Numbers: Zero to Infinity
CTY Course Syllabus

Monday, Day 1

Have morning work ready on students' desks…

9:00 to 10:15

1. Do time estimation activity- have students close their eyes and after the start command raise their hand when they think 1 minute has gone by; try a second time with 30 seconds. Wait until last student has raised their hand. Record time for the first student and the last.
2. Do introductions! Name, age, school, something interesting…
3. Talk about the basic idea of estimation. Read from the book on Estimation (p.7, 10-12).
4. Introduce estimation project- something too big to count!
5. Take walking tour of campus to get ideas and learn where things are!
6. Introduce break system and rules to follow…

10:30 to 11:30

1. Explain Pre-Assessment and answer any questions
2. Allow students to complete Pre-Assessment
3. Provide activity to work on if they finish sooner than others. Beginning of number line.
4. Talk about activity period and sign up!

12:30 to 1:30

1. Read Betcha!
2. Explain the estimation workshop and hand out sheets
3. Let students make estimates for all items. When done return to seats and answer questions 1 and 2.
4. Switch papers to check estimates and then return to owner
5. Pop corn and measure
6. Return to seats to add up total difference (question 3)

1:45 to 2:30

1. Introduce Gulliver's Travels and the reading log as homework
2. Read Part I, Chap. I
3. Vocabulary
4. Units

5. Lilliputian Words
6. Start 6 in CTY students

Homework:

1. Reading Log for Part I, Chap. II – IV

Tuesday, Day 2

Have morning work ready on students' desks…

9:00 to 10:15

1. Do time estimation activity- have students close their eyes and after the start command raise their hand when they think 1 minute has gone by; try a second time with 30 seconds. Wait until last student has raised their hand. Record time for the first student and the last.
2. Talk about strategies for estimating numbers too big to count. Read from the estimation book to get some ideas (p.18-19).
3. Assign groups for the project.
4. Have groups brainstorm ideas, pick one with help, and choose a strategy to follow to get a good estimate. Make sure groups decide what smaller pieces of information are necessary to make the estimate.
5. Get back together as a class and go over the 4 different estimation projects and the strategy that will be used to estimate each. Let the groups present their ideas. Discuss if it seems like each will work and if we have missed any details.
6. Explain how projects will be done tomorrow…

10:30 to 11:30

1. Introduce Class Number Line – what should be included?
2. Break into groups to work on sections – make sure "line" is in the same place on each section
3. Go over what each group included and why.

12:30 to 1:30

1. Introduce Apple Estimation activity- talk about what parts of the apple are edible and which are not.
2. Pass out apples and paper towels. Each student must estimate the amount of their apple they think is edible.

3. Head outside or to the cafeteria with apples, paper towels, scale, pencils, calculators, and sheet
4. Students each weigh their apple and record the weight
5. Students each eat their apple and save all the inedible parts on the paper towel. They weight the uneaten parts and paper towel again and record the weight
6. Then the calculations on the worksheet are completed individually.

1:45 to 2:30

1. Talk about how the first night's reading was. Too long, too short, easy, hard…
2. Vocabulary
3. Items chosen?
4. Finish work on 6in CTY students and start conveyance, temple, other items

Homework:

1. Reading Log for Part I, Chap. V – VII

Wednesday, Day 3

Have morning work ready on students' desks…

9:00 to 10:15

1. Do time estimation activity- have students close their eyes and after the start command raise their hand when they think 1 minute has gone by; try a second time with 30 seconds. Wait until last student has raised their hand. Record time for the first student and the last.
2. Talk about GREAT ideas from the day before in group work: number of loops in the carpet, number of books in the library, number of words in a set of encyclopedias, number of bricks in the courtyard…
    a. Group 1
    b. Group 2
    c. Group 3
    d. Group 4
3. Review estimates back in the classroom. Talk about how close they may be, if a better strategy came up while working, and what might change next time.

10:30 to 11:30

1. Go over the Product Estimation worksheet from the book- make sure all calculators are put away and students are trying to estimate. What are good strategies to use to get close??
2. Go around and give them a check mark when they have made all the estimates. Have students check how close the answers are by using a calculator to figure out the actual answer and finding the difference. Find the total difference. Start on quotient estimation when done…
3. Talk about what was hard about the activity and what would be a better strategy to use on the next worksheets.
4. Work on quotient and percent estimation sheets until lunch.

12:30 to 1:30

1. Discuss how estimation can also be used to measure smaller things. Why would we want to do that (quicker, easier, don't need real answer)?
2. Hand out estimation sheet of items in and around the classroom. Allow students to make estimates individually. Provide space for them to add one item to be estimated by their classmates.
3. Put additional estimation items on the board for students to add to the back of their sheet.
4. Talk about using body parts to help measure. Fill in table with estimates on how big a thumb, arm, foot, body, etc. are.
5. Now use body parts to estimate items around the room that are on the sheet.
6. Do the body parts help make better estimates? Which work best?

1:45 to 2:30

1. Talk about what Gulliver means by proportion- read quote (p.55)!!
2. Give examples of comparisons found in book.
3. Read quote on making the new clothes (p.61) and talk about activity.
4. Talk as a class about the different way of measuring.
5. Hand out worksheet on Lilliputians measurements and help students.
6. Continue work on the Lilliputian items…

Homework:

1. Reading Log for Part I, Chap. VIII – Part II, Chap. I

Thursday, Day 4

Have morning work ready on students' desks…

9:00 to 10:15

1. Do time estimation activity- have students close their eyes and after the start command raise their hand when they think 1 minute has gone by; try a second time with 30 seconds. Wait until last student has raised their hand. Record time for the first student and the last.
2. Introduce Circle Estimation activity- read Sir Cumference and the Dragon of Pi.
3. Each student must measure the circumference and diameter of 6 circles
4. After measuring is done work with the students on the relationship between the two measurements for each circle
5. Students can then trace one circle onto the grid on the back of the handout and estimate the area of the circle using the squares of the grid. After estimating the area they can measure the radius of the circle and use the number found in the previous experiment to calculate the area (area = pi * radius * radius). Find the difference between the estimated area and the calculated area
6. Talk as a class about what the quantity pi is, whether or not it can be found exactly, why it is a good thing to estimate…

10:30 to 11:30

1. Hand out product estimate worksheets from the day before with notes and remind students to follow the directions!
2. Have students finish product estimates and move onto quotient and percent estimates for more practice
3. Talk about what is hard and what some good strategies are for doing the worksheets. Collect worksheets to look over…
4. Introduce the idea of nice numbers to the students and look at handout on examples of nice numbers and estimating nice numbers
5. Start handout on making quick and adjusted estimates, and have students move on to the back page if they have time

12:30 - 1:30

1. Introduce M+M estimation project- have students get in groups and fill out their estimates, each student completing the sheet themselves by agreeing
2. Remind students not to eat the candy before they have recorded their data and gotten checked off as being done with the data recording
3. Make bar graphs of how many of each color of M+M

4. As a class talk about:
    a. What did you think about when estimating the total amount of candy?
    b. Did all teams have the same number of different color candy?
    c. Do you think all teams will have the same color for the most and least?
    d. Did your results turn out like you expected?
5. Find the total number of M+Ms in the 4 groups and then get an average per bag
6. Also make a class graph on the board of M+Ms by color and number
7. Compute the ratios of each color to the total- would it be the same in a big bag?

1:45 to 2:30

1. Discuss the conditions Gulliver had to agree to in order to be freed.
2. Talk about whether the conditions make sense and how they help the Lilliputians. Are they hard for Gulliver?
3. Finish work on models…

Homework:

1. Reading Log for Part II, Chap. II – IV
2. Bring in Estimation Challenge item!

Friday, Day 5

Have morning work ready on students' desks…

9:00 to 10:15

1. Do time estimation activity- have students close their eyes and after the start command raise their hand when they think 1 minute has gone by; try a second time with 30 seconds. Wait until last student has raised their hand. Record time for the first student and the last.
2. Remind students about using estimation strategies when trying to decide each item- think about shape of the item and container, etc.
3. Have everyone estimate and record each one except for their own :)
4. Switch papers to reveal the answers and find out differences.
5. Return papers to add up differences and find the best estimator!
6. Brainstorm list of what they have learned about estimating, when it is useful, what types of problems it can solve, etc.

10:30 to 11:30

1. Introduce "Nice Numbers"
2. Go over the front of the worksheet together

3. Take volunteers to do each of the problems on the back
4. Let students work on the quick and adjusted estimates

12:30 to 1:30

1. Introduce grocery store estimates by talking about the problem on the last sheet
2. Bring out the target and all the store items for the game- talk about the idea of getting within the center ring by buying the right amount of one product and do an example with the animal crackers
3. Have each student pick a number and then go in order through the game- when they pick the product and the number they want to buy then have the class calculate the price to see which ring they are in- write name and total on the sheet
4. Decide which group was the closest total and give each a pack of gum or squares!

1:45 to 2:30

1. Vocabulary and other comments
2. Do unit conversion worksheet for Blustrugs, Glumgluffs, and Glonglungs
3. Watch 30 minutes of the movie ☺

Homework:

1. Reading Log for Part II, Chap. V – VII

Monday, Day 6

Have morning work ready on students' desks…

9:00 to 10:15

1. Talk about how fractions can be nice numbers. There will be a lot of fractions when we start to measure!
2. Go over front of "Nice Numbers" worksheet
3. Take volunteers to go over the back to estimate each sum
4. Allow students to work on next worksheet, then discuss
5. Talk about measuring properly and carefully! NOT estimating!
6. Have students work on Estimeasure with customary and metric units

10:30 to 11:30

1. Talk about using the metric system. What units are part of the metric system, which are used for measuring length, etc.
2. Give out copies of the Metric Measuring worksheet and a pair of scissors to everyone. Have them cut out the rectangle that says decimeter. Then, have them look around the room and themselves to find 5 items that are close to 1 decimeter in length.
3. Make a chart on the board and have each student share one item they found

4. Now have students cut out the rectangle with numbered boxes. Have them measure the rectangle and decide what size each smaller division is. Then compare the strip to the 1-decimeter strip. What is the connection?
5. Put students in new groups, 3 groups of 4, and have each group find and measure 4 items in centimeters.
6. When the groups are done measuring and recording their items have them start working on their meter tapes. Before the end of the period make sure to make the connection that 10 cm = 1 dm and 10 dm = 1m. Figure out how many cm = 1m??

12:30 to 1:30

1. Talk to class about how to measure correctly, being careful about checking closely and trying to be exact. That is a key difference between estimating and measuring. Let them know they will be working in their groups and talk about the method they will use. First they will estimate the amount (cups, tbs, or ounces) of each item and then put them in order from least to most. Then they will actually measure with water or the scale and record the information. Finally they will see if their estimates were right and rearrange objects.
2. Go outside or to the cafeteria and have the groups estimate, record the estimates, measure, and record the measurements.
3. Then go back inside and have each group report on what they thought would happen and what actually did. Everyone can write down the measurements in US Standard and Metric to use later on in the week.
4. Talk about how the measurements in both systems could help us figure out conversion factors.

1:45 to 2:30

1. Talk about the movie- like they imagined, the same as the story, any differences, any questions, etc.
2. Vocabulary
3. Did anyone find out information about the largest hail?
4. What is useful math?
5. Begin making Brobdignagian objects

Homework:

1. Reading Log for Part II, Chap. VIII – Part III, Chap. I

Tuesday, Day 7

Have morning work ready on students' desks…

9:00 to 10:15

1. Do worksheets on smaller fractions for measurements. Be precise!
2. Go over answers.
3. Go over front of "Length, Mass, Capacity" worksheet
4. Take volunteers for 1 – 10 on the back
5. Let students work on 7 – 14 and discuss.
6. Have students work on front of Proportions worksheet.
7. Start on back of worksheet if there is time.

10:30 to 11:30

1. Finish back of the worksheet. Have students work together to convert from the metric measurements to US standard.
2. Talk about activity and different units.
3. Do "Relating Units" worksheet, including 4 problems at the bottom. First estimate/guess and then calculate.

12:30 to 1:30

1. Convert measurements for recipe for clay.
2. Go to the cafeteria and make clay!
3. Clean-up and return to classroom.

1:45 to 2:30

1. Vocabulary
2. Latitude and longitude worksheet
3. Finish work on Brobdignagian items and add "regular" size person

Homework:

1. Reading Log for Part III, Chap. II - IV

Wednesday, Day 8

Have morning work ready on students' desks…

9:00 to 10:15

1. Introduce the volume activity and remind students about precise measurements.
2. Give each student two 8.5 by 11 sheets to work with and remind them they will need to listen and follow directions. Go through how to make the liter cube and what it means to be a liter.
3. Go over what the little cube will be and how to make it.
4. Do follow-up questions individually and then discuss.
5. Find the volume of the room in groups.

10:30 to 11:30

1. Read Magic School Bus: Voyage through the Human Body
2. Work on finding the volume of your body! (measuring tapes! Meter sticks!)
3. Word find
4. Learn about phi/the Golden Ratio

12:30 to 1:30

1. Practice conversions with worksheet.
2. Convert Italian waffle recipe from metric to US Standard
3. Then cut the recipe in half or even smaller?
4. Go to cafeteria and make batter
5. Bake waffles!
6. Enjoy ☺

1:45 to 2:30

1. Vocabulary
2. Discuss Laputian measuring
3. Discuss compliments
4. Read Twelve Snails to One Lizard and begin work on new measurement system

Homework:

1. Reading Log for Part III, Chap. V - VIII

Thursday, Day 9

Have morning work ready on students' desks…

9:00 to 10:15

1. Discuss powers of ten that we have been using this week to work in the metric system. How are they used in our number system? (base 10 numbers!) video?
2. Explain that another use of the powers of ten is something called scientific notation.
3. Go over exponents and scientific notation with notes (MI)
4. Worksheet to practice (MI)
5. Other uses now that you understand?

10:30 to 11:30

1. Talk about other number bases and what might work.
2. Wheat, rice, money stories with powers of 2 (One grain of rice?)
3. Learn a little about binary with notes
4. Practice with binary

12:30 to 1:30

1. Exponential growth and decay; something hands on! World population?
2. Graphing here to see the growth and talk about infinity
3. Read <u>On Beyond a Million</u>

1:45 to 2:30

1. How big is a league?
2. Who would you talk to from the past?
3. Finish new measurement systems

Homework:

1. Reading Log for Part III, Chap. IX – XI

Friday, Day 10

Have morning work ready on students' desks…

9:00 to 10:15

1. Dimensional analysis with all units
2. Read <u>If your Dog were a Dinosaur</u> then work on related problems

10:30 to 11:30

1. Matchbox car to chalk drawn car
2. Talk about speed of sound and light and complete related worksheets

12:30 to 1:30

1. Run or walk a certain distance, recording measurements every minute.
2. Make a distance and time graph
3. Make a speed graph based on your data
4. Look at the connections between the graphs. Also think about related questions; how long would it take to run across the US or around the world…

1:45 to 2:30

1. Would you want to live forever?
2. What has been your favorite math idea so far?
3. Watch 30 more minutes of the movie ☺

Homework:

1. Reading Log for Part IV, Chap. I – IV
2. Start gathering materials for your house…

Monday, Day 11

Have morning work ready on students' desks…

9:00 to 10:15

1. Remind students about the idea of a scale model- reasons why a scale model might be better, needed, easier
2. Do "Point of View" and "Scale Drawings" worksheets
3. Give out packet on planning their dream house and talk about how all the steps need to be done in order to have a great project (have a check-off place at the bottom of each page so they know to see teacher before they go ahead…)
4. First step is planning the shape of their house and drawing a bird's eye view…
5. Give them time to work on their houses- Phase 1 and Phase 2

10:30 to 11:30

1. Read The Magic School Bus: Lost in the Solar System
2. Do worksheet on time it takes for light to travel to other planets
3. Find weight on each of the planets
4. Word find

12:30 to 1:30

1. Put up measurements on the board of planet sizes and distances in between to show the real scale and amount of space
2. Go out in hall and use floor tiles to make a scale model
3. Come back in room and talk about characteristics of planets (color, rings, etc.)

4. Hand out planets to cut and color- mention how much distance would be needed to make a real scale model with those planets which are bigger than the hallway model and go outside to make this model or part of it!

1:45 to 2:30

1. Vocabulary
2. Do you know of other civilizations that don't write?
3. What do you think the Houyhnhnms know about math?
4. Present new measurement systems

Homework:

1. Reading Log for Part IV, Chap. V - VII

Tuesday, Day 12

Have morning work ready on students' desks…

9:00 to 10:15

1. Do worksheet on "Planning a Room" and "Scale Drawings" (now a room!)
2. Give them time to work on their houses- Phase 1, Phase 2, and Phase 3…

10:30 to 11:30

1. Read book on the pyramids or go over background information
2. Do activity to make scale models of the pyramids
3. Have word search ready for those who finish early

12:30 to 1:30

1. Pass out the sheet of Egyptian numbers and have the students practice making them on a separate sheet
2. Talk about how the Egyptians had a system where they just wrote numbers in the places they belonged, so they had very long numbers sometimes…
3. Have students do handout on the numbers- going from regular to Egyptian and then the other way
4. Go over Egyptian multiplication

1:45 to 2:30

1. Vocabulary
2. What would you do with a lot of money?
3. Work on Mayan numbers and their different base system
4. Work on Chinese numbers plus Chinese method for square roots

Homework:

1. Reading Log for Part IV, Chap. VIII – X

Wednesday, Day 13

Have morning work ready on students' desks…

9:00 to 10:15

1. Do activity on scale distances using maps
2. Give them time to work on their houses- Phase 2, Phase 3, and Phase 4…

10:30 to 11:30

1. Learn about some of the smallest things, subatomic particles
2. Discuss how particles make up atoms and then make the different elements
3. Go back to exponential decay and do work on radioactive decay of elements

12:30 to 1:30

1. Discuss important elements on earth
2. Atomic models for these elements
3. Element bingo

1:45 to 2:30

1. Vocabulary
2. Right and wrong? Girls and boys?
3. How important is the calendar?
4. Mayan calendar, Aztec calendar, Chinese calendar, Hebrew/Jewish calendar

Homework:

1. Reading Log for Part IV, Chap. XI - XII

Thursday, Day 14

Have morning work ready on students' desks…

9:00 to 10:15

1. Have students do evaluations of the class- talk to them about it before and the responsibility they have to be honest and fair
2. Give them time to work on their houses- Phase 3 and Phase 4…

10:30 to 11:30

1. Post-Assessment…
2. Functions, graphs, area, limits…

12:30 to 1:30

1. More on functions and graphs
2. Read What if your Dog was a Dinosaur?

1:45 to 2:30

1. Vocabulary
2. Final thoughts
3. Foreign Exchange worksheet
4. Have students draw a picture about their favorite part of the book and write a paragraph

Homework:

1. Finish your house!

Friday, Day 15

Have morning work ready on students' desks…

9:00 to 10:15

1. Site Evals by students
2. Read The Librarian who Measured the Earth
3. Present houses and tour them

10:30 to 11:30

1. Finish up any last projects…
2. Puzzles for squares

12:30 to 1:30

1. Watch 30 more minutes of the movie
2. Final raffle and clean-up/set-up

1:45 to 2:30

1. Visit with parents