

Mathematical Modeling – Course Syllabus

Book: Excursions in Modern Mathematics, 6th edition, Prentice Hall, Tannenbaum

DAY	TIME	TOPIC	ACTIVITY
Day 1	Morning	Introductions Rules & Regulations (Honor Code, cheating, plagiarism, no taking books out of class) Introduction into Euler Circuits	Ice Breaker—Vertices and Nodes Name Game Play--Case of the Stolen Coins Graph Theory Vocabulary Sprouts – Is the game's outcome predetermined?
	Afternoon	Euler Circuits	Problems: 7 bridges of Koingsburg
	Evening	Pretest Review circuits, practice problems	Bookwork: Chapter 5 #5-25
Day 2	Morning	Hamilton Circuits	Pretest Day 2 Vocabulary Find Hamilton Circuits in examples Campus Map Tour Guide Activity
	Afternoon	Hamilton Circuits Present Graphs & best Paths	East Field Hamilton Circuit Couples at a party activity
	Evening	Hamilton Circuits	Bookwork: Chapter 6 #1-16

DAY	TIME	TOPIC	ACTIVITY
Day 3	Morning	Statistics	Stats Vocabulary Types of Survey data Misleading data Design surveys in groups
	Afternoon	Statistics	Type Surveys Give surveys to other classes Begin Analyzing Data
	Evening	Statistics	M & M's Sample size activity Continue to work on survey data and survey report
Day 4	Morning	Finish Statistics and Begin Probability	Present Survey reports Probability Vocabulary
	Afternoon	Probability	Study probabilities of games' outcomes Black Jack hands Dice games
	Evening	Probability	Practice games with probabilities
Day 5	Morning	Voting methods	Voting vocabulary Nominate Class mascot Vote on class mascot using various methods

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	Afternoon	Voting	Compare and discuss voting methods Arrow's Impossibility Theorem
Day 6	Morning	Weighted Voting	Team up with other Math Modeling and play "Coalitions"
	Afternoon	Apportionment Methods: Hamilton Jefferson Adams Webster Hill	Split class into four groups. Each group reads and does an example of one of the first four methods and then presents it to the class. Example: <i>Conventional Method's don't Always Work</i> Each person does the first four methods using the example Hand out a list of the apportionment of the electoral college for the 200 election. Who won? Bush or Gore?
	Evening	Book work	Finish Coalitions & page 537 (1, 3-5, 10-12, 21, 22, 24, 34b,c, 36)
Day 7	Morning	Fair Division Sealed Bids Estate Auction Method of Markers Divisor/Chooser	Sealed Bids: Auction off a 10 piece poker chip. Auction off a sealed brown bag Have an estate auction with a car and picture and house. Method of Markers: Lay out candy. Divide class into four groups and play out a method of markers with candy.
	Afternoon	Fair Division Lone Divider Last Diminisher	Cut a cake using the last-diminisher method.
	Evening	Book work/ Midterm Review	
Day 8	Morning	Midterm	
	Afternoon	Binary Modular Arithmetic	Add, subtract, Multiply & Divide Binary Binary Bingo

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	Evening	Post Net Code Cryptology Encoding using Matrices	Hand out letters and decode zip code. Come up with your own matrix. Encode your message. Then pass your paper around and that person will find the decoding message.
Day 9	Morning	Caesar Cipher	Computer Lab: Create Caesar's cipher using Excel Calculators: Create ciphers using matrices
	Afternoon	Fibonacci Numbers	Tell story about the Rabbits. Give some background information on Leonardo "Fibonacci" Wrote Fibonacci numbers around the room on the top of the chalk boards. Make golden rectangle using our bodies on white paper.
	Evening	Golden Ratio	Construct golden rectangle. Measure different parts of the body to see if it correlates to the golden ratio.
Day 10	Morning	Map Coloring	Color graph in 4 different shades without ever touching any other property.
	Afternoon	Infinity Infinite Hotel Cantor Set	Discussion Infinite Hotel: PowerPoint
	Evening	Review/Read ahead on Fractals	Apportionment problems Read chapter on Fractals (From different book) Start cutting out 3-D Sierpinski Triangle
Day 11	Morning	Fractals Sierpinski Triangle Kosh Snowflake	Make a Koch Snowflake On poasterboard have each student make a Sierpinski Triangle, Sierpinski Carpet, or Koch Snowflake Continue making three dimensional Sierpinski Triangle

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	Afternoon	Fractals Continued Madelbrot Sequence	Sequences Complex Numbers (What are they? How do you multiply them?) Mandelbrot Set Computer Lab – 1 st hour http://www.lightlink.com/homer/what.html http://www.coolmath.com/fractals/fractals_lesson.html Fractal Fern
	Evening	Fractals Continued	Finish Mandelbrot Set Show pictures Finish up poster board and continue cutting out pieces for Sierpensi Triangle
Day 12	Morning	Transformations: Translations Frieze Patterns Symmetry Reflectional/Line Rotational	Students create there own Frieze Patterns Freize patterns, tessellations, tilings, with regular polygons
	Afternoon	Internet Research	Computer Lab
	Evening	Post Test Review	
Day 13	Morning	Post Test	
	Afternoon	Internet Research	Computer Lab
	Evening	Internet Research	Computer Lab

DAY	TIME	TOPIC	ACTIVITY
Day 14	Morning	Present Final Projects	
	Afternoon	Present Final Projects	
Day 15	Morning	Present Final Projects Pictures & Goodbyes	