesson

eBook: 24-Hour Time Dominoes Game
- Have students work with partners or play this game as a class.
- Print off the 24-hour dominoes game cards by logging into Teacher Console > eBooks > Grade 5 > Time.
- Click on “Measuring time.” Print page 8, “24 hour time dominoes.” One partner, or the teacher, can be the caller. The other partner or the class will write down 6 times. They must be hour or half-hour times, not other intervals.
- The caller or teacher then shuffles the cards and calls out the times. The first person to cross out all 6 times wins!
- You could call the times out in 12-hour time and students will need to convert the time to the 24-hour times they have chosen.

Collaborative Group Work
- Group 1—Live Math
  Students should try Level 5/6 of Live Mathletics on a classroom computer under teacher account. One student types while the other group members shout out the answers. These levels include time conversion.
- Group 2—Time Activities
  Students should work on curriculum activities together at the interactive whiteboard. Have students use the teacher login so data is not skewed. Suggested activities: What Time Will It Be, Elapsed Time, 24 Hour Time.
- Group 3—eBook Time Wheel
  Students work together on eBook > Grade 5 > Time, Measuring Time, page 5, question 6, printed or on interactive whiteboard.

After the lesson

Think, Pair, Share
- Have students reflect on their learning about time with another partner. Give students a few minutes to think, pair up with another partner, and share their learning.
- Prompt question: How did you measure time today? What were your challenges with a 24-hour clock?
LESSON PLANS: ONTARIO
Grade 5: Geometry and Spatial Sense
Triangles

45 MINS

Overall Curriculum Expectations:
• Identify and classify two-dimensional shapes by side and angle properties, and compare and sort three-dimensional figures.

Specific Curriculum Expectations:
• Identify triangles (i.e., acute, right, obtuse, scalene, isosceles, equilateral), and classify them according to angle and side properties.
• Construct triangles using a variety of tools (e.g., protractor, compass, dynamic geometry software), given acute or right angles and side measurements.

Introduction to Lesson

10 MINS

Teacher Background:

Ask students,
- What types of triangles are there?
- Is it possible to have a scalene triangle?
- What does that tell you about the angles?
- How do we know a triangle is isosceles? Obtuse? Scalene? etc.
- Brainstorm everything you know about triangles and angles in a KWL chart.

NOTE:
• You can show additional triangle-related videos in the Teacher Console by clicking on Teacher Toolkit.
• Type "triangles" into the Search bar.
• Click Presentations tab.
• Select any video for added visual for students.

ITEMS NEEDED
- Interactive whiteboard
- Mathletics teacher login
- Marian Small's printed student problem
- Laptops
- Geoboards
- Elastics
- Dot paper

ASSESSMENTS
- Observation
- Group work checklist
- Journal entries
- Comment section of interactive word problem

ACCOMMODATIONS/ MODIFICATIONS
- Modify lesson using flipped classroom approach: Students look up concepts in Mathletics Concept Search at home before lesson.

EXTENSION OF LEARNING
- Students present a type of triangle to the class using information found in Concept Search within Mathletics.
- Ask students to create different 2D polygons using various types of angles using dot paper or geoboards.
- Complete pages 11 and 12 in Grade 5 Geometry eBook "2D Shapes."
The Lesson

Centres

- **Teacher Background**: Place students in ability groups. Have students choose their starting centre, or place students in a selected rotation. Teacher will need to set up centres before lesson and print "What Triangle Is That?" word problem for students. If math journals are implemented in your classroom, have students record their learning in a math journal at each centre.

- **Centre 1: Laptops/Computers**
  Students can sign in to their Student Console. At this centre, have students explore Concept Search. Students can search for concepts related to classifying triangles. Suggested terms could be isosceles, triangles, equilateral, scalene. Students can click on the square and arrow icon located in the bottom right corner to maximize view and interact with the concept. Have students record what types of angles help to classify different triangles.

- **Centre 2: Problem Solving**
  Students can work on the printed Marian Small word problem, What Triangle is that? To accommodate various learning styles, set up geoboards so students can practice making the triangles with elastics. Dot paper can also be used. Students can then answer the problem on their word problem sheet, recording all the different triangles that would work for the suggested problem.

- **Centre 3: Interactive Whiteboard**
  Use this centre as a reinforcement activity; display the Marian Small interactive problem on the interactive whiteboard. Log in to your Teacher Console > ebooks > Grade 5 > What Triangle? What Triangle is that? interactive problem. Have students work through the problem in their groups, using the interactive protractor. Students should include a comment once they have reached a possible solution to the problem.

**Extra-time/cross-curriculum activity**: Have students create an art project using only triangles. Students need to make a repeating design using only one type of triangle. They should use a protractor to create one type of triangle and then cut the 2d shape out. Use this triangle as a template to flip, slide, and turn to create a design or pattern. Have students colour in the geometric pattern in art.

After the lesson

**Think, Pair, Share**

- Give students 2 minutes to think about something they have learned during this lesson. Have students turn to their elbow partner and share their learning. Prompt with questions like: What types of properties are specific to isosceles triangles? What did you find easy/difficult about constructing triangles?
LESSON PLANS: ONTARIO
Grade 6: Geometry and Spatial Sense
Angles

Overall Curriculum Expectations:
• Classify and construct polygons and angles.

Specific Curriculum Expectations:
• Measure and construct angles up to 180° using a protractor, and classify them as acute, right, obtuse, or straight angles.
• Construct polygons using a variety of tools, given angle and side measurements.

Teacher Background:
Log in to Mathletics and go to Demonstrations > Concept Search.
Search “protractor” in the Search bar. Have students interact with the protractor to measure angles. Ask students to draw a shape that has this type of angle included in it. Have students use their arms for the sides of the angle.

Ask students,
○ Can you make a 90° angle with your arms?
○ Can you construct an angle greater than 90°?
○ What happened to your arms?
○ What do we call an angle that is larger than 90°?
○ What about when it is less?
○ How do we properly measure an angle?

ITEMS NEEDED
☑ Interactive whiteboard
☑ Mathletics teacher login
☑ Mathletics Grade 6 eBook ("Lines and Angles" section) printed for each student
☑ Markers
☑ Protractor

ASSESSMENTS
☑ Have students use self and peer assessment for the Hand It Over Activity.

ACCOMMODATIONS/ MODIFICATIONS
☑ Have students work with leveled groups or partners.
☑ Use this activity as a rotation.
1st station: measuring angles on the Interactive whiteboard.
2nd Station: Hand It Over activity in eBooks
3rd Station: Constructing Polygons

EXTENSION OF LEARNING
☑ Have students complete the paper-folding activity in eBook > Grade 6 > Geometry “Lines and Angles;” question 1
The Lesson

Hand it Over Activity

- Display Hand it Over Activity on interactive whiteboard. In the Teacher Console, go to Mathletics Teacher Console > eBooks > Grade 6 > Geometry. Click on “Lines and Angles.” Scroll to “Hand it over” activity on the last page.
- Have students work in pairs or groups to trace their hands in different positions. Then have students estimate the sizes of the angles in between their fingers. Have partners/groups exchange tracings with another group and measure the angles between the fingers. Label the fingers with the type of angle (ex., acute, right, straight, obtuse).
  Discussion Questions: How did your finger angles differ from another group’s? Did you have more acute, obtuse, or right angles? How would the position of your fingers affect the angles?
- Generate a hand with the class in the designated box on the interactive whiteboard that has one right angle and one obtuse angle. How would this hand have to look? What other types of angles are in your hand? How do you know?

Constructing Polygons

- Search polygons in Concept Search. In the Mathletics Teacher Console, go to Demonstrations > Concept Search. Click the Concept Search icon. Type polygon into Search bar.
- Review what makes a shape a polygon. Discuss what types of angles are present in different polygons. Review acute, obtuse, straight, and right angles again.
  Ask students:
  - What polygon could you draw with one 90° angle?
  - What polygon could you draw with one acute angle?
  - What polygon could you draw with two different types of angles?
- Students can draw these independently, in small groups, or collaboratively on the interactive whiteboard.

After the lesson

Discuss with students real-life examples of where we find angles.
Ask students: What jobs/sports would require you to know how to measure an angle? (soccer, architects, designers, construction workers, fitness instructors, etc.) Where do we see angles in the classroom? At home? (clocks, desks, walls, rugs, rooms, etc.)
Overall Curriculum Expectations:
• Estimate, measure, and record quantities, using the metric measurement system

Specific Curriculum Expectations:
• Demonstrate and understand the relationship between estimated and precise measurements, and determine and justify when each kind is appropriate.
• Select and justify the appropriate metric unit (i.e., millimetre, centimetre, decimetre, metre, decametre, kilometre) to measure length or distance in a given real-life situation.

Introduction to Lesson

Teacher Background:
Log in to your Teacher Console > Demonstrations > Concept Search.

Type length into the search bar. Review perimeter and area with students. Search different units of measurement in Concept Search and Animated Math Dictionary.

Ask students:
○ When it is appropriate to use specific types of measurements.
○ When would we use centimetres as our unit of measurement?
○ When would it be appropriate to use kilometres?
○ Have students estimate different lengths in the classroom.

Ask students:
○ How did you know what unit of measurement to use?
○ Was your estimation close to the actual length/height? Why or why not? Record information on a KWL chart.

NOTE: Teachers should show students a variety of manipulatives they can use during the measurement unit (scales, rules, metresticks, links, tape measures, measuring cups, pedometers, etc.). Have students brainstorm real-life examples of when you would use these measurement tools.

ITEMS NEEDED

Interactive whiteboard
Mathletics teacher login
Computers/tablets
Measurement tools

ASSESSMENTS

Observations
Participation
Curriculum activity marks (found in Results)
Have students initial their sticky notes for assessment.

ACCOMMODATIONS/MODIFICATIONS

Ability groups
Encourage students to use the “Something Easier” and “Something Harder” sections of curriculum activities.
Allow students to work in a grade level above or below in “Rainforest Maths.”

EXTENSION OF LEARNING

Problem Solving Making Tracks” game
Use scales for measurement in science. Determine what would be the best measurement tools, units of measurement.
Design a recipe with students. Use different types of measurement within the recipe. Ask students to convert measurements
LESSON PLANS: ONTARIO
Grade 6: Measurement
Units of Measurement

The Lesson

30 MINS

Research/Curriculum Activities/Rainforest Maths
• Have students log in to their Student Console of Mathletics. Give students time to explore different types of measurement in the Concept Search and Animated Math Dictionary on their own.
• Have students start to complete curriculum activities Measuring Length and Which Unit of Measurement? They can then explore in “Rainforest Maths”: Measurement. Explain to students how measurements can be converted. Begin discussing which unit of measurement is larger or smaller.

Cross-Curriculum Activity: Students can measure themselves and body parts during Phys.Ed. time. They can measure different objects and physical activities (e.g., distance jumped, length of the gymnasium, length of strides when walking, etc.).

eBook: Unit Bingo
• As a class, play a game of Unit Bingo. Players should fill out their individual bingo cards. Unit bingo is found in eBooks > Grade 6 > Length, Perimeter and Area in “Units of Length” on page 2.
• Once students have completed their cards, the teacher can call out units of measurement. If there is an item written on their card that could be measured using the unit called, they can cross it off. First player to get a bingo wins!
• Discuss with students what the most common unit of measurement is and why they think this is the case.
• Generate a hand with the class in the designated box on the interactive whiteboard that has one right angle and one obtuse angle. How would this hand have to look? What other types of angles are in your hand? How do you know?

After the lesson

5 MINS

• On the KWL chart, have students fill out a sticky note with one thing they learned about choosing the correct unit of measurement, a real-life example of something we measure, or one thing they learned about measurement they did not know before today's class. Students can stick these onto the "L" spot.
• Have students periodically complete these; at the end of the Measurement unit you will be able to see all of the things students have learned each day.
LESSON PLANS: ONTARIO
Grade 6: Patterning and Algebra
Growing and Shrinking Patterns

Overall Curriculum Expectations:
• Describe and represent relationships in growing and shrinking patterns (where the terms are whole numbers).

Specific Curriculum Expectations:
• Determine the term number of a given term in a growing pattern that is represented by a pattern rule in words, a table of values, or a graph
• Describe pattern rules (in words) that generate patterns by adding or subtracting a constant, or multiplying and dividing by a constant, to get the next term.
• Determine a term, given its term number, by extending growing and shrinking patterns that are generated by adding or subtracting a constant, or multiplying or dividing a constant, to get the next term.

Teacher Background:
Play the Marian Small video “Pyramid Prediction.” Log in to Teacher Console > eBooks > Grade 6 > Marian Small’s Pyramid Prediction > Videos.

This video has two parts. Play Part 1 of this video, stopping at each section for questioning. Play Part 2 of the video and pause for students to investigate and calculate possible answers for the patterns.

Prompting Questions:
• What is happening in this row/section of the pyramid?
• How do you know the pattern rule?
• Can you determine what the top number would be without filling in the other rows?

ITEMS NEEDED
- Interactive whiteboard
- Mathletics teacher login
- Computers/tablets
- Marian Small’s “Pyramid Prediction” handout
- Math journals/blank paper

ASSESSMENTS
- Observations
- Discussion during guided math group time
- Collect and assess journal responses

ACCOMMODATIONS/ MODIFICATIONS
- Leveled or ability groups for guided math time.
- Scaffold during guided math.

EXTENSION OF LEARNING
- Curriculum activities
- Grade 6 eBook, various sections.
- Grade 6 “Rainforest Maths”
- Have students find real-life examples of when they would need to use a numbered pattern or have seen/used a growing/shrinking pattern in their lives.
- Write a journal response on where you have used a table of values before. When can it be used? What professions would use this type of table?
- Create your own math game/math brain twister using a table of values or pyramid.
LESSON PLANS: ONTARIO
Grade 6: Patterning and Algebra
Growing and Shrinking Patterns

The Lesson

Shared Math Activity
Pyramid Prediction Interactive
• Open Marian Small’s Pyramid Prediction interactive found in the eBook “Marian Small’s Pyramid Prediction”. Display this problem on your interactive whiteboard. Have students choose the numbers to put in the bottom row. Click on the connector boxes.
  Ask students: What has happened to the numbers? What rule/pattern can you come up with? Can we predict what the next row of numbers will be? Can we predict the number at the top of the pyramid? How do you know this?

Guided Math Group
Teacher-Led Pyramid Handout Activity
• In leveled/ability groups, teachers should designate a table or spot in the classroom to call over groups to work with them on the Pyramid Prediction handout sheet found in the eBook Marian Small’s Pyramid Prediction.” Work with groups to scaffold student learning and determine how your students are grasping this concept. Have students complete three different pyramids (worksheet found with Teacher Notes) and explain to you their steps in completing the question. Stop students during their work and ask them to predict what the top number would be. Guide student learning using the questions found in the Teachers Notes section of this Marian Small eBook.

Independent Math Activity
Concept Search/Journal
• Have students log in to their Student Console > Concept Search. Type table of values into the Search bar. Students should investigate this concept and how it is similar to and different from the pyramid patterns.
  Prompting questions to post: How are the pyramid and table of values similar? Can you determine a pattern using a table of values? Can you determine a pattern using a pyramid? Which method do you find easier? Students should journal their response and show an example of both ways to describe and represent growing and shrinking patterns. If your students do not have math journals, they can use a math response sheet or loose-leaf paper to express their ideas.

After the lesson

Live Math
• Give students time at the end of class to play Live Math against each other. Each round is 60 seconds; you can allot 5–10 minutes for this activity. Add “Top Live Mathlete of the Day” to your board for the person who received the highest number of points.
Overall Curriculum Expectations:
• Read, represent, compare, and order whole numbers to 1 000 000, decimal numbers to thousandths, proper and improper fractions, and mixed numbers.

Specific Curriculum Expectations:
• Read and print in words whole numbers to one hundred thousand, using meaningful contexts. Demonstrate an understanding of place value in whole numbers and decimal numbers from 0.001 to 1 000 000, using a variety of tools.
• Solve problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 1 000 000.

Introduction to Lesson

Teacher Background:
• Give students base ten blocks and number lines for the activity. Students can create their own number lines for reference as well. Have students represent the numbers 0.5, 100, and 1000 in as many ways as possible.
• Students can use pictures, numbers, words, manipulatives, or examples of where they have seen or heard this number before. Students should think of real-life examples and as many ways as they can to represent that number.
Log on to your Teacher Console > Demonstrations > Concept Search.
• Type “thousand” in Search bar.
• Show students the place value chart and how to arrange a numerical value in the proper columns.
• Students can make their own place value charts to use for reference when completing the rest of this lesson.
• Using the arrow for the next slide over, students will be able to see a visual of how base ten blocks can make up a whole number.
• Explore with students “Decimal System” in Concept Search to show them how whole numbers become decimal numbers.

ITEMS NEEDED
- Interactive whiteboard
- Mathletics teacher login
- Student handouts from eBooks
- Computers/tablets
- Base ten blocks
- Place value charts
- Chart paper
- Markers
- Abacus (if used in the classroom)

ASSESSMENTS
- Observations
- Collaborative/group work
- Oral presentation
- Collect and assess place value charts.

ACCOMMODATIONS/MODIFICATIONS
- Allow students to use their own place value chart and base ten blocks to help read and represent whole numbers.
- Pair students in ability or leveled groups.

EXTENSION OF LEARNING
- Curriculum activities
- Grade 6 eBook "Reading and Understanding Whole Numbers," various sections.
- Grade 6 “Rainforest Maths,” Numbers section.
- Live Math Level 6
- Have students look up abacus in the Concept Search section of their Student Console; interact with this concept.
The Lesson

Teacher Background:
Students should have created their own place value charts prior to this lesson, or should be given a handout of a place value sheet.

eBooks—Read and Understand Numbers (Ordering)
• For this math game, students will each need a printed handout from the eBook > Grade 6 > Reading and Understanding Whole Numbers.
• Go to “Read and Understand Numbers,” page 4, question 3. A copy should be made for every student. Students should be placed in or choose a group of four for this activity. Every student will need a set of the digit cards. Students can practice making the largest numbers they can; as an extension to this activity, have students place their numbered cards in their place value charts. Students should say the word aloud to obtain the points.

Open-Ended Problem Solving—Some Really Big Numbers
• Option 1—Display the problem-solving questions, one at a time, on the interactive whiteboard. Log in to your Teacher Console > eBooks > Problem Solving > Problem Solving Level 3.
• Go to “Open-ended” and to the “Some really big numbers” activity. Have students work collaboratively to determine a solution to the problems. Students should write the number in their place value charts. Students should write the whole number in words. Students can then test the real-life problem and begin determining strategies to find a solution.
• Option 2—Using the same activity as above, print out the handout from the Problem Solving eBook and distribute to partners. Students should work on one of the three open-ended problem-solving questions. Students should show their work for each problem to their partners and write the whole number in both words and numbers. Have students write their responses on chart paper and share with the class.

After the lesson

• 3, 2, 1
  How It Works: Three things you have learned, two things you have questions about, one thing you want the teacher to know. Students can share their 3, 2, 1 response individually or through discussion, or you can provide exit slips (sticky notes) and have students post them before the class ends.
Overall Curriculum Expectations:
• Represent as a fraction the probability that a specific outcome will occur in a simple probability experiment, using systematic lists and area models.

Specific Curriculum Expectations:
• Determine and represent all the possible outcomes in a simple probability experiment (e.g., when tossing a coin, the possible outcomes are heads and tails), using systematic lists and area models.
• Represent, using a common fraction, the probability that an event will occur in simple games and probability experiments.

What Is Probability:
• Take a few minutes to begin a discussion around probability.
• Create a KWL chart with students to determine what they already know about probability and what they would like to learn.
• On the interactive whiteboard or individually, look through Concept Search.
• Log in to Teacher Console > Demonstrations > Concept Search.
• Suggested terms to search are probability, chance, random, spinner. Add these words to your math word wall or math journal.
• You can also look up the terms in the Animated Math Dictionary for a specific definition.

ITEMS NEEDED
✓ Interactive whiteboard
✓ Mathletics teacher login
✓ Computers/tablets
✓ Spinners
✓ Die
✓ Chart paper
✓ Markers
✓ Coins

ASSESSMENTS
✓ Observations
✓ Participation
✓ Probability questions (index cards)
✓ Math journals
✓ Collect eBook handouts for assessment.

ACCOMMODATIONS/MODIFICATIONS
✓ Ability groups
✓ Encourage students to use manipulatives for probability.
✓ Limit/modify the number of questions required.
✓ Have a teacher-led centre. Scaffold student learning.
✓ Allow students to work in a grade level above or below in Rainforest Maths.

EXTENSION OF LEARNING
✓ Curriculum activities
✓ During science, have students determine the outcomes of an experiment.
✓ Have students create tree diagrams during language arts.
The Lesson

Problem Solving

- To begin having students think about possible outcomes, start with a combinations problem-solving game, Demonstrations > Problem Solving > Combinations > I-scream Lady game.

- Students should take turns coming up to the interactive whiteboard and determining a possible combination. At the end, ask students: How many different combinations are there? If all the ice cream cones were in a freezer and I pulled one out, what would be my chances of having one with chocolate? Mango? How would we represent this in a fraction? How else could we organize this data?

- You can also try the "Monkey Matters" game under Data in Problem Solving. This will introduce students to a tree diagram and how to record possible outcomes using this method.

Probability Games (Centres)

- Centre 1—Spinners: Have students complete page 6 of eBook > Grade 6 > Chance and Probability. Give students spinners, or have them create their own. Students should use these manipulatives to help answer the questions. Have students glue these sheets into their math notebooks.

- Centre 2—Roll the Dice: Have students complete page 7 of the eBook > Grade 6 > Chance and Probability. Students can do a combination of any of the questions on this page or all questions. Give students chart paper to re-create one of the questions, showing a table they created with their expected and actual outcomes. Students should work with partners for this task, and each partnership should have 2 dice.

- Centre 3—“Rainforest Maths”: Display “Rainforest Maths” on the interactive whiteboard. Log in to the Teacher Console > Demonstrations > Rainforest Maths > Grade 6 > Probability. Have students work together at this centre to complete the interactive problems. Students will have a chance to explore dice probability, spinners, and tree diagrams. After centres are completed, have one student from each group teach the other students what their group did and the strategies they used to determine the possible outcomes.

After the lesson

- What Are the Chances?
  Have students complete their own probability question on an index card. Using elbow partners, give students the sentence starter, "What are the chances..." Students should think about when they would see/use probability in real life. Partners should determine a question to ask another group. Collect questions to solve next class (e.g., What are the chances of running into a girl in our classroom?). Students could then determine the odds of running into a girl out of the whole school or class.
For more information about these lesson plans, or any aspect of Mathletics, contact our friendly team.

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