

Discrete Mathematics/Computer Science Scope and Sequence



**Department of
Education &
Workforce**

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Scope and Sequence

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice
UNIT 1: PROBLEM-SOLVING: INTRODUCTION TO THE MATHEMATICAL PRACTICES		
Day 1	Collaboration—with the Cup Stack Challenge. Students will collaborate to complete the Cup Stack.	MP.1
Day 2-3	Trading Places: Leap Frogs – This lesson presents the students with a puzzle to solve. They are asked to determine the minimum number of moves to transfer two groups of frogs from one side of the puzzle board to the opposite side. Students will have a game where they can find the most numbers in order. The class will begin establishing classroom norms surrounding collaboration.	MP.1, MP. 2, MP. 3, MP.7
Day 4	Launching a Lesson – This task sets the routine for launching lessons.	MP.1, MP.2, MP.3
Day 5	Mathematical Mindset: Promoting Productive Struggle and Perseverance – Students will learn about and experience productive struggle and perseverance by watching the tiger video and starting a “would you rather” activity.	MP.1
Day 6	Mathematical Mindset: Making Mistakes – Students use the Ultimate Tic-Tac-Toe task to continue problem-solving emphasizing equivalence and learning about factorials.	MP.7
Day 7	Overview of the Mathematical Practices and Number Talks—Students will learn about the importance of using different representations by doing a Dot Plot. Then students will use the jigsaw method to explore the standards of mathematical practices.	MP.1-MP.8
Day 8	Communication, Reasoning and Precision—Students will use Number Talks and Fermi Problems to communicate their reasoning to others and defend their reasoning and critique the reasoning of others.	MP.2, MP. 3, MP.6
Day 9	Flowcharting, Reasoning, and Precision—Students will continue constructing viable arguments using Number Talks. Students will implement Math Practices 7 and 8 using the Border Problem and then reflect on the math practices.	MP.2, MP.3, MP.6

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	
UNIT 1: PROBLEM-SOLVING: INTRODUCTION TO THE MATHEMATICAL PRACTICES			
Day 10	Hello World – Students analyze mathematical tools and programming designs available at their disposal including the benefits and drawbacks.	MP.1, MP.5	
Day 11	Convincing, Defending and Proof - Students explore proof–in the context of trying to convince someone of their hypothesis as a defendant and being a skeptic (prosecutor) of another’s hypothesis.	MP.3	
Day 12	Proofs, Introductions, and Evaluation–Students prove their conjecture from day 5–Would You Rather? They will use the Business Card programs to introduce each other and will fill out an evaluation of Theme 0 using the 3-2-1 evaluation.	MP.1, MP.5	
Days 13-14	These days are reserved for local High-Quality Student Data Collection. These days can be used at any time during or after Unit 1. If the district chooses to use these days later in the year, then they will need to adjust the scope and sequence accordingly.	N/A	
Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 2: GAMES			
Days 15-19	Unplugged Games – Students will continue their work from Unit 1 to determine the optimal strategies for three new games. From this, students will develop a way to show that the strategies for games work every time through understanding their common structures.	MP.1, MP.3, MP.6, MP.7, MP.8	CS ATP.A.9-12.F.a, ATP.M.9-12.F.a, ATP.A.9-12.F.b, DA.IM.9-12.F.a, ATP.CS.9-12.F.a, ATP.CS.9-12.F.b

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 2: GAMES (CONT.)			
Days 20-31	Half Checkerboard – In this lesson, students will continue their work from Games to determine the optimal strategies for three new games. From this, they will develop a way to show that the strategies for games work every time through understanding their common structures.	MP.1, MP.3, MP.6, MP.7, MP.8	<p>Math F.IF.2, F.BF.1, G.CO.2</p> <p>CS ATP.A.9-12.F.b, DA.IM.9-12.F.a, ATP.CS.9-12.F.a, ATP.CS.9-12.F.b</p>
Days 32-33	Logic Part 1 – Students use what they know about evaluating basic mathematical expressions to learn about Boolean values and Boolean arithmetic in a Computer Science setting.	MP.6	<p>CS ATP.CS.9-12.F.a, ATP.VDR.9-12.F.a, ATP.A.9-12.F.b, ATP.CS.9-12.A.a, ATP.CS.9-12.A.b, ATP.M.9-12.A.a, ATP.CS.9-12.A.a</p>
Day 34	Mid-Unit Assessment/Evaluation	N/A	N/A

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 2: GAMES (CONT.)			
Days 35-48	<p>Thai 21 – In this lesson, students will engage in problem-solving to determine the strategy for a particular game, Thai 21. They will need to make sense of the rules and play the game repeatedly to figure out its winning strategy. Students will learn to create valuable representations or models of the game. Students will develop systematic reasoning and problem-solving approaches such as playing smaller games to search for patterns and abstract their structure. They will be expected to describe their strategy and justify why their strategy will always work by appealing to the rules of the game. Students will communicate their thinking to their peers in a way that doesn't spoil the fun of discovery for others.</p> <p>Students need to understand that each game in this unit is a problem to be solved and not a competition between them and their classmates to see who can win the game.</p>	MP.1, MP.3, MP.4, MP.5, MP.7, MP.8	<p>CS</p> <p>ATP.CS.9-12.F.a, ATP.VDR.9-12.F.a, ATP.A.9-12.F.b, ATP.CS.9-12.F.a, ATP.CS.9-12.F.b</p>
Day 49	End of Unit Assessment/Evaluation	N/A	N/A
Days 50-52	Writing Good Solutions: Unit 2 – In this lesson, students will engage in an activity where they investigate what it means to write a good solution and critique the solutions that both they and their classmates write.	MP.2, MP.3, MP.6, MP.8	<p>Math</p> <p>F.IF.2, F.BF.1, G.CO.2</p>

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 3: COUNTING/COMBINATORICS			
Days 53-54	Liar's Bingo - Liar's Bingo is all about patterns, specifically in the binary number system. This lesson involves recognizing patterns and searching for underlying structures, number theory, numeration, and potentially binary arithmetic. Sometimes, as in the game of Liar's Bingo, order seems to arise magically from something we first assume to be random or chaotic. In this case, the game of Liar's Bingo is used to engage participants' desire to find patterns and supercharge that desire by demonstrating a magic trick that captivates attention by disrupting participants' expectations that the Liar's Bingo cards are without pattern.	MP.1, MP.3, MP.4, MP.6 MP.7, MP.8	
Day 55	Binary Numbers (Part 1) – This is an “unplugged” activity where students will use cards, egg cartons, their hands and other metaphors to represent binary numbers and learn to add them together. Binary numbers are a topic that exists in math and computer science. The concepts are the same but the vocabulary is different.	N/A	CS ATP.VDR.9-12.F.a, ATP.VDR.9-12.A.b
Days 56-58	Barcodes and QR Codes–In this lesson, using a ruler students will analyze barcodes and QR codes to figure out how many “bits” exist in each case and why QR codes represent an improvement over barcodes.	MP.5, MP.6	CS ATP.VDR.9-12.F.a, ATP.VDR.9-12.A.b

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 3: COUNTING/COMBINATORICS (CONT.)			
Days 59-61	Count Me In!–This lesson gives students experiences with counting situations before labeling any combinatorial ideas or objects. The key is for students to practice reasoning, participate in sense-making, and create their representations and notations. By the end of the lesson, students learn to write out all outcomes for small cases. When it’s not possible to write all outcomes, they would likely write a few examples of outcomes, skipping others intentionally, because of the size of the set, and identifying patterns they can justify. One likely example is that students will observe an arithmetic series and want to know its sum. The use of tree diagrams, tables, lists, ordered pairs and expressions should be anticipated.	MP.1, MP.3, MP.7, MP. 8	Math A.CED.1
Day 62-65	Counting Fundamentals–In this lesson, students solve problems that challenge them to think about the ideas behind two fundamental counting principles, the Addition Principle, and the Multiplication Principle. Students are asked to examine what it is about the situation that determines when it is appropriate to add and when to multiply. Students continue to attend to the relationship between the set of outcomes and their counting process, participate in sense-making, and create their representations and notations. They leverage tree diagrams, tables, lists, ordered pairs and expressions to identify patterns, generalize and abstract the fundamental concepts behind the operations they choose to use.	MP.1, MP.6, MP.7	Math (+) S.CP.9
Day 66	Mid Unit Assessment	N/A	N/A

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 3: COUNTING/COMBINATORICS (CONT.)			
Days 67-71	<p>Crack the Pin–This begins with a discussion of cybersecurity and cybersecurity measures in place at the school. A scenario is presented where there is a locked smartphone with a three-digit pin. Students modify a computer program to scan every possible pin until the correct pin is found. An important question is how long it takes the computer program to guess the pin. Students will create a model to predict the maximum time for the program to run. Students need to run the program multiple times to determine if the model is reasonable. Later the task is changed to guessing a four-digit pin that uses the numbers 0-5. Students must modify (and thereby generalize) both their code and their model to consider this new situation. Finally, in a qualitative way, they discuss how password length and the presence or absence of different types of characters affect the strength of a password.</p>	MP.2, MP.4, MP.5, MP.6, MP.7, MP.8	<p>Math (+) S.CP.9</p> <p>CS NI.C.9-12.F.a , NI.C.9-12.F.b, IC.SLE.9-12.F.b, IC.SLE.9-12.A.a</p>
Days 72-74	<p>Order Please!–In the previous lesson, students explored the ideas underlining the Addition Principle and the Multiplication Principle. The lesson emphasizes counting permutations of r objects from n distinct objects in two ways:</p> <ol style="list-style-type: none"> (1) Repeatedly applying the multiplication principle to construct arrangements of k objects. (2) Counting arrangements of all n objects and then using division to correct for overcounting. <p>By the end of the lesson, students derive formulas culminating from the investigations.</p>	MP.2, MP.6, MP.7	<p>Math S.CP.1, S.CP.7, (+) S.CP.8, (+) S.CP.9</p>

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 3: COUNTING/COMBINATORICS (CONT.)			
Days 75-78	Creating a Factorial Function–Students write a computer program to compute the factorial function with the idea that very large factorials are difficult for humans to compute. Although most calculators can do the factorial function with an exclamation mark (!).	MP.5, MP.6	Math A.SSE.1, A.SSE.3 CS ATP.M.9-12.F.a, ATP.CS.9-12.F.b, ATP.CS.9-12.F.a, ATP.A.9-12.F.b, ATP.A.9-12.F.a, ATP.M.9-12.F.b, ATP.M.9-12.A.a, ATP.A.9-12.A.b
Days 79-80	Writing Good Solutions: Unit 3–Students review the principles of writing good (clear, precise, and complete) solutions and then write good solutions for various counting problems. They engage in meaningful mathematical discourse as they critique the solutions that both they and their classmates write.	MP.3, MP.6	Math A.CED.1, A.SSE.1, A.SSE.3, S.CP.1, (+) S.CP.8, (+) S.CP.9
Day 81	Post-Unit Assessment/Evaluation	N/A	N/A
UNIT 4: PROBABILITY			
Days 82-87	That was Totally Random–This activity demonstrates the different ways that the random function can be used in JavaScript. Understanding all the different ways to use the random function is key to figuring out how to write code to model any particular game that includes some element of randomness. Students use this random function to explore the average or expected value and discuss how to use this measurement to recognize situations such as a “loaded dice”.	MP.1, MP.2, MP.4, MP.7, MP. 8	Math S.ID.1, S.IC.2, (+) S.MD.1, (+) S.MD.2, (+) S.MD.6 CS DA.DCS.9-12.F.a, DA.VC.9-12.F.a, DA.VC.9-12.A.a, DA.IM.9-12.F.a, ATP.A.9-12.F.a, ATP.M.9-12.F.b, ATP.VDR.9-12.A.b

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 4: PROBABILITY (CONT.)			
Days 88-92	Game of Risk – This lesson builds off the “That was Totally Random” lesson which introduced students to the random function in JavaScript and how to use it to simulate dice rolls. In this activity, students play the game of Risk. Then students modify a computer program to simulate a scenario from the game where there is one attacking dice and one defending dice. By considering all the possible combinations of two, six-sided dice students can estimate what the likelihood of winning is in this situation and compare it to the result of many trials with the computer program.	MP.1, MP.2, MP.4, MP.7, MP.8	Math S.IC.2, (+) S.MD.1, (+) S.MD.2, (+) S.MD.5, (+) S.MD.7 CS DA.DCS.9-12.F.a, DA.VC.9-12.F.a, DA.IM.9-12.F.a, ATP.VDR.9-12.F.a, ATP.M.9-12.F.b, ATP.VDR.9-12.A.a, ATP.VDR.9-12.A.b, ATP.A.9-12.A.b
Day 93	Mid-Unit Assessment/Evaluation	N/A	N/A

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 4: PROBABILITY (CONT.)			
Days 94-97	<p>Minesweeper–This lesson builds upon and extends the understanding of conditional probability concepts such as Set Theory using the game Minesweeper. Students may require some ‘just in time support’ of conditional probability concepts throughout the lesson as concepts from Geometry/Math 2 are revisited and extended.</p> <p>Minesweeper is a game where you look at the available information and use probability to make educated guesses. You start with a board with unknown information. After the first click, you suddenly have information that you can use to decide. You can organize this information into sets. All the unknown squares are sets of possible mine locations. Each square gives information on how many mines surround that square. You can use the information for that square and adjacent squares to turn a wild guess into an educated guess and even figure out the probability that your guess is correct.</p>	MP.2, MP.4, MP.6	<p>Math S.CP.1</p> <p>CS DA.VC.9-12.F.a, ATP.A.9-12.F.a, ATP.A.9-12.F.b, AI.RR.9-12.F.a</p>
Days 98-99	Writing Good Solutions: Unit 4–Students practice writing thorough, clear explanations by looking at several partially completed Minesweeper boards. They craft viable arguments and critique the reasoning of others with partners/small groups, before refining their explanations independently.	MP.3, MP.6	<p>Math S.CP.1, (+) S.MD.5, (+) S.MD.7 (+)</p> <p>CS DA.IM.9-12.F.a, ATP.A.9-12.F.a, ATP.A.9-12.F.b</p>
Day 100	Post Unit Assessment	N/A	N/A
Days 101-102	These days are reserved for local High-Quality Student Data Collection. These days can be used at any time during or after Unit 4. If the district chooses to use these days later in the year, then they will need to adjust the scope and sequence accordingly.	N/A	N/A

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 5: CONNECTIVITY			
Days 103-107	Nice to Meet You/Getting to Know You–This lesson introduces modeling with graphs using basic graph theory terminology. Students identify how to create a representation of connections between people and things.	MP.1, MP.4, MP.6	CS DA.DCS.9-12.F.a, DA.VC.9-12.F.a, ATP.A.9-12.F.a, ATP.A.9-12.F.b
Days 108-111	Zombie Apocalypse–Previously in “Nice to meet you Getting to know you” students were introduced to various ways to quantify different aspects of networks (<i>i.e.</i> , graphs). In this lesson, students explore how these quantities relate to real-world applications of networks through the context of a zombie virus outbreak. Students explore how different aspects of a network affect the spread of a virus, including how the “distance” between parts of a network is important for how quickly a virus will spread.	MP.1, MP.4, MP.6	Math F.LE.1, F.LE.5 CS NI.N.9-12.F.c, DA.VC.9-12.F.a, ATP.A.9-12.F.a, IC.SI.9-12.F.a, AI.RR.9-12.A.b
Day 112	Mid-Unit Assessment/Evaluation	N/A	N/A
Days 113-122	Graphs and Connectivity/Completely Connected Graphs–This lesson focuses on fully connected and minimally connected graphs. It uses code to confirm the number of connections required for a fully connected graph with between 3 and 8 vertices. Students engage in real-world scenarios to look at limitations that would make fully connected graphs less ideal or impractical. Students are asked to explore different situations with minimally connected graphs and discuss outcomes.	MP.2, MP.6	Math A.CED.1, F.BF.1 CS NI.N.9-12.F.c, ATP.A.9-12.F.a, ATP.A.9-12.F.b, ATP.VDR.9-12.F.a, ATP.CS.9-12.F.a, ATP.VDR.9-12.A.a
Days 123-124	Writing Good Solutions: Unit 4–Students write thorough and clear explanations of both key concept questions and graphs and graph connectivity questions. They craft viable arguments and critique the reasoning of others with partners/small groups, before refining their explanations independently.	MP.3, MP.6	Math G.MG.1, G.MG.3 CS NI.N.9-12.F.c, DA.VC.9-12.F.a, ATP.A.9-12.F.a

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 5: CONNECTIVITY (CONT.)			
Day 125	Post Unit Assessment/Evaluation	N/A	N/A
UNIT 6: ITERATION AND RECURSION			
Days 126-128	Towers of Hanoi–This lesson introduces the concept of recursion by using a game called “Towers of Hanoi”. It shows how you can solve for a small number of rings and use that information to see how many steps it would take for one more ring. This can then be extended to a generalization of how to solve for any number of rings.	MP.1, MP.3, MP.7, MP.8	Math F.BF.1 CS ATP.A.9-12.F.c, ATP.A.9-12.F.d, ATP.A.9-12.A.b, ATP.A.9-12.A.c
Days 129-130	Creating a Factorial Function–The goal of this lesson is to rewrite the factorial function from unit 2 to use recursion instead of iteration. Students will modify code to correctly have a function recursively call itself. They will look at the difference between mathematical and computer functions and see how they might graphically represent recursion.	MP.5, MP.6	Math F.BF.1 CS ATP.A.9-12.F.c, ATP.A.9-12.F.d, ATP.A.9-12.A.b, ATP.A.9-12.A.c
Day 131	Mid-Unit Assessment/Evaluation	MP.3, MP.6	N/A
Days 132-136	Fibonacci Sequence and Golden Ratio–In this lesson, students will be introduced to a variety of contexts based on the Fibonacci sequence. Students will repeat the reasoning process to internalize and gain a deeper sense of how a linear recurrence relation is constructed, the same kind of thinking that led us to conclude that the Fibonacci recurrence was true. They will develop systematic thinking as they explore the base cases first and then expand the existing structure to the next ‘size’.	MP.3, MP.6	Math F.IF.3, F.BF.1, F.BF.2 CS DA.IM.9-12.F.a, ATP.A.9-12.F.a, ATP.A.9-12.F.d, ATP.A.9-12.A.c

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 6: ITERATION AND RECURSION (CONT.)			
Days 137-138	Writing Good Solutions: Unit 5–Students will write thorough and clear explanations of questions on iteration and recursion. They will work on some as partners/small groups and then complete some explanations independently	MP.3, MP.6	Math F.IF.3, F.BF.1, F.BF.2 CS DA.IM.9-12.F.a, ATP.A.9-12.F.a, ATP.A.9-12.F.c, ATP.A.9-12.F.d, ATP.A.9-12.A.c
Day 139	Post-Unit Assessment/Evaluation	N/A	N/A
UNIT 7: CRYPTOGRAPHY			
Days 140-141	Counting the Ways–The strength/security of a system is connected to the time it would take to try all possibilities. Calculating the time required to try all possibilities requires knowing how many possibilities exist. This leads to a need for developing counting methods.	MP.1, MP.2, MP.3, MP.7	Math S.CP.2, (+) S.CP.9 CS NI.C.9-12.F.a, NI.C.9-12.F.d DA.IM.9-12.F.a
Days 142-143	Making it Difficult to Read–This lesson allows students to explore the fundamentals of a cryptology system: two “friends” that wish to communicate via an encryption system that is easy to apply and reverse. Messages must be easily read by the intended recipient but difficult to decrypt for anyone else. After looking at a few examples using a particular method, students will generate features they believe enhance security and will then develop their encryption systems.	MP.1, MP.3, MP.4, MP.6, MP.7	CS NI.C.9-12.F.a, NI.C.9-12.F.d

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 7: CRYPTOGRAPHY (CONT.)			
Days 144-147	Counting the Ways–Students will learn the basics of substitution ciphers. They will start with symbolic substitution and move to shift substitution. They will see how the modulus operator will help them describe encryption as a function. They will also make connections as to why factorials are useful in looking at encryption and analyzing the security level of these different ciphers.	N/A	CS NI.C.9-12.F.a, NI.C.9-12.F.d, DA.IM.9-12.F.a
Day 148	Skipping Ahead–This lesson introduces students to transposition ciphers that create a ciphertext by shifting the position of every character of the plaintext in the same direction by a scalar multiple amounts (skip-ahead ciphers). Students will also create a whole skip-ahead alphabet and use this to encrypt and decrypt messages.	MP.1, MP.4, MP.6	CS NI.C.9-12.F.a, NI.C.9-12.F.b, IC.SLE.9-12.F.b, NI.C.9-12.A.d
Days 149-151	Speeding Up–This lesson is intended to illuminate multiplicative properties under modular arithmetic. The key takeaways are: <ul style="list-style-type: none"> ● An ability to design a function and its inverse. ● To define what an inverse must do and the ability to create an inverse for a given system. These are the habits of mind that we hope students will develop through this section: <ul style="list-style-type: none"> ○ Look at the mapping of inputs and outputs. Develop a function that describes the relationship and determines if an inverse function exists. ○ Look at properties of numbers (here, factors) to determine their advantages and disadvantages for a given situation. 	MP.1, MP.3, MP.4, MP.6, MP.7	Math F.BF.1 CS NI.C.9-12.F.a, NI.C.9-12.F.b, IC.SLE.9-12.F.b, NI.C.9-12.A.d

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 7: CRYPTOGRAPHY (CONT.)			
Days 152-153	Unlocking the Map–Students analyze permutation block ciphers which are described using a mapping (key). They will then examine and create grid ciphers by utilizing properties of least common multiples and factors. Attention is first drawn to divisibility and remainders through the initial “Keypad Encryption” activity.	MP.1, MP.2, MP.3, MP.7	<p>Math F.BF.4</p> <p>CS NI.C.9-12.F.a, NI.C.9-12.F.d</p>
Days 154-155	Binary Numbers (Part 2) –This activity talks about the similarities and differences in how a mathematician and a computer scientist might talk about binary numbers. An important concept is a “bit”. Another important concept is that using a finite number of bits to represent integer numbers places a limit on how large that number can be. Exceeding that maximum number is referred to by computer scientists as “overflow”. This lesson introduces concepts that will be used later in the Limitations of Computer Math (Part 1. Overflow Error) and (Part 2. Memory) coding activities.	N/A	<p>CS ATP.VDR.9-12.F.a, ATP.VDR.9-12.A.b</p>
Days 156-162	Limitations of Computer Math–In this lesson, we use our knowledge of bits and the limitations of using a fixed number of bits to represent numbers in connection with real computer programs. First, we will re-write some code from the Creating a Factorial Function (Part 1. For loop method) to avoid producing infinities in permutation problems where the correct answer is well below the approximately 10^{309} character limit in JavaScript. Next, we will consider how using different variable types can change the amount of memory that a computer program uses. However, there is a drawback; the largest integer that can be represented becomes smaller. Students are presented with a coding scenario where they must navigate both of these issues.	N/A	<p>CS ATP.VDR.9-12.F.a, ATP.VDR.9-12.A.b, ATP.CS.9-12.A.b</p>

Instructional Day(s)	Title of Lesson and Description	Standards for Mathematical Practice	Ohio Learning Standards
UNIT 7: CRYPTOGRAPHY (CONT.)			
Days 163-164	Modern Cryptography–Computer processors are very fast now and all the encryption methods we have discussed so far can be quickly defeated by using a computer to scan through different possibilities for the secret key. The Caesar cipher only has 26 possible keys, so a computer could easily try each one and check the decrypted message for recognizable words. More sophisticated ciphers like the enigma machine would take longer but a computer scientist recently found that a laptop can decrypt enigma messages in about a minute. In this lesson, students demonstrate a method that is often used on the internet called RSA encryption which is much more difficult to crack.	N/A	CS NI.C.9-12.F.a, NI.C.9-12.F.d, DA.IM.9-12.F.a
Days 165-166	Writing Good Solutions: Unit 6–Students will write thorough and clear explanations of questions on cryptology. They will work on some as partners or in small groups, and then complete some explanations independently.	MP.3, MP.6	CS DA.IM.9-12.F.a, ATP.A.9-12.F.a, NI.C.9-12.F.a, NI.C.9-12.F.d
Day 167	Post-Unit Assessment/Evaluation	N/A	N/A
Days 168-169	These days are reserved for local High-Quality Student Data Collection. These days can be used at any time during or after Unit 7. If the district chooses to use these days later in the year, then they will need to adjust the scope and sequence accordingly.	N/A	N/A