Class 1: Learn About How Math Is
Taught at Lin Howe
and Activities You Can Do At Home

1. Intro – your name and students grade (have tent papers folder and stapled, ready for their names.)
2. Numbers are the same and arithmetic answers are the same, so 2 + 3 is still 5 and 6 x 10 is still 60, BUT the way our children are taught these arithmetic facts is VERY different. Also, and even more important, children are asked to think like a mathematician starting right at kindergarten.
3. What is CGI
    a. Cognitive: processes related to thinking, reasoning, or remembering
    b. Guided: guide direct show steer lead
    c. Instruction: teach train coach
4. Problems presented very differently than what we experienced; the days of just practice arithmetic drill is being replaced by mathematics problems appropriate for children
5. Sample Problem Handout problem sheet and read top; when get to tools say that children use fingers, pencils, counting blocks, abacus, anything that helps them solve the problem
    a. Direct modeling strategy
    b. Counting strategy (count by 2s or by 3s)
    c. Number facts
6. Share and discuss solution strategies
7. Demo with child
8. Debrief demo -- how is this instruction different from what you experience in school?
9. Supporting your child at home through constructive listening and questions
    a. Your teachers are concerned about you teaching the kids the way you learned and that is now not the focus
    b. Math is part of real world and kids should view it that way
    c. Help parents learn what kinds of questions to ask – focus on having the children explain to them and NOT giving them the answers
    d. Parents as supporting guides and question askers, not as directors nor answer providers
10. What you can try this coming week
    a. Ask questions
    b. Play card games (give out deck and teach "crazy 8")
    c. Count things

    d. Discuss math in your environment

Class 2: More to Math than Numbers and Counting

Note: prepare handouts; Disney pic by itself and pages 2 and 3 of handout as back2back.

11. Welcome back; those who were not here last time please just try to hang in their and ask questions and I'll fill you in. If it is an in-depth question, I'll ask you to stay after and I'll be happy to go over the material with you more in-depth.

12. Review what is CGI
    a. Problem oriented instruction unlike anything we experienced growing up.
    b. Cognitive: processes related to thinking, reasoning, or remembering
    c. Guided: guide direct show steer lead
    d. Instruction: teach train coach

13. Today we want to explore two ideas: that there is more to math than numbers, and counting, something we all think we know how to do!!!

14. But first, would anyone like to share any math related activities they did this week with their children?
    a. Ask questions
    b. Play card games
    c. Count things
    d. Discuss math in your environment

15. Handout papers with Disney picture up.

16. Sing Sesame Street song (invite class to join me)

17. Ask each person to work alone and identify which one doesn't belong (more than one answer is possible).

18. After minute or so, tell class to draw a line under their work so we know where they stopped.

19. Ask people to work in pairs and compare answers to see if you can add anything to your list.

20. After minute or so, tell class to draw a line under their work so we know where they stopped.

21. Now create a list on the white board
    a. Princess only human
    b. Chipmunks   they are a group rather than individuals (The PSB Chipettes. Brittany, Jeanette, and Eleanor

       c. Elephant is the only quadruped
       d. Princess only one without a tail
       e. Mickey   only male
       f. Mickey   only one with shoes showing
       g. Mickey   only one with hand extended
       h. Elephant has a long nose
       i. Elephant only one who's not a Disney character
       j. Elephant only character than can be called enormous
       k. Elephant doesn't have a significant other counterpart
       l. Elephant only one in profile

22. Is what we just did "mathematics?"
23. Now turn over your paper; read top lines and evaluate what you have on your paper in terms of these four statements

24. Let's do this one as a class and see how many ways we can identify which numbers are different
    - only square number 5x5
    - only even number, can be split into halves evenly
    - only number with both digits even
    - only cubic number 3x3x3
    - not part of sequence 25, 26, 27
    - only number in 30's, 3 in tens place
    - only number where both digits are odd
    - only odd when digits are multiplied
    - 31 only prime number, only number with 1x31

25. Moving to totally different topic: counting collections
26. Have everyone work in pairs and take a bag of items and do the worksheet.
27. Have sharing to see how different collections were counted
28. Debrief -- Educational Value
    a. Counting provides the foundation for understanding numbers and for computation skills (addition, subtraction, multiplication, and division).
    b. Counting teaches children the names of numbers, the sequence of numbers, one-to-one correspondence, relative size
    c. Efficient and accurate counting strategies
        i. It's easier to keep track of groups of ten, than to count 170 single objects!
        ii. Skip counting (5-10-15-20…)
        iii. How to count on from a number (129, 130, 131,…)

         iv. How to count groups of objects
         v. How to represent or record what they've counted

29. Things to do at home this week
30. What you can try this coming week
    a. Ask questions
    b. Play card games (give out decks)
    c. Count things
    d. Discuss math in your environment
31. Plans for next couple of weeks
    a. Next week is addition and subtraction
    b. Following week is multiplication and division
    c. Following week is multi-digit numbers

Class 3: UNDERSTANDING Addition and Subtraction
From a child's perspective

32. Welcome back
33. What did you do this week?   Would anyone like to share any math related activities they did this week with their children?
34. Goal today is to share four broad CGI concepts and then see how they apply to learning addition and subtraction
    a. A child's understanding of mathematics gradually grows over a long period of time (years not days) as they solve problems.
    b. Children learn the most when they can develop several different ways to solve problems.
    c. Children progress from direct modeling the action in problems to some form of counting to the use of number facts.
    d. Children learn to reason mathematically by talking about their ideas and solutions.
35. As parents, to see your child grow mathematically
    a. Give them time,
    b. Ask questions regarding what they have done,
    c. Have them explain things to you, and
    d. Encourage them to try and solve things more than one way.
36. Now let's turn to addition and subtraction
37. In a CGI classroom, teachers provide students with many tools and allow them to make the choice (CCSS mathematical practice #5). Last couple of weeks

we've used blocks, noodles, beans, rubber bands, and paper and pencils, and next week we'll look at other tools.

38. Let me show you another useful tool children find useful as they grow their collection of tools for solving problems. This is the number line
    a. Put an open number line on board
    b. Do oral counting by 2s, 5s
39. In a moment I'll hand out papers and want you to solve the six problems of the kind the teachers will give your children over the course of k, 1st and 2nd grades. The goal is for you to try out these different problem types so you get a sense of what it's like for your child in the classroom.
40. For this exercise, please use ONLY direct modeling and counting tools. For the children, we want them to use as many different tools as possible. For this activity, you are NOT to use number facts. For example, let me demonstrate on the board
    a. There are 2 chocolate chips on each cookie and you have 4 cookies. How many chocolate chips are there?
    b. Show using "direct modeling" with blocks
    c. Show using number line
41. Handout papers with six problems; leave space for "show your thinking"
    a. JRU – if someone has direct mdel picture, ask questions uch as "where is the 8" and "show me the 5" and afte we finish the problem we can write an equation 8 + 6 = 14.
    b. SRU
    c. SCU
    d. JCU
    e. JSU
    f. SSU
42. Please work by yourself and solve these six problems using any tools you want, but no memorized facts; do the problem as if you were a k, 1st or 2nd grade student and didn't know the number facts.
43. Show your thinking in the space provided
44. Go round room selecting people to invite to show their solutions to entire class. Ask questions to show "the process" and invite discussion
45. Discuss the problems from the perspective of easiest to hardest to solve for a child; why that order? Use the notation   8+6= □; end up with six equations:

$$8+6= \square \qquad 14- 6= \square$$
$$8+ \square = 14 \qquad 14-\square=6$$
$$\square+6=14 \qquad \square-6=8$$

46. First column is join problems, second column is separation problems

47.Problems go from easiest to hardest as location of unknown moves
48.What you can try this coming week
      a. Ask questions
      b. Play card games
      c. Count things
      d. Discuss math in your environment

Class 4: CGI PHILOSOPHY
Solving problems is central
Using many strategies is important
Explaining clarifies thinking
Growth takes time

1) Turn to a partner and share a math experience you had with your child this past week.
2) Please solve the problem 12 x 24 the way you would usually (normally) solve it (without a calculator).
3) Invite couple people to share their solutions, demonstrating that there are different ways to find the answers
4) I say "trust us" with respect to your child learning more advanced material, so I want to play an audio that goes with the picture on your paper of a child doing a derived fact for 8x7 (taken from the internet)
5) Note how the teacher asks for clarification of thinking and explanation of ideas.
6) Multiplication and division:
      a. 3 problems using numbers (3, 8, 24)
      b. 3 problems using (7, 12, 84)
7) Sharing of strategies: select a couple people to put their work on the board and invite entire class to ask questions about how they did the problem.
8) Discussion on how problems are different: As adults we see the first as a multiplication problem, and then the next two problems are just division. However children see these problems as different, requiring them to understand the context of the problem for them to solve with understanding.
9) Asking questions at home activity: Go round room and have parents come up with math questions they could ask at home, for example
      a. How many rooms in our house?

    b. How many noses are in our house, Nostrils? Eyes? Ears? Feet? Hands?

    c. How many toes are in our house? How many fingers?

    d. How many pairs of shoes do you have? How many shoes is that?

    e. What is the shape of each of our rooms?

    f. Which room is largest? Smallest? How do we know? How can we find out?

Class 5: Our Base Ten Number System
And Arithmetic with Multidigit Numbers

1) Ask parents "What did you do at home this week?"
2) Handout papers and say "as you can see there are some phrases at the top of the page and blanks for you to complete them. We'll come back later in the class to complete these phrases, but first I want to go through our some material.

    Using friendly numbers: _____

    Thinking flexibly: _____

    Computing confidently: _____

3) What does base ten mean? History of base ten and why we use it. (Background material for parent to better understand our number system.)
    a) See notes beginning page 2 belowß
4) CGI approach to base ten concepts. Core idea: collections of tens can be counted. Use multiplication and division problems involving 10s:
    a) Counting by ones strategy
    b) Counting by tens strategy
    c) Direct place value
5) Road map
6) Arithmetic of multidigit numbers (numbers larger than 10).
    a) Direct modeling strategy
    b) Counting strategy
    c) Derived fact strategy
7) Now let's go back and complete the phrases at the top of the handout:

8) What to do at home this week: Asking questions activity. Go round room and have parents come up with math questions they could ask at home, for example
   a) How many rooms in our house?
   b) How many noses are in our house, Nostrils? Eyes? Ears? Feet? Hands?
   c) How many toes are in our house? How many fingers?
   d) How many pairs of shoes? How many individual shoes is that?

Class 6: Geometry and Spatial Thinking.

1) What counting activities did you do at home this week?
2) Why Geometry and Spatial Thinking is important
   a) Geometric activities are really good for
      i) Observing our world
      ii) Looking for patterns
      iii) Making comparisons
   b) Understanding more advanced mathematical concepts, eg, calculas was discovered in part by trying to figure out the area under a curve.
3) Vocabulary: Names and shapes; pictures of everyday things that RESEMBLE the mathetical ideals (expect the trapezoid)
   a) Resemblance -- figures look similar to or the same as
   b) Attributes – characteristics of the figures: number of sides, number of angles, number of vertieces
   c) Properties – rules that determine what we call a figre; eg, simple closed cuver made of line segments is a polygon; 3-sided polygon is a triangle; things that enable a person to argue why a figure is what it is.
4) Describing teacher's lounge in geometric terms

Spatial sense	Shapes and figures	Measurement
Top and bottom Above, middle and below Inside, outside and on Opposite, next to Left, middle, and right Flip, turn, and slide	2-dimensional shapes: circles, squares, rectangles, and triangles Count sides and angles Count sides and vertices Compare sides and angles Compare sides and vertices	Distance between two points Distance around an object Distance around a geometric shape Area of a space Area of surface Area of geometric shape

	3-dimensional shapes: cubes and pyramids Count edges, vertices, and faces Compare edges, vertices, and faces	

5) Describing 3-D objects in geometric terms
6) Making and unmaking objects (cutting up a milk carton!)
   a) Had parents do cut out and then take tour of room to see all the different ways that they cut up the boxes
   b) Asked what they learned: reinforced more than one solution.
   c) I said that important for kids to see that stuff is created from basic parts, and that the creative process starts with building blocks, just as the milk carton is made up of parts.
   d)
7) A child's path to understanding geometric concepts
   a) Resemblance -- figures look similar to or the same as
   b) Attributes – characteristics of the figures: number of sides, number of angles, number of vertieces
   c) Properties – rules that determine what we call a figre; eg, simple closed cuver made of line segments is a polygon; 3-sided polygon is a triangle; things that enable a person to argue why a figure is what it is.
8) Class evaluation

Path children following learning stuff
Explorations to do with your kids
Measurement
Properties
Obseration

Observations and d

Ned to ask them to tell you what theyh are thinking, to describe how they decide ideas.

Shere
Cone
Box
Cube

Three

3-dimnial stuff is made up of 2-d stuff; 2

Geometry

9) Ask parents "What counting activities did you do at home this week?"

10)   Today we are going to do several geometry and spatial relationship activities
that you can do at home. We'll do them here to be sure you understand what
we're trying to do and why.
   a) We live in 3-dimenional space and understanding it is important just for
      living
   b) Geometric ideas are crucial for developing deeper mathematical
      understanding
   c)   Geometric ideas are central for many professions involving design.

11)   To live in our world children should know the names of various geomtric
shapes like circle, square, triangle