Statewide IT Bridge Curriculum
Contextualized Math Module

Students will:

OUTCOMES	CONTENT	ACTIVITIES/RESOURCES	ASSESSMENT
1. Use spreadsheets to generate graphs from data **Standards**: 5.W.WL.3 Produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience. 5.S.CC.2 Demonstrate active listening skills. 6.S.CC.1 Initiate and participate effectively in a range of collaborative discussions with diverse partners on texts, topics and issues appropriate to skill level, building on others' ideas and expressing their own	Navigation, input, interpretation, and entry of data	• Navigate and use the functions of a spreadsheet application (e.g., Google Sheets or MS Excel) **Activity 1 - Warmup introduction to graphical representation of data** • Discuss the uses of graphs to show and explain data. • Show graphs created using Google Sheets – bar charts, pie charts, and line graphs. • Input numeric data via a spreadsheet, database, or directly. **Activity 2 - Open Google Drive and navigate to the application** Demonstrate: How to Access Google Sheets • Recall how to access your Google Drive from G-mail. • Open the SPREADSHEETS folder. • Go to **My Drive** pull down menu. • Select Google SHEETS and open a new, blank spreadsheet. • Recall the following spreadsheet features: rows, columns, column width, row height. • Demonstrate how to create a pie chart, bar chart, and line graph, Practice: • Students follow the instructions to access their SPREADSHEETS folder and Google Sheets. • Open a blank spreadsheet, practice navigating across rows and down columns using arrow keys; be ready to enter data. • Create a pie chart, line graph, and bar chart using the data • Enter title text, axis names, and legends in graphs **Activity 3 - Build-up Exercises Task 1: Enter data and display graphs** • Students work individually to enter the text and data, create graphs, then move the sheet to the SPREADSHEETS folder.	Instructor observation Student self-assessment Spreadsheet work

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clearly and persuasively.
3.OA.6
Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
		• NOTE: You might want to pace this by demonstrating how to do one type of graph at a time, and having students create each graph after your demonstration.
		• Edit data as necessary
		• Adjust the size of the graph
		• Change the scale of a graph
		• Successfully print graphs
		
		Activity 4 - Build-up Exercises Task 2: Change graphical display
		• Demonstrate how to locate the key editing functions of Google Sheets.
		  ○ Edit the y-axis by setting upper and lower scale limits.
		  ○ Change scale ratios on horizontal and vertical axis.
		  ○ Save the new graph or chart.
		• Demonstrate the following functions to edit the spreadsheet charts from Activity Task 1.
		  ○ Edit the y-axis by setting upper and lower scale limits.
		  ○ Change scale ratios on horizontal and vertical axis.
		  ○ Print the new chart.
		• Students work individually to:
		  ○ Enter data into a new spreadsheet and create a bar chart.
		  ○ Reduce the scales of the graph on x- and y-axis and set upper and lower scale limits, following the instructions for Task 2.	

2. Explore patterns in different situations **Standards**:	Description and prediction; data	• Find, describe, explain, and predict, using patterns. • Determine whether or not patterns in tables are uniquely described. • Distinguish between closed and recursive descriptions of patterns. • Understand that a table of data associated with a specific situation determines a unique pattern.	Instructor observation Completed tables

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<table>
<tr><th>OUTCOMES</th><th>CONTENT</th><th>ACTIVITIES/RESOURCES</th><th>ASSESSMENT</th></tr>
<tr>
<td>5.S.CC.2
Demonstrate active listening skills.
6.S.CC.1
Initiate and participate effectively in a range of collaborative discussions with diverse partners on texts, topics and issues appropriate to skill level, building on others' ideas and expressing their own clearly and persuasively.
3.OA.5
Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule "add 3" and the starting number 1, generate terms in the resulting sequence and</td>
<td>determination of patterns</td>
<td>
Activity 1. Warm up: Logic patterns guessing game

Use sorting and classifying to guess the number that your partner is thinking about.

1st person: Give a limit (e.g., between 0–100). Select some attributes of your number.
2nd person: Ask questions and use logical sorting to identify the number.

Ask questions about the attributes (e.g., types of number, less than, greater than, between two numbers).
Use the response to:

Eliminate the numbers that don't match.
Classify the type of number as odd, even, prime, square number, tens, hundreds, thousands.
Narrow down the choice and identify your process for guessing the number.

Draw a diagram to show your logical process (decision tree or process flow chart).

Activity 2. Number Patterns: Describing a pattern

Describe several different patterns that you see in this table. Discuss what happens to the input number to make the output number.

<table>
<tr><th>Input</th><th>Output</th></tr>
<tr><td>1</td><td>6</td></tr>
<tr><td>2</td><td>10</td></tr>
<tr><td>3</td><td>14</td></tr>
<tr><td>4</td><td>18</td></tr>
<tr><td>5</td><td>22</td></tr>
<tr><td>6</td><td>26</td></tr>
</table>
</td>
<td>Think/pair/share</td>
</tr>
</table>

OUTCOMES	CONTENT	ACTIVITIES/RESOURCES	ASSESSMENT
observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.		• Describe the pattern. How are the numbers in the Output increasing with the Input numbers? *Possible answers: each output number is 4 more than the last; output numbers that appear are all the even numbers that aren't multiples of 4 (starting with 6); the output number is 2 more than 4 times the input number. Also, adding one input to the following input yields half the first output.* RULE: the output number is 2 more than 4 times the input number • **Q1**: What is the 100th entry in the table? How do you know? You can't be sure, because the pattern is not completely specified, but it is likely that the 100th number is 402. This follows the rule listed above - that the output number is 2 more than 4 times the input number. **Activity 3: "Recipe" to perform on a number** 1. Pick a number 2. Triple your number 3. Subtract 2 from the answer 4. Double the answer 5. Add 6 6. Subtract twice your original number. • **Q2.** What does this recipe do to the numbers from 1 to 10? Record your answers in a table. • **Q3.** Can you explain how this recipe is related to the patterns you saw in the table from the Question 1? Think-pair-share activity: ○ Comment on each of the following descriptions of the table given below. ○ Do all these descriptions produce the same list of outputs?	

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		○ Are all of these descriptions valid for the table? *(HINT: test each one using a list of numbers)* **Pair up:** Each pair takes one description and decides if it produces the same list of outputs. **Share:** Discuss each group's findings. Decide which, if any, of the descriptions are valid for the Table in Q2. **DESCRIPTIONS:** 1. As the input increases by 1, the output increases by 4. 2. If you add 2 to 1 and double it, you get 6. If you add 3 to 2 and double it, you get 10. If you add 4 to 3 and double it, you get 14. Or, if you add the input to the next input, double that and you get the output. 3. The units' digits are in the sequence 6, 0, 4, 8, 2, so the next number would be 26, then 30, 34, 38, and 42, and then 46, 50, 54, 58, 62, etc. 4. To get the output, multiply the input by 4 and add 2. 5. To get the output, triple the input, then add 2 more than the input. 6. After 6 as an input, the output numbers repeat over again: 6, 10, 14, 18, 22, 26, etc. 7. After 6, the output numbers remain constant: 26, 26, 26, etc. • **Q4:** Which number comes next in this sequence: 1, 2, 3, ___? Find as many different answers and explanations as you can. **Activity 4: Reflection activity: Skills for thinking about patterns** • Take a closer look at the four skills for thinking about patterns. 1. *Finding patterns* involves looking for regular features of a situation that repeats. 2. *Describing patterns* involves communicating this regularity in words or in a mathematically concise way that other people can understand. 3. *Explaining patterns* involves thinking about why the pattern continues forever, even down the line in cases you haven't looked at.	

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		4. *Predicting with patterns* involves using your description to predict pieces of the situation that aren't given. **Think-Pair-Share activity**: Look back at the questions in Activity 3. • **Think** about how you use these skills in each problem. • **Describe** to your partner how you use these skills in each problem. • **Share** with the class. **Instructor Summary** at end of sharing segment: • Finding is observing the pattern you see. • Describing is putting what you see into words or symbols. • Explaining is figuring out why the pattern continues. • Predicting is using your description or rule for a new value.	
3. Discover and create algorithms for daily activities **Standards:** 5.W.WL.3 Produce clear and coherent writing in which the development, organization and style are appropriate	Identification, creation, description, and analysis	• Explain what is meant by an algorithm. • Create algorithms for everyday activities. • Discuss algorithms in your everyday life. **Activity 1: What is an algorithm and why should you care** • Video https://www.khanacademy.org/computing/computer-science/algorithms/intro-to-algorithms/v/what-are-algorithms • Describe what you understand by an algorithm.	Instructor observation Student verbal interaction Think/pair/share

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to task, purpose and audience. 5.S.CC.2 Demonstrate active listening skills. 6.S.CC.1 Initiate and participate effectively in a range of collaborative discussions with diverse partners on texts, topics and issues appropriate to skill level, building on others' ideas and expressing their own clearly and persuasively.		• Think about what we have been doing with number patterns and describing the steps to create them. Is this an algorithm? **Activity 2: Create an algorithm of a guessing game** • https://www.khanacademy.org/computing/computer-science/algorithms/intro-to-algorithms/a/a-guessing-game **Activity 3: Route finding** • https://www.khanacademy.org/computing/computer-science/algorithms/intro-to-algorithms/a/route-finding • Play Pac Man or Go for Goal • Describe the steps to win the game or reach the goal **Activity 4: Discussion—Algorithms in everyday life Think- Pair-Share activity** • https://www.khanacademy.org/computing/computer-science/algorithms/intro-to-algorithms/a/discuss-algorithms-in-your-life • Think about your answers to these questions: ✓ What algorithms do you use in everyday life? Do you think you could write a program to make them more efficient? ✓ What algorithms do you think are used by your favorite games and apps? ✓ Have you ever made an algorithm for a program? What did it do? Was it correct and efficient? • In pairs: Answer one or more of these questions. • Share; listen to what other students say.	

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4. Create budget spreadsheets; understand and analyze income statements **Standards**: 5.W.WL.3 & 6.W.WL.6 Produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience. 5.S.CC.2 Demonstrate active listening skills. 6.S.CC.1 Initiate and participate effectively in a range of collaborative discussions with diverse partners on texts, topics and issues appropriate to skill level, building	Text and numeric entry; formatting; formulas	• Learn basic Google Sheet features to create a personal budget and enter into a spreadsheet. • Use the following skills: ✓ Cell usage and access ✓ Basic formulas ✓ Text entry ✓ Numeric entry ✓ Cell Format ✓ Simple 'if' statement ✓ Merge and center ✓ Pie charts **Activity 1: My Budget Project** Create a personal budget spreadsheet that lists expenses and income for 12 months. • The spreadsheet will cover 12 months starting in January. • The spreadsheet there have three separate entries: variable expenses, fixed expenses, and income. • In variable expenses you must include at least 12 items over the 12 months. Examples include groceries, gas, babysitting, junk food, etc. Make up your own list. Be creative but not inappropriate. • In fixed expenses you will enter at least 6 items that recur such as rent and cable. Each item should have the same value for each month. Again, be creative. • In the income section there must be at least two entries. One should be the salary from your regular job and the other from another type of income such as part time work, investments, consulting, etc.	Instructor observation Student verbal interaction Written work/personal budget

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on others' ideas and expressing their own clearly and persuasively. 4.EE.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number or, depending on the purpose at hand, any number in a specified set.		• Make sure you: ✓ Use at least 3 different formulas. ✓ Use at least one function. ✓ Format text to use at least 3 colors and/or italics, bold or underlined. ✓ Create a graph or chart of part or all of your data. ✓ Use two sheets and name each sheet. Challenge students by changing the data—how does this affect the outcome?	

5. Make spending and purchasing decisions; calculate costs/discounts; make consumer comparisons **Standards**: 5.S.CC.2 Demonstrate active listening skills 4.RP.6 Use proportional relationships to solve multistep ratio and percent problems. (Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error).	Cost analysis and comparison	• Make spending and purchasing decisions • Calculate costs and discounts • Make consumer comparisons **Activity 1: Buying and selling online** • Ask students about their experiences of buying and selling online. • Demonstrate Craigslist, ETSY and other selling sites. • Have students search for an item online and identify cost and discount. **Activity 2: The sharing economy** • Ask what we mean by the sharing economy. *Definition: In what is called collaborative consumption, the sharing economy, or the peer economy, owners rent out something they are not using such as a car, house or bicycle to a stranger using these peer-to-peer services. The company typically has an eBay-style rating or review system so people on both sides of the transaction can trust the other. With the popularity of these services, many people don't need to buy when they can rent from others.* • Discuss Ron J. Williams, CEO of SnapGoods, a site for lending and borrowing high-end household items such as cameras, kitchenware or musical instruments. • Examples: AirBnB, Taskrabit, Relayrides, Getaround, Lyft, Lending Club • See slideshow https://www.forbes.com/pictures/eeji45emgkh/airbnb-snapgoods-and-12-more-pioneers-of-the-share-economy/#1e25786c52cf Students investigate one or more of these sites and report back to the group on the products or services offered, the pros and cons of sharing, etc.	Teacher observation Oral presentation