Scope and Sequence 2024 - 2025
Please Note: All standards in the state course description are designed to be learned by the end of the course. This guide represents a recommended timeline and sequence to be used voluntarily by teachers for planning purposes. Specific question regarding when content will be addressed in a specific course are best answered by the individual teacher.
Course Resources

Publisher Resource: Discrete Mathematics with Applications + WebAssign, National Geographic Learning Cengage
 	
Supplemental Resources:
 	
    Khan Academy (does not support Internet Explorer)
 	
    Illustrative Mathematics (does not support Internet Explorer)

In Discrete Mathematics, instructional time will emphasize five areas: (1) extending understanding of sequences and patterns to include Fibonacci sequences and tessellations; (2) applying probability and combinatorics; (3) extending understanding of systems of equations and inequalities to solve linear programming problems; (4) developing an understanding of Graph Theory, Election Theory and Set Theory and (5) developing an understanding of propositional logic, arguments and methods of proof.

Quarter 1 (August 12 – October 11)

Chapter 1: Speaking Mathematically
Students will use variables in mathematical discourse. They will write universal, existential, and conditional statements as well as define and use set-roster and set-builder notation. Students will also be able to define, use, and create subsets, Cartesian products, and strings.

Chapter 2: The Logic of Compound Statements
Students will define and write compound statements and determine truth values. Students will evaluate the truth of compound statements and determine logical equivalences. Students will represent *if-then* as *or* logical equivalences, negate conditional statements, and define contrapositive, converse, and inverse of a condition statement. Finally, students will define and use rules of inference, fallacies, contradictions, and valid arguments.

Chapter 4: Elementary Number Theory and Methods of Proof
Students will define and use direct proof and counterexamples. They will prove existential statements, universal statements, properties of rational numbers, and properties of divisibility. Students will create proofs by contradiction and arguments by contraposition and use proofs as a problem-solving tool.

Quarter 2 (October 15 – December 20)

Chapter 5: Sequences, Mathematical Induction, and Recursion
Students will define explicit formulas for sequences and use factorial and n choose r notation. They will define the Principals of Mathematical Induction and discuss examples of recursively defined sequences. Students will define and use the Method of Iteration.

Chapter 6: Set Theory
Students will discover the proof and disproof for sets. They will define set equality and an empty set. Students will perform operations with sets and create Venn Diagrams. They will define and use Power Sets and prove subset relations and set equality.

Quarter 3 (January 6 – March 13)

Chapter 8: Properties of Relations
Students will define and apply the inverse of a relation, create directed graphs of a relation. They will define and use the reflexive, symmetric, and transitive properties and apply properties of relations on infinite sets. Students will define

a relation induced by a partition, an equivalence class and equivalence relation.

Chapter 9: Counting and Probability
Students will define sample space, event, lists, sublists, and one-dimensional arrays. Students will find the probability in equally likely cases. They will create and use possibility trees and define, use, and apply the addition rule and multiplication rule.

Chapter 10: Theory of Graphs and Trees
Students will define and identify graph, vertices, endpoints, edges, and loops. They will create graphs such as color graphs, directed and undirected graphs when given characteristics. Students will define and use trails, paths, and circuits as week as create and characterize trees.

Quarter 4 (March 24 – May 30)

Election Theory
Students will define and explain the basic concepts of Election Theory and voting. They will analyze election data using election theory techniques and decide voting power within a group using weighted voting techniques. Students will solve problems using fair division and appointment techniques.

Linear Programming
Students will represent, interpret and solve real world problems that involve linear programming in two variables.