

Numbers: Zero to Infinity Course Syllabus

	WHAT (skills, goals, knowledge, concepts, readings)	HOW (activities)
DAY 1	Quantitative Observations and the Metric System, Part 1	
Morning	<ol style="list-style-type: none"> 1. Create a classroom number line 2. Powers of 10 video 3. Introductions, rules, honor code 4. Pre Assessment Test 5. Estimating metric volume 	<ol style="list-style-type: none"> 1. Break in groups to cover sections 2. Show video and get student reactions 3. Names and math background, discuss rules and honor code, etc. 4. Pre Assessment Test 5. Liter box activity
Afternoon	<ol style="list-style-type: none"> 1. Using reference tables 2. Using appropriate units 3. Using appropriate units and reasonable quantities 	<ol style="list-style-type: none"> 1. “Handy Tables Handout” scavenger hunt 2. Little Millie metric worksheet 3. Metric Mad Libs
Late Afternoon/ Homework		Read <i>Millions to Measure</i> by David M. Schwartz, or read this tomorrow morning.
Supplement		
DAY 2	Quantitative Observations and the Metric System, Part 2	
Morning	<ol style="list-style-type: none"> 1. Convert from and within the metric system 2. Use instruments to measure 3. Use benchmarks to estimate 	<ol style="list-style-type: none"> 1. Unit conversion clinic—lecture and handouts 2. Metric Instruments scavenger hunt 3. Benchmark measurements—group activity
Afternoon	<ol style="list-style-type: none"> 1. Find volume of regular solids 2. Find volume of a space 3. Find volume of the body 	<ol style="list-style-type: none"> 1. Overview of finding volume for regular solids 2. How much space is in this room?—measuring activity 3. What is your volume?—activity to model the body and calculate volume
Late Afternoon/ Homework		<ol style="list-style-type: none"> 1. “Say It Metric” worksheet 2. Creating a measuring scale and instrument
Supplement		

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DAY 3	Large Numbers in Life: What is large?	
Morning	<ol style="list-style-type: none"> 1. Conceptualize a million 2. Calculate large numbers 3. Exponential growth 	<ol style="list-style-type: none"> 1. Graphing, time it takes to count to a million or a billion, how long is a billion minutes? 2. Heartbeats in a Lifetime activity 3. Grains of rice story
Afternoon	<ol style="list-style-type: none"> 1. Introduction to Scientific notation, “Dealing with very large quantities” (part 1) 2. Calculate with scientific notation 	<ol style="list-style-type: none"> 1. Use previous activities to spring board into why writing and working with large numbers in scientific notation is so powerful and efficient. 2. Density of the planets activity
Late Afternoon/ Homework	What is large?	<ol style="list-style-type: none"> 1. Describe what a large number looks like in decimal form as well as in scientific notation. 2. Describe what a small number looks like in decimal form as well as in scientific notation. 3. Scientific notation practice problems with large numbers
Supplement		
DAY 4	Small Numbers in Life: What is small?	
Morning	<ol style="list-style-type: none"> 1. Conceptualize small numbers 2. Writing small numbers with decimals and fractions—when to use each, usefulness and efficiency of each 3. Practicing decimals and fractions 4. Find very small numbers in life 	<ol style="list-style-type: none"> 1. Plate movement rate of the Earth’s Crust (per year, per day, per hour, per second) 2. Lecture and writing exercise (Describe what a small fraction/decimal looks like) 3. Worksheet 4. Student research and presentations
Afternoon	<ol style="list-style-type: none"> 1. How to deal with small numbers, scientific notation part 2 2. More on Powers of 10 3. Calculations with small numbers 	<ol style="list-style-type: none"> 1. Lecture and worksheet 2. Lecture and Graph activity 3. Volume of one atom, gravitation force exerted by two small objects
Late Afternoon/ Homework	What is small?	
Supplement		

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DAY 5	Describing and Measuring Motion	
Morning	1. Measure motion 2. Describe motion 3. Measure motion 4. Measure motion	1. Kilometer Walk activity 2. Write journal entry on what they have learned about motion 3. 100-m Dash activity 4. Stepping Up to the Challenge worksheet
Afternoon	1. Research motion 2. Interpret motion	1. What is fast? Research activity and problem solving on fastest animals, jets, speed of sound and light 2. Lecture with graph examples
Late Afternoon/ Homework		What are the consequences of the universe's speed of light speed limit? What can happen in a millisecond?
Supplement		
*** WEEK TWO ***		
DAY 6	Using Functions to Make Predictions	
Morning	1. Creating functions 2. Representing functions 3. Graphing functions	1. Amazing Function Machines—develop “function machines” that perform an operation 2. Lecture 3. Presentation and practice
Afternoon	1. Modeling with functions 2. Exponential growth and decay	1. Research activity 2. Lecture and worksheet
Late Afternoon/ Homework		
Supplement		
DAY 7	Numbers, Theoretically Speaking	
Morning	1. Classifying number sets 2. Fundamental number properties 3. Exploring 0 and 1 4. Prime numbers	1. Presentation and student-created visuals 2. Lecture and practice 3. Discussion and writing assignment on why these numbers are special 4. Prime Time! worksheet
Afternoon	1. Other interesting numbers 2. Other classifications of numbers 3. Mid-Course Self-Evaluation	1. Lecture and practice 2. Number Safari—research and presentations 3. Daily Journal time
Late Afternoon/ Homework		Mad Lib on checking answers' reasonableness

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Supplement		
DAY 8	Ratios and Proportional Thinking, Part 1	
Morning	<ol style="list-style-type: none"> 1. Introduction 2. Ratios and proportions overview 3. Expressing ratios as decimals, fractions, and percents 4. Setting up and solving proportions 	<ol style="list-style-type: none"> 1. Does Lady Liberty have a big nose? 2. Lecture 3. Danny is going to post this lecture and practice worksheet 4. Two worksheets for practice
Afternoon	<ol style="list-style-type: none"> 1. Proportions with time 2. Scaling with proportions 	<ol style="list-style-type: none"> 1. Gulliver timeline 2. Start Mildendo project
Late Afternoon/ Homework		
Supplement		More on percents, Repeating decimals
DAY 9	Ratios and Proportional Thinking, Part 2	
Morning	<ol style="list-style-type: none"> 1. Using proportions to predict unknowns 2. Proportions and metric measurements 3. Scaling 	<ol style="list-style-type: none"> 1. How long would it take to walk home? 2. Metric cookie recipe 3. Dino-Dogs: If your dog were the size of a dinosaur, how much dog food would you need?
Afternoon	<ol style="list-style-type: none"> 1. Gulliver's clothes and Lilliputian self 2. If Barbie and Hulk/GI Joe were human... 3. Scaling with proportions 	<ol style="list-style-type: none"> 1. Create your own Lilliputian project 2. Measuring activity 3. Mildendo project
Late Afternoon/ Homework	Create two other Lilliputian sized objects	
Supplement		One Inch Tall poem
DAY 10	Scale Drawings	
Morning	<ol style="list-style-type: none"> 1. Scale drawings: people 2. Scale drawing: places 3. Scale drawing: structures 	<ol style="list-style-type: none"> 1. Does the camera add 10 pounds? 2. Scale drawing of Mildendo 3. Research and presentations
Afternoon	<ol style="list-style-type: none"> 1. Scale drawings: maps 	<ol style="list-style-type: none"> 1. Create a campus map
Late Afternoon/ Homework		
Supplement		

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	* * * * WEEK THREE * * * *	
DAY 11	Mental Math	
Morning	<ol style="list-style-type: none"> 1. Some fun and very powerful mental math strategies 2. Sharing mental math tricks 3. Calculating square numbers 4. Calculating square roots 5. Rounding and estimating 	<ol style="list-style-type: none"> 1. Mental Math Power Builder worksheets 2. Discussion 3. Mental trick and number patterns worksheet 4. Chinese method 5. Worksheet
Afternoon	<ol style="list-style-type: none"> 1. Estimateasure 2. Estimating time and distance 3. Estimating distances 	<ol style="list-style-type: none"> 1. Worksheets 2. Waiting in Line problem 3. Amazon measuring
Late Afternoon/ Homework		
Supplement		Grocery Store estimating activity (in supplements folder) or any worksheets from the Estimating section of the supplements folder
DAY 12	Measuring Uncertainty	
Morning	<ol style="list-style-type: none"> 1. Introduction to probability 2. Overview of probability and counting principles 3. Calculating probabilities 4. Interpreting probabilities 	<ol style="list-style-type: none"> 1. SKUNK, a game of chance and choice 2. Lecture 3. Worksheet 4. Discussion (what is fair? What is highly likely, unlikely, impossible, certain, etc?)
Afternoon	<ol style="list-style-type: none"> 1. Applications of probability 2. Using factorials 	<ol style="list-style-type: none"> 1. Research and group activity on big number problems (planets all lining up, chance of rain, chances of being born a US citizen, Chinese citizen, etc) 2. Fun with Factorials worksheet
Late Afternoon/ Homework		
Supplement		More on factorials, and student-created problems and games
DAY 13	Systematic Summation: Sequences, Series, and Surface Area	
Morning	<ol style="list-style-type: none"> 1. Introduction to sequences 2. Sierpinski Carpet 3. Introduction to series 4. Area under a curve 	<ol style="list-style-type: none"> 1. Lecture 2. Coloring activity 3. Lecture 4. Hands-on activity
Afternoon	<ol style="list-style-type: none"> 1. Surface area 	<ol style="list-style-type: none"> 1. Mouse and Elephant activity
Late Afternoon/ Homework		

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Supplement		Dealing with large sets of numbers Other number systems
DAY 14	General Problem-Solving Techniques (integrating ideas)	
Morning	1. Temperature ranges of planets and what they mean to life 2. Translating verbal models into variable expressions 3. How long will it take to wear out your shoes?	
Afternoon	1. Modeling the solar system 2. Modeling the atom	
Late Afternoon/ Homework		
Supplement		
DAY 15	“Closure”	
Morning	1. Pass back/discuss all remaining work 2. Break down the classroom 3. Reading list 4. Post assessment 5. Course and instructor review 6. Certificates 5. Other stuff specific to site	1. Students present solutions as appropriate 2. Clean up, gather students’ work 3. Pass out and discuss, students may want to add their own recommended books to it. 4. Instructor & TA hand out 5. 6. Presentations, visit to other classes, etc. 7.
Supplement		