



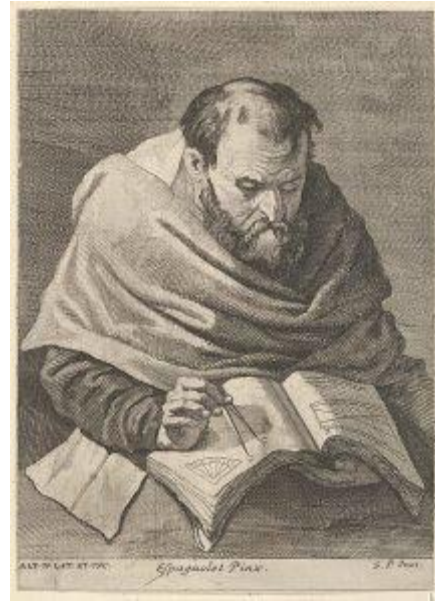
Singapore Math with Dawn Swartz

Lesson 4: Number Sense and Place Value

Outline:

Place Value

- One of the distinctives of the Singapore Math Model is to teach from the concrete to the pictorial to the abstract.
- Concrete materials for teaching place value:
 - Unifix Cubes
 - Everyday materials that can be bundled and unbundled (for example: coffee stirrers)
 - Base ten blocks
 - Place Value Strips
 - Place Value Charts
 - Place Value Disks
- Think through your management of these items. Talk about how these tools will be used and what your expectations are for these items.
 - Set a timer for 2 minutes, after which time these materials will magically turn into math tools.
 - Proportional number disks & base ten blocks :
 - Do you want the students to sort them? Do you want them to stack them? Limit their sorting and stacking time.
 - If they fall off the desk, they stay off the desk.
 - Think about the pattern from *Teach Like a Champion* (I do, we do, you do stages).



Examples of Use of Manipulatives during the Concrete Stage (First Grade)

- **First Grade Place Value with Addition (14:15)**
 - Combine bundled manipulatives for addition.
 - You will know from your curriculum whether you will only use concrete manipulatives or also include number bonds.
 - Prompting questions:
 - Do we need to bundle the 7 and the 8? Why?
 - Do we need to bundle the 7 and the 2 in $17 + 12$? Why?
- **First Grade Place Value with Subtraction (22:35)**
 - If I had 28 muffins, and I gave 13 of them to my friends, what do I have left? Do I have a part left or a whole left?



- What you start with is the whole, we are taking away part, and we are looking for a missing part.
- Prompting questions:
 - Can we eat or give away 13 of these muffins?
 - What would we have left? What is the part that we have left?
- They do this concrete exercise often enough until they move into mental math. Some things require an algorithm.
- **Subtraction Problem (26:45)**
 - 23 is our whole, we have given away part, and we are looking for the other part that is left. You can see from the number bond that it is a subtraction problem.
 - Prompting questions:
 - Do I need to unbundle? Why?
 - Do I still have 23 after I unbundle? Yes, just because we have unbundled does not mean that we have changed the value.
 - No can we take away the 7?
- **Base Ten Blocks (31:35)**
 - Do the same problems with bundling and unbundling as with the base ten blocks.
- **Pictorial and Abstract (33:35)**
 - If you do enough with concrete manipulatives they will begin to think about abstract algorithms.

Developmental Shift in Second Grade

- There is a developmental shift where they can start to think about proportions. They can use **proportional object**.
- They can use a disk to represent a 10.
- **Place Value Chart (36:30)**
 - Model numbers with the place value chart and disks.
 - Train the students from the beginning, when filling in place value chart, to group the disks in 5s. Take your time through the training.
- **Place Value Strips (41:00)**
 - This helps them to see where the digits are and also the value of the digit. You can pull the digit out to see the value.
- **Use place value chart, place value disks, and place value cards in combination.**
 - This is all about understanding the place the digit is in and the value as well.
 - Don't let the management discourage you. Part of teaching and part of kids is that stuff ends up on the floor.
- **Have students model numbers. (47:50)**
 - Let's represent 463 on our place value chart.
 - What digit is in the 10s place?
 - What digit is in the 100s place?
 - What is the value of the 6?



- What is the value of the 3?
- I'd like you to show me one more than 463 (on the place value chart). If we are just increasing by one more, which place changes? Those practices are important for mental math later.
- How can we be sure that these disks represent 248? Let's count them together.
- Show me 10 less than 248. What number is 13 less? What places have to change with 13?
- **Hundreds Board (53:50)**
 - There are so many ways to get to the right answer.
 - Add $15 + 43$
 - Tell me how many tens are there in 43?
 - What is the value of that 4?
 - There is a 3 in the ones place. What is the value of the 3?
 - Let's combine these two parts into a whole.
 - Add $27 + 32$
 - Use place value cards if someone gets stuck on the value.
- **Addition Problem with Renaming on the Place Value Chart (1:06:00)**
 - They know that once the number of disks on the place value chart is over 9, you can't do that.
 - Rename 10 ones as a 10.
 - Have everyone think of one of their nicknames. Discuss how these are different names for the same person. We don't change the value of the number by renaming 10 ones as one 10.
- **Subtraction With and Without Renaming on the Place Value Chart (1:14:30)**
 - Draw the number bond for the students. We are looking for an unknown part, which means that this becomes a subtraction problem.
 - $34 - 12$: Can we take away 1 ten? Can we take away 2 ones?
 - $34 - 17$: Can I take away 1 ten? Can take away 7 ones from the 4 ones?
 - What could we do? Rename one of the 10s to get more ones.
 - Have I changed the value of this number? Let's check to be sure (continue to count together to show that what is represented is the same value).
 - Now can I take way 1 ten? Can I take away 7 ones? Now, what is my other part?