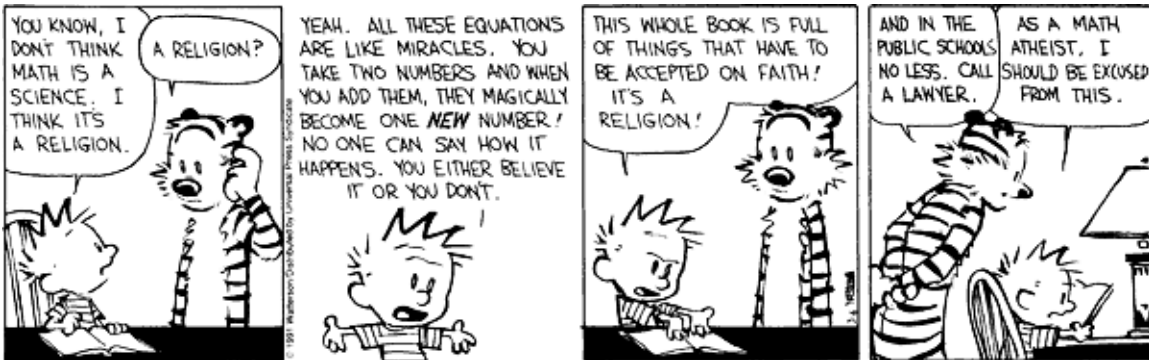


Number Sense

What is it? Here are a few of the ways in which it is described by math educators and cartoonists.

1. **Number sense** is the intuitive understanding of magnitudes, ranges, and estimates of numerical values based off of both logic and experience. Number sense is not only critical to the development of strong math skills, it is also a necessary element of basic reasoning through every-day situations.
2. **Number sense** essentially refers to a student's "fluidity and flexibility with numbers" (Gersten & Chard, 2001). He/She has sense of what numbers mean, understands their relationship to one another, is able to perform mental math, understands symbolic representations, and can use those numbers in real world situations. In her book, *About Teaching Mathematics*, Marilyn Burns describes students with a strong number sense in the following way: "[They] can think and reason flexibly with numbers, use numbers to solve problems, spot unreasonable answers, understand how numbers can be taken apart and put together in different ways, see connections among operations, figure mentally, and make reasonable estimates."
3. **Number Sense is Magic!** (Calvin & Hobbes)



Activities to Help Kids Develop Number Sense

Compare these activities. How are they different?

- a. Add the following numbers

$$\begin{array}{r} 5.321 \\ +2.555 \\ \hline \end{array}$$

$$\begin{array}{r} 1.002 \\ +.198 \\ \hline \end{array}$$

$$\begin{array}{r} .004 \\ +1.097 \\ \hline \end{array}$$

- b. Find the pairs of numbers whose sum is 2.

2.867

1.456

3.888

.038

.250

1.962

1.876

.544

1.754

2.004

Find the sum of three consecutive numbers. Do this repeatedly, at least five times (i.e., with 5 different sets of three consecutive numbers). What patterns do you notice? Work with your partner to articulate the reason for the pattern(s).

Games That Foster Number Sense AND Computation Practice

The following games, designed by Marilyn Burns, give children the chance to practice simple computation in the context of activities that also compel them to think strategically, and about relationships between numbers.

Cross Out Singles (Burns, 2000, p. 191)

Materials: one die or 0-9 spinner

The template included at the end of this handout

- To begin the game, one player rolls the die or spins the spinner.
- All players write the number in a square on their first chart. Once a number is recorded, it cannot be changed.
- Another player now rolls or spins to generate a number for everyone to record in another square. Take turns rolling/spinning until players have filled all nine squares on their charts.

- d) Players then find the sums of the rows, columns and diagonal, and record them in the respective circles.
- e) Players examine their sums. Any sum that appears in only one circle must be crossed out.
- f) The total of the sums that are not crossed out is the players score for that round.

3	4	2	(9)
2	3	4	(9)
6	3	5	(14)

(11)
~~(11)~~
(11)
(11)

Play two more rounds. Then compare totals.

Extensions:

- a. Find ways that produce a zero score.
- b. Using the numbers 1 to 9 once each, what is the highest score you can get?
- c. Discuss strategies for how to place numbers.

The Game of Pig (Burns, p. 71)

Materials: A pair of dice

The goal of the game is to be the first to reach 100. On your turn, roll the dice as many times as you like, mentally keeping a running total of the sum (if necessary for your student, write the numbers and totals down). When you decide to stop rolling, record the total for that turn and add it to the total from previous turns.

The catch: If a 1 comes up on one of the dice, the player's turn automatically ends and 0 is scored for that round. If 1s come up on both dice, not only does the turn end, the total accumulated so far returns to 0. After coming familiar with the game, write a strategy.

101 and Out (Place Value)

Materials: a die or 0-9 spinner

1. Each player makes a recording sheet as shown.
2. Take turns rolling the die or spinning the spinner to generate six numbers.
3. On each turn, all players write the number in either the tens column or the ones column of their recording sheet. Once a number is recorded, it cannot be changed.
4. After six numbers, fill in any blank spaces in ones column with zeros and add.
5. The player closest to 100 without going over wins.

101 and Out	
10s	1s
1.	_____
2.	_____
3.	_____
4.	_____
5.	_____
6.	_____
Total:	_____

Race for \$1.00 (or more)

Materials: baggie with dimes, pennies and dollars
two dice

Players take turns rolling the dice and taking that many pennies. Each time a player accumulates 10 pennies, she can trade them in for a dime. The game continues until one player collects 10 dimes and exchanges them for \$1.00. Record how many each player has at the end of the game.

Roll 15 (Burns, 2000, p. 186)

To play this game each pair needs four cubes, two numbered 0 to 5 and two numbered 5 to 10. The object of the game is to get a score as close to 15 as possible.

As each player rolls the cubes, he or she should record each roll to keep track of the numbers that come up, and the sums. The game should be played 5 times before discussing the questions.

The first player chooses any cube to roll, then rolls a second, cube and finds the sum of the two numbers rolled (if the two numbers rolled are 3 and 4, the sum is 7 so far). The player may now choose to stop or to roll a third cube. This third number is then added to the previous sum (if the number rolled is a 9, the sum is now 16; it's all right to go over 15). After the third roll, if the sum is still less than 15, the player may choose to roll the fourth cube. Then the second player rolls the cubes one at a time in the same way. The player closes to 15 is the winner (figuring out who is closer may involve some discussion).

Questions: How many times did you usually roll before stopping?
Which cube did you use first? Second?
How many times did you go over 15?
What might you roll to produce a result of exactly 15?

Play 5 more rounds and then talk about whether you (i.e., your child) changed strategies.

Cross Out Singles

From *About Teaching Mathematics*, by Marilyn Burns

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			○
			○

○ ○ ○ ○

1. _____
2. _____
3. _____
TOTAL: _____

