Third Quarter

Blocks	Concept	SOL	Text Reference
	Investigate and describe weighted voting and the results of various election methods. These may include approval and preference voting as well as plurality, majority, run-off, sequential run-off, Borda count, and Condorcet winners.	DM.8	
	Mathematics of Voting		Chapt. 1
	Weighted Voting		Chapt. 2
	Analyze and describe the issue of fair division (e.g., cake cutting, estate division). Algorithms for continuous and discrete cases will be applied.	DM.7	
	Fair division		Chapt. 3
	Identify apportionment inconsistencies that apply to issues such as salary caps in sports and allocation of representatives to Congress. Historical and current methods will be compared.	DM.9	
	Apportionment		Chapt. 4
	Solve problems through investigation and application of circuits, cycles, Euler Paths, Euler Circuits, Hamilton Paths, and Hamilton Circuits. Optimal solutions will be sought using existing algorithms and student-created algorithms.	DM.2	
	Euler Paths/Circuits		Chapt. 5
	Hamilton Paths/Circuits		Chapt. 6

Fourth Quarter

Blocks	Concept	SOL	Text Reference
	Apply graphs to conflict-resolution problems, such as map coloring, scheduling, matching, and optimization. Graph coloring and chromatic number will be used.	DM.3	*Use Internet resources
	Graph Theory & Color Theory		
	Apply algorithms, such as Kruskal's, Prim's, or Digkstra's, relating to trees, networks, and paths. Appropriate technology will be used to determine the number of possible solutions and generate solutions when a feasible number exists.	DM.4	
	Trees		Chapt. 7
	Use algorithms to schedule tasks in order to determine a minimum project time. The algorithms will include critical path analysis, the list-processing algorithm, and student-created algorithms.	DM.5	
	Model problems, using vertex-edge graphs. The concepts of valence, connectedness, paths, planarity, and directed graphs will be investigated. Adjacency matrices and matrix operations will be used to solve problems (e.g., food chains, number of paths).	DM.1	
	Scheduling		Chapt. 8
	Use the recursive process and difference equations with the aid of appropriate technology to generate compound interest; sequences and series; fractals; population growth models; and the Fibonacci sequence.	DM.10	
	Spiral growth in nature		Chapt. 9
	Dynamics of population growth		Chapt. 10
	Fractals		Chapt. 12
	Describe and apply sorting algorithms and coding algorithms used in storing, processing, and communicating information. These will include: bubble sort, merge sort, and network sort; and ISBN, UPC, Zip, and banking codes.	DM.11	supplement from library, PBS, NSA, Discovery, Spy museum
	Coding/Ciphers		
	OPTIONAL: IF TIME PERMITS		
	Select, justify, and apply an appropriate technique to solve a logic problem. Techniques will include Venn diagrams, truth tables, and matrices.	DM.12	
	Solve linear programming problems. Appropriate technology will be used to facilitate the use of matrices, graphing techniques, and the Simplex method of determining solutions.	DM.6	
	Apply the formulas of combinatorics in the areas of: the Fundamental (Basic) Counting Principle; knapsack and bin-packing problems; permutations and combinations; and the pigeonhole principle.	DM.13	
	Problem Solving		