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# **Stage 1: Identify Desired Results**

### **Essential Question:**

What thought-provoking questions will foster inquiry, meaning making and transfer?

- An essential question is open-ended; it has no simple "right answer."
- Is meant to be investigated, argued, looked at from different points of view
- Encourages active "meaning making" by the learner about important ideas.
- Raises other important auestions.
- Naturally arises

- In what ways can data be expressed so that its accurate meaning is concisely presented to a specific audience?
- How are spatial relationships, including shape and dimension, used to draw, construct, model and represent real situations or solve problems?

### **Scaffold Questions:**

What questions can we ask students that break the essential question into smaller pieces of content?

What is data?

What does accurate mean? What does concise mean?

How does audience and purpose determine visual representation of data?

What is a spatial relationship?

What is area?
What is perimeter?
How can I organize it?
What information can I get?

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|   | How can I calculate it?<br>How can I measure area?<br>How do area and perimeter change?  |
|---|--|
| Brief Summary of Unit:  | The first section of this chapter focuses on visualizing and displaying data. Students will collect data about their estimates of 60 seconds and then investigate and compare the strengths and weaknesses of various methods for displaying their data.  The second section of the chapter focuses on area. Students learn that area is measured by counting the number of square units that cover a region. As with linear measure, these units must be repeated with no gaps or overlaps. Students also explore conservation of area (when a shape is cut into pieces and they are moved around the total area does not change) and determine whether a relationship exists between the area and perimeter of a figure. |
|   | After using multiplication to find the area of a rectangle, students use rectangles as a tool for multiplication. Generic rectangles are introduced as a way to calculate large products mentally or on paper. Students also use generic rectangles to find greatest common factors. This work will later be formally related to the Distributive Property.  |
| Desired Understanding: The long-term accomplishments that students should be able to do with knowledge and skill, on their own. Frames Standards as long-term performance accomplishments. Answer the questions Why? And What can you do with this? | In the beginning of this chapter, you will continue your focus on representation from Chapter 1. You will do experiments and learn several ways to display and understand the results of your experiments. Then, in Section 2.2, you will investigate area and how to measure it. You will also explore the relationship between area and perimeter and think about how changing one affects the other.  In Section 2.3, you will focus on multiplication. You will use your understanding of our base ten number system to visualize multiplication in new ways. This will allow you to calculate products efficiently.  In this chapter, you will learn how to:  |

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|   | <ul> <li>Analyze the strengths and weaknesses of various graphical representations of data.</li> <li>Define and measure the area of rectangles and shapes that can be broken into rectangles.</li> <li>Use a generic rectangle to multiply, both on paper and mentally.</li> <li>Find the greatest common factor of selected numbers.</li> </ul>  |
|---|---|
| Common Core State<br>Standards (CCSS) -<br>Mathematics<br>List all of the standards in this unit. | <ul> <li>Statistics and Probability</li> <li>Topic: Summarixe and describe distributions</li> <li>CCSS.MATH.CONTENT.6.SP.B.4: Display numerical data in plots on a number line, including dot plots, histograms, and box plots.</li> <li>Geometry</li> <li>Topic: Solve real-world mathematical problems involving area, surface area, and volume</li> <li>CCSS.MATH.CONTENT.6.G.A.1: Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.</li> <li>Expressions &amp; Equations</li> <li>Topic: Apply and extend previous understanding of arithmetic to algebaraic expressions</li> <li>CCSS.MATH.CONTENT.6.EE.A.3: Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.</li> <li>The Number System</li> <li>Topic: Compute fluently with multi-digit numbers and find common factors and multiples</li> <li>CCSS.MATH.CONTENT.6.NS.B.4: Find the greatest common factor of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4 (9 + 2).</li> </ul> |

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| Mathematical Practices Which of the mathematical practices will be focused on during this unit?  | The 8 Mathematical Practices are listed below. A "kid friendly" version of each standard is also included.  1. Make sense of problems and persevere in solving them 2. Reason abstractly and quantitatively 3. Construct viable arguments and critique the reasoning of others 4. Model with mathematics 5. Use appropriate tools strategically 6. Aftend to precision 7. Look for and make use of structure 8. Look for and express regularity in repeated reasoning  Kid-Friendly Version of Standards  1. I never give up on a problem and I do my best to get it right 2. I can solve problems in more than one way 3. I can explain my math thinking and talk about it with others 4. I see the math in everyday life and I can use math to solve everyday problems 5. I know how to choose and use the right tools to solve a math problem 6. I can work carefully and check my work 7. I can use what I know to solve new problems 8. I can solve problems by looking for rules and patterns |
|--|---|
| Essential Standards* List the Essential Standards that will be taught and assessed in this unit. | To be determined.   |
| Crossover standards*  Connection to other content areas (Option)                                 |   |

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# Alignment to the Vision of High Quality Instruction in Mathematics

(How do the instructional targets in this unit align to the district's vision of high quality instruction?)

### Teacher Actions:

- Teacher establishes clear goals for the mathematics that students are learning, situates targets within learning progressions, and uses the targets to guide instructional decisions.
- Teacher engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allows multiple entry points and varied solution strategies.
- Teacher engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.
- Teacher facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.
- Teacher uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.
- Teacher builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems.
- Teacher consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.
- Teacher uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.
- Teacher provides instructional scaffolding with the gradual release model of instruction to ensure students are able to construct meaning of mathematics.

### Student Actions:

- Students solve problems without giving up.
- Students think about numbers in many different ways.
- Students explain and justify their thinking and understand the thinking of others.
- Students show, analyze and revise their work in many different ways.

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- Students use math tools and explain why they chose them.
- Students calculate accurately and efficiently, evaluate their work, and clearly communicate their thinking.
- Students use what they know to solve new problems.
- Students solve problems by looking for rules and patterns and evaluate their result.
- Students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace.

# **Stage 2: Determine Acceptable Evidence**

(With the exception of formative assessments, all assessments listed in this section are required elements of the district's curriculum and the data associated will be collected in the district's performance management driver system.)

# Measure of Understanding (Performance Task)

(How will students demonstrate their attainment of the desired understanding?)

### 1. SUMMARIZING MY UNDERSTANDING

This section gives you an opportunity to show what you know about the main math ideas in this chapter.

### Constructing a Concept Catcher

Your teacher will give you the <u>Chapter 2 Closure Resource Page</u>. Cut the page as indicated so that your paper is now a square. This square is divided into four regions, each containing a question or problem

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|  | related to area. Discuss the problems with your team and write clear and complete answers in each regit Fold each of the four corners in toward the center so that each problem is covered and your paper is in the shape of another square. Then label each flap with a title that describes the main idea of the covered problem. Follow your teacher's instructions for sharing your good ideas now captured in your Concept Catcher. |  |  |  |  |
|--|--|--|--|--|--|
| Assessing the Performance Task (How will we evaluate quality student work in the performance task? How will we determine that students can use their learning independently?)  | Concept Catcher Holistic Rubric  |  |  |  |  |
| Summative Assessments (How will we know if students can demonstrate mastery of the unit's content, skills, and common core state standards?) Can overlap the performance-based evidence, thereby increasing the reliability of | Individual Chapter Assessment  |  |  |  |  |

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| the overall assessment (especially if<br>the performance task was done by<br>a group) |   |
|---|---|
| Interim Assessments   | 2 - 14. LEARNING LOG  In your Learning Log, compare the histogram in problem 2-13 with the stem-and-leaf plot from problem 2-12. What connections can you make between the two data displays? How are these data displays the same or different? How do they compare to a dot plot? Title this entry "Histograms and Stem-and-Leaf Plots" and label it with today's date.  2-23. LEARNING LOG  In your Learning Log, describe area. What makes area different from length? What can you use to measure area? Include examples. Label this entry "Area" and include today's date.  2-45. LEARNING LOG  Is there a relationship between area and perimeter? Does changing one mean the other one always changes? Use examples to support your ideas. Label the entry "Area and Perimeter" and include today's date.  2-64. LEARNING LOG  In your Learning Log, describe how you can use a generic rectangle to multiply two numbers. Be sure to include an example. Title this entry "Generic Rectangles" and include today's date. |

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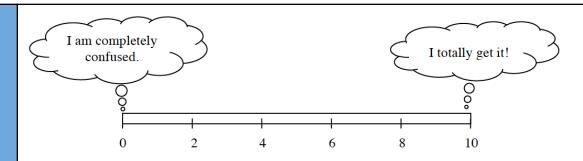
|   | 2-74. LEARNING LOG   |  |  |  |  |  |
|---|--|--|--|--|--|--|
|   | Discuss the idea of a greatest common factor with your team. Then write a definition for greatest common factor in your Learning Log. Create your own example to help explain your definition. Title this entry "Greatest Common Factor" and include today's date.                         |  |  |  |  |  |
|   | -85. LEARNING LOG  |  |  |  |  |  |
|   | In your Learning Log, write a definition for the Distributive Property in your own words. Explain how it can be used to help you find products mentally without the use of a calculator. Be sure to include an example. Title this entry "Distributive Property" and include today's date. |  |  |  |  |  |
|   | Homework Review Preview Options  |  |  |  |  |  |
| Formative<br>Assessments  |  |  |  |  |  |  |
|   | For each of the problems above, do the following:  |  |  |  |  |  |
| Student Self-Reflection   |  |  |  |  |  |  |
| and Self-Regulation (Student-Centered) (How will we measure students' ability to think meta-cognitively?) |  |  |  |  |  |  |

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Draw a bar or number line that represents 0 to 10.

• Color or shade in a portion of the bar that represents your level of understanding and comfort with completing that problem on your own.

If any of your bars are less than a 5, choose *one* of those problems and complete one of the following tasks:

- Write two questions that you would like to ask about that problem.
- Brainstorm two things that you DO know about that type of problem.

If all of your bars are at 5 or above, choose *one* of those problems and do one of these tasks:

- Write two questions you might ask or hints you might give to a student who was stuck on the problem.
- Make a new problem that is similar and more challenging than that problem and solve it.

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# State Assessment Practice

(How will we measure students' ability to interact with content and skills in an MSTEP-like or SAT-like format?)

Standards Based Illuminate Assessment

# **Stage 3: Learning Plan**

(Summary of Key Learning Events and Instruction)

What activities, experiences and lessons will lead to achievement of the desired results and

Students will explore mathematical reasoning and representations through collaborative teams and roles, using grit to solve challenging problems and provide reasoning for their solutions.

Dot Plots and Bar Graphs
Histographs and Stem-and-Leaf Plots
Exploring Area
Square Units and Area of Rectangles
Area and Perimeter

Using Rectangles to Multiply Using Generic Rectangles

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# success at the assessments?

The learning events –

- should be derived from the goals of Stage 1 and the assessments of Stage 2 to ensure alignment and effectiveness of the activities.
- should match the level of rigor within the standard
- support student Acquisition, Meaning Making, and Transfer.

Generic Rectangles and Greatest Common Factors
Distributive Properties

Class Schedule:

Bell Work

Roles

Inquiry/Investigation (Lesson)

Review/Preview work time if left

Daily Wrap up/closure

ALL CHAPTER 2 MATERIALS, Assessments, Binder Materials (Notes), Homework, and Learning Targets/Agendas

## **Learning Targets**

What will students be taught? What should they know? What should they be able to do?

| Lesson # | Question                            | Learning Target   | Standard/Practice   | Time Estimate |
|----------|-------------------------------------|---|---|---------------|
| 2.1.1    | How can I<br>represent the<br>data? | Students will<br>analyze the<br>strengths and<br>weaknesses of<br>various<br>graphical<br>representations<br>of data. | 6.SP.4: Display numerical data in plots on a number line, including dot plots, histograms, and box plots.  Models | 45 Min        |
| 2.1.2    | How else can l<br>represent data?   | Students will learn<br>how to collect   | 6.SP.4: Display numerical data in   | 45 min        |

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|       |                           | data and how to<br>display the data in<br>a stem-and-leaf<br>plot and a<br>histogram.                                       | plots on a number<br>line, including dot<br>plots, histograms,<br>and box plots.<br>Models  |         |
|-------|---------------------------|---|---|---------|
| 2.2.1 | What else can I measure?  | Students will explore the concept of area and develop strategies for measurignt eha rea of a closed two-dimensional region. | 6.G.1: Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.  Use appropriate tools strategically | 45 Mins |
| 2.2.2 | How can I<br>measure with | Students will extend their  | <b>6.G.1:</b> Find the area of right  | 45 Mins |

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|       | square units?            | understanding of area with the introduction of standard units of measure.   | triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. |         |
|-------|--------------------------|---|--|---------|
| 2.2.3 | Is there a relationship? | Students will continue to develop an understanding of composing and decomposing area and begin to look at how this affects perimeter within the context of Base Ten Blocks. | 6.G.1: Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these  | 45 Mins |

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|       |                                  |   | techniques in the context of solving real-world and mathematical problems.  Precision and Reasoning  |         |
|-------|----------------------------------|---|--|---------|
| 2.3.1 | How can I make the largest area? | Students will use generic rectangle area models to represent multiplication of multi-digit numbers. | 6.EE.3: Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply | 45 Mins |

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|       |                                      |   | properties of operations to y + y + y to produce the equivalent expression 3y.  Reasoning  |         |
|-------|--------------------------------------|---|--|---------|
| 2.3.2 | How can I find products efficiently? | Students will use generic rectangles to multiply mulit-digit numbers. | 6.EE.3: Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of | 45 Mins |

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|       |                                      |  | operations to y + y<br>+ y to produce the<br>equivalent<br>expression 3y.<br>Reasoning and<br>Precision   |         |
|-------|--------------------------------------|--|---|---------|
| 2.3.3 | How can I<br>understand<br>products? | Students will define greatest common factor (GFC) and use it to find the dimensions of generic rectangles. | 6.NS.4: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. | 45 Mins |

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|       |                             |   | For example,<br>express 36 + 8 as 4<br>(9 + 2).<br>Structure and<br>Reasoning  |         |
|-------|-----------------------------|---|--|---------|
| 2.3.4 | How can I rewrite products? | Students will use generic rectangles and factoring to discover and thena apply the Distributive Property to multi-digit products! | 6.EE.3: Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y | 45 Mins |

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|  | + y to produce the equivalent expression 3y.  Structure and Reasoning  |
|--|--|
| optimize achievement for all learners?  Teaching - | Chapter 2 Outline  Total: 9 days plus optional time for Closure and Assessment  Section 2.1  Lesson 2.1.1  Objectives: Dot Plots and Bar Graphs  Days:1  Materials: Sticky dots & Poster paper eTools & Videos:  Area Tiles and Toothpicks (CPM) Desmos Lesson 2.1.1 Activity  Core Problems & Homework: CP: 2-1, 2-2, and 2-5 HW: 2-6 to 2-10  Lesson 2.1.2  Objectives: Histograms and Stem-and-Leaf Plots Days: 1 |

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interests, and preferred ways of learning.

Materials: Timing device, Sticky notes or dots, Poster paper and markers eTools & Videos:

- 2-13 Student eTool (Desmos) (ESP)
- Desmos Lesson 2.1.2 Activity

Core Problems & Homework:

CP: <u>2-11 to 2-14</u> HW: <u>2-15 to 2-19</u>

Section 2.2

**Lesson 2.2.1** 

**Objectives:** Exploring Area

Days: 1

Materials: Measuring tools (rulers, meter sticks, tape measures, Pattern blocks or Lesson 2.2.1A RP (ESP),

<u>Lesson 2.2.1B RP (ESP)</u> (opt.)

eTools & Videos:

Core Problems & Homework:

CP: 2-20 to part (d) of 2-22

HW: <u>2-24 to 2-28</u>

**Lesson 2.2.2** 

**Objectives:** Square Units and Area of Rectangles

Days: 1

Materials: Lesson 2.2.2A (ESP) 2.2.2B (ESP) 2.2.2C RP (ESP) Cardstock, Rulers, Scissors

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### eTools & Videos:

- 2-33 Student eTool (CPM) (ESP)
- 2-33 Answer eTool (CPM)
- <u>Pattern Tiles & Dot eTool (CPM)</u>
- Area Tiles (CPM)

#### **Core Problems & Homework:**

CP: <u>2-29 to 2-32</u>

HW: <u>2-34 to 2-38</u>

**Lesson 2.2.3** 

**Objectives:** Area and Perimeter

Days: 1

Materials: Lesson 2.2.3 RP (ESP) (Base Ten Blocks)

### eTools & Videos:

- 2-43a Student eTool (CPM) (ESP)
- 2-43a Answer eTool (CPM)
- 2-43b Student eTool (CPM) (ESP)

### **Core Problems & Homework:**

CP: <u>2-39 to 2-42</u>

HW: <u>2-46 to 2-50</u>

Section 2.3

**Lesson 2.3.1** 

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**Objectives:** Using Rectangles to Multiply

Days: 1

Materials: Playing cards and Base Ten Blocks

eTools & Videos:

Core Problems & Homework:

CP: 2-51 to 2-54

HW: 2-55 to 2-59

**Lesson 2.3.2** 

**Objectives:** Using Generic Rectangles

Days: 1

Materials: None eTools & Videos:

**Core Problems & Homework:** 

CP: <u>2-60 to 2-62</u>

HW: <u>2-65 to 2-69</u>

Lesson 2.3.3

**Objectives:** Generic Rectangles and the Greatest Common Factor

Days: 1

Materials: None eTools & Videos:

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| Core | Prob | lems | & H | lome | work: |
|------|------|------|-----|------|-------|
|------|------|------|-----|------|-------|

CP: <u>2-70 to 2-72</u>

HW: 2-75 to 2-79

**Lesson 2.3.4** 

**Objectives:** Distributive Property

Days: #

Materials: None eTools & Videos:

**Core Problems & Homework:** 

CP: <u>2-80 to 2-82</u>

HW: <u>2-86 to 2-90</u>

### **Chapter Closure (Various Options)**

### Team Roles:

- Resource Manager:
  - The teacher may call you over to give you extra information to share with the team
  - Get supplies for your team and make sure that your team cleans up
    - "I will put away the while you ."
  - Make sure that everyone has shared all of their ideas and help the team divided when it needs outside help.
  - Call the teacher over for team questions.
    - "No one has an idea? Should I call the teacher?"
- Facilitator:
  - Get your team started by having someone read the task outloud

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- "Who wants to read?"
- "What are some ideas to get started?"
- Check that everyone understands what to work on
  - "Does anyone know how to get started?"
  - "Let's check the directions."
  - "What does the first question mean?"
  - "I'm not sure what are we supposed to do?"
- Make sure that everyone understands your team's answer before you move on
  - "Do we all agree?"
  - "Can we figure out which one is right?"
  - "I'm not sure I get it yet can someone explain?"
- Recorder/Reporter:
  - Take notes for the team
    - "For part one..."
    - "Because we figured out that..."
  - Share your team data with the class
  - Make sure that each team member can see the work the team is discussing, ensure each member has access to diagrams by placing them at the center of the table
  - Make sure that your team agrees about how to explain your ideas and each person has time to write their answer
    - "How can we write this?"
    - "How can we show it on the diagram?"
    - "How can we keep track of our calculations?"
  - Make sure that each member of your team is able to share ideas.
- Task Manager:
  - Make sure that no one talks outside your team
  - Help keep your team on task and talking about math
    - "Let's move on to another part of the problem."
    - "Okay, let's get back to work!"
    - "Let's keep working."
    - "What does the next auestion say?"

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|   | <ul> <li>Listen for statements and reasons</li> <li>"Explain how you know that."</li> <li>"Can you prove that?"</li> <li>"Explain why!"</li> <li>"Can you show us another way?"</li> </ul>  |
|---|---|
| Key Vocabulary                              | Dot plot Bar graph Venn Diagram Stem-and-leaf plot Bin Histogram Dimensions Area Plane Perimeter Product Generic Rectangle Common Factor Greatest Common Factor (GCF) Distributive Property |
| Resources  Description or link to resources |   |