



## Singapore Math with Dawn Swartz

### Lesson 3: Number Sense and Number Bonds

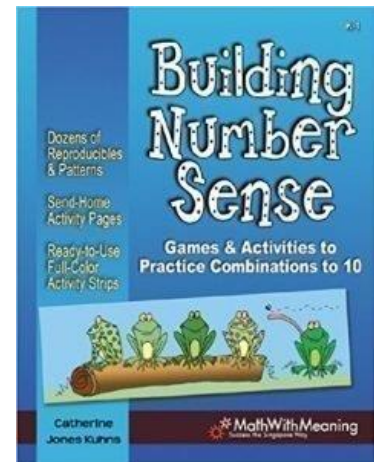
#### Outline:

##### Introduction

- Recall the definition of Number Sense: Fluidity and flexibility with numbers.
- In this session, Dawn will discuss developing number sense by means of number bonds.
- Print out the number bonds worksheet—a PDF posted on this course page.
- One of Dawn’s favorite session is this one on number bonds!
- How to compose and decompose numbers—you may have an “aha moment” as Dawn did learning about number bonds
- You will likely work with number bonds almost daily.

##### What are number bonds and why are they important?

- Definition of Number Bond: A way to visually represent how to decompose a number
- Helps students understand the part-whole relationships of numbers; part-whole relationships helps students to compute numbers and find unknown quantities
- Helps student to understand how to make ten—a benchmark of first-grade mathematics; then they will make other multiples of ten
- Helps students to compose and decompose numbers
- A bridge for building mental math strategies
- We will follow the pedagogy: **Concrete to Pictorial to Abstract**. Paper math first, then mental math.
- Dawn gives a visual example of a number bond, featuring the number 5. Dawn shows a number bond card, shaped as a triangle. “The story of five.”
- Manipulatives are used frequently to teach number bonds; make use of reproducible diagrams. Consider using the reproducible diagrams contained in the book [Building Number Sense](#) by Catherine Jones Kuhns.
- Using linking cubes in conjunction with charts of number bonds
- Having students come forward to the front of class and represent number bonds
- Bracelet with the number bond of seven: moving beads on the bracelet to show whole-part relationships (in conjunction with number bond charts)
- Follow the sequence of moving from concrete to pictorial to abstract





- Example: The story of nine with student-produced crafts (flowers with petals).
- Example: “A Penny for Your Thoughts.” Students each use 7 pennies. Roll out pennies to see how many heads and how many tails we find.
- Recycle and reuse your manipulatives, objects each year; brainstorm with your colleagues about how to create these kinds of activities
- Number bonds for 10: Consider using the **ten frame cards** (1st-grade teachers especially need a set of these).
- Teach children to subitize: to perceive a number of a group without counting, at a glance (from the Latin *subitus*, “sudden”). Students need to learn how to subitize the number ten especially. This will greatly help them later to make other larger number in increments of ten. Help students to “make ten” or “make twenty...” This will open the door to mental math.
- Teachers need a rich supply of objects, resources, and manipulatives for these number bond activities.

## **Minute 40: Follow along with Dawn on your print outs.**

### Number Bonds in Real Life

- $24 \times 3$ : 1<sup>st</sup> grade students could solve this problem through the use of number bonds, repeated addition, and skip counting.
- Finding area problem (5<sup>th</sup> grade): Use part whole thinking to solve this problem. The students use what was memorized in 1<sup>st</sup>/2<sup>nd</sup> grades to build a long equation, which is a precursor to algebraic thinking.

### Number Bonds

- Number bonds are introduced in K and 1<sup>st</sup> grade, but they are used throughout grammar school and beyond.
- Number bonds help students understand part whole relationships, making 10, making all other multiples of 10, all other units of measure, how to compose and decompose numbers, and how to master mental math strategies and skills.
- Concrete practice needs to be often and varied until it goes into the pictorial and the abstract.