Math Night

4th Grade Topics

Topics for Tonight:
Number sense & fact fluency
and how they apply to 4th Grade Math

- Define number sense
- The terms “From Memory” vs. memorization
- Subitising

Definition of Number Sense

(a) fluency in estimating and judging magnitude

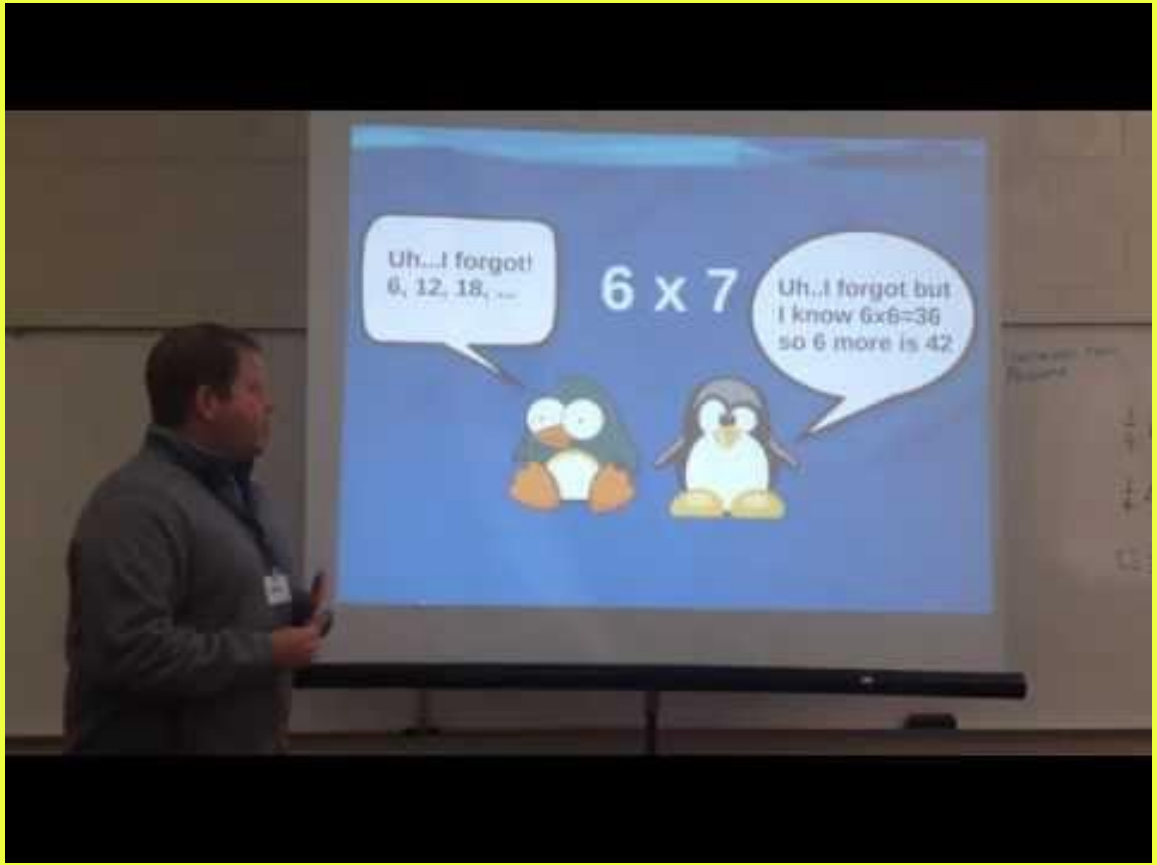
(b) ability to recognize unreasonable results

(c) flexibility when mentally computing

(d) ability to move among different representations and to use the most appropriate representations.

Kalchman, M., Moss, J., & Case, R. (2001). Psychological models for the development of mathematical understanding: Rational numbers and functions. In S. M.Carver & D. Klahr (Eds.), Cognition and instruction. Mahwah, NJ: Lawrence Erlbaum.

Flexibility when Mentally Computing



From memory
vs.
memorization

How can I help my child?

Great question! Here are some resources:

Multiplication array flash cards

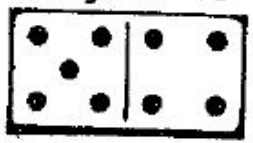
Multiplication subitising cards
(more on that soon!)

Multiplication games like Domino War (in action next door!)

Multiplication dominoes

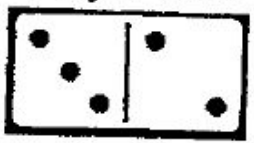
MULTIPLICATION WAR: Players draw a domino and multiply the pips. The player with th greatest product captures the dominoes. "Twenty is a greater product than six" and Player One win

Player One



5 x 4 = 20

Player Two



3 x 2 = 6

Definition of Number Sense

(a) fluency in estimating and judging magnitude

(b) ability to recognize unreasonable results

(c) flexibility when mentally computing

(d) ability to move among different representations and to use the most appropriate representations.

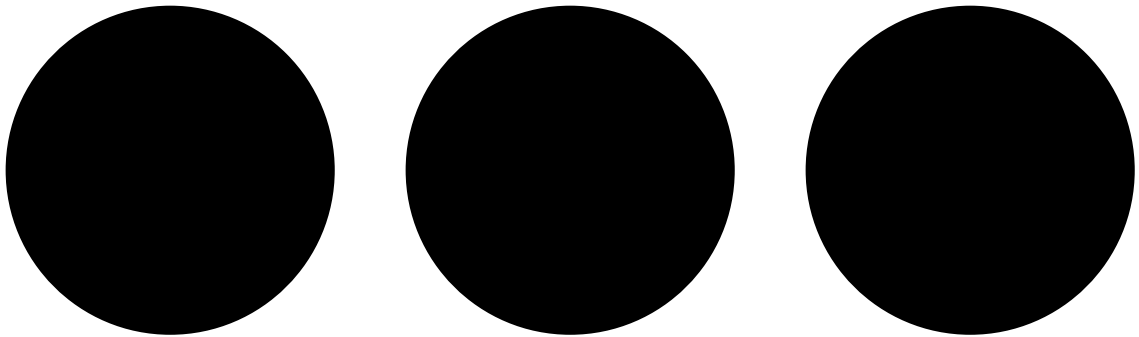
Kalchman, M., Moss, J., & Case, R. (2001). Psychological models for the development of mathematical understanding: Rational numbers and functions. In S. M.Carver & D. Klahr (Eds.), Cognition and instruction. Mahwah, NJ: Lawrence Erlbaum.

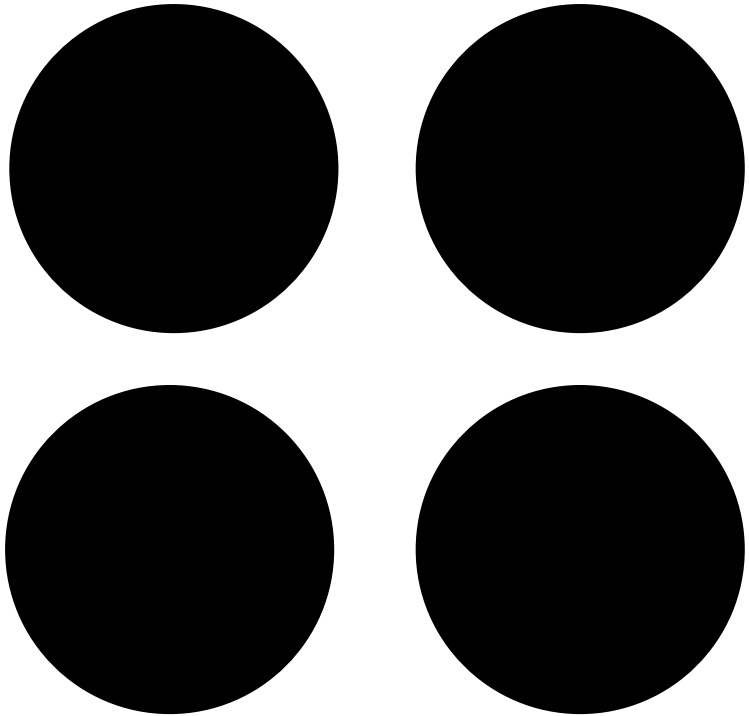
Fluency in Estimating and Judging Quantity

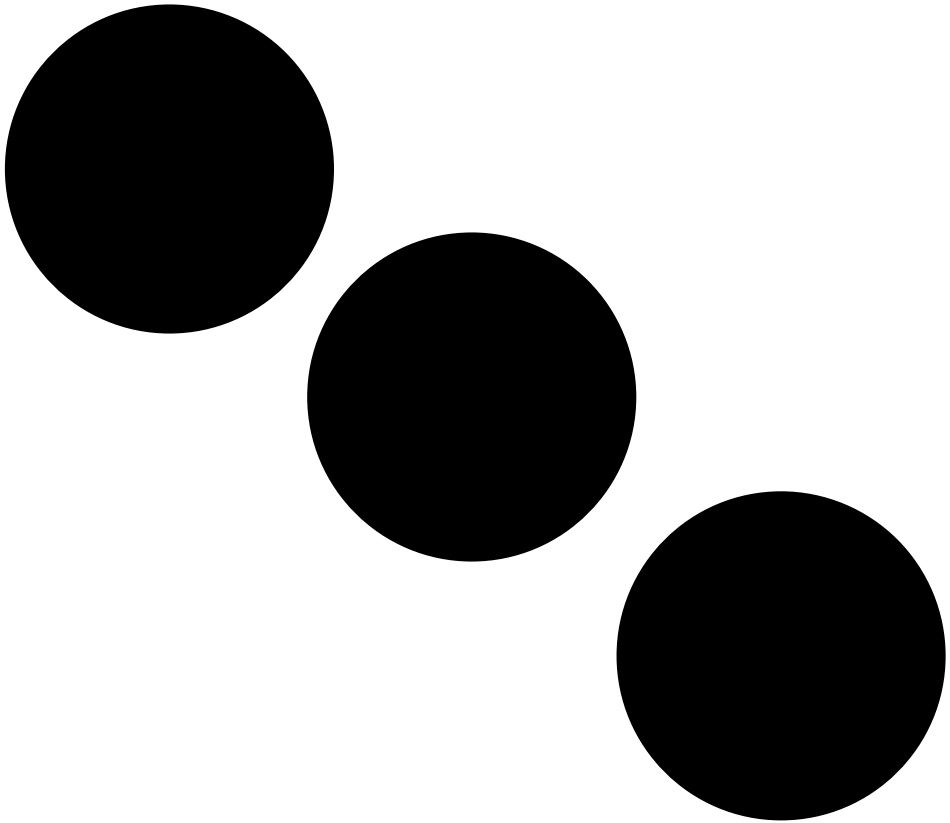
How do we practice this? Subitising

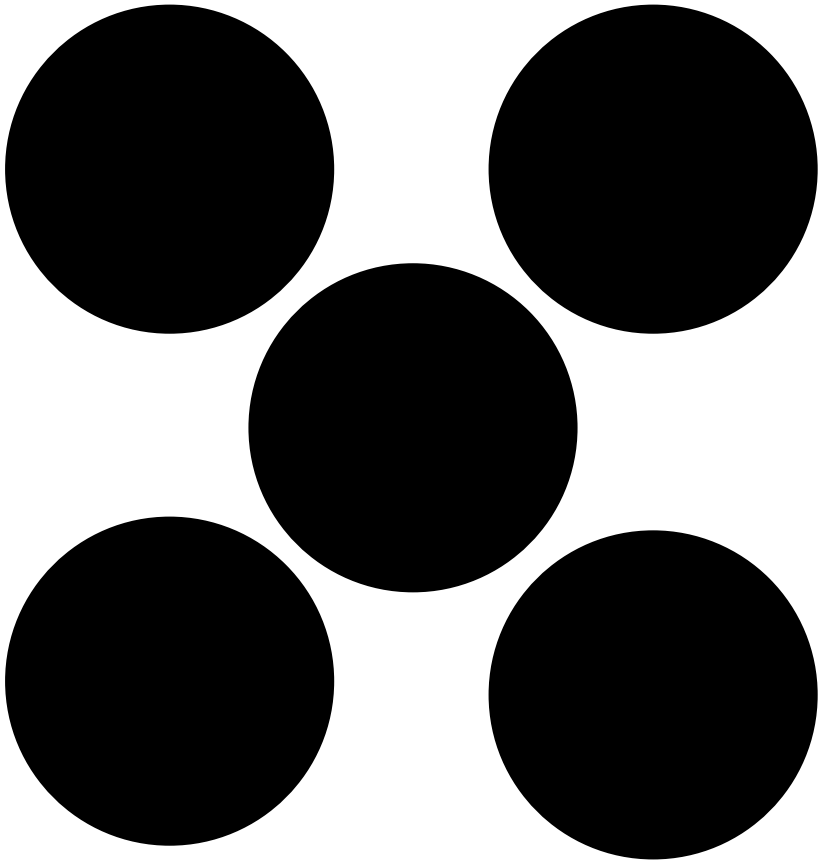
Subitising is when you suddenly see a quantity

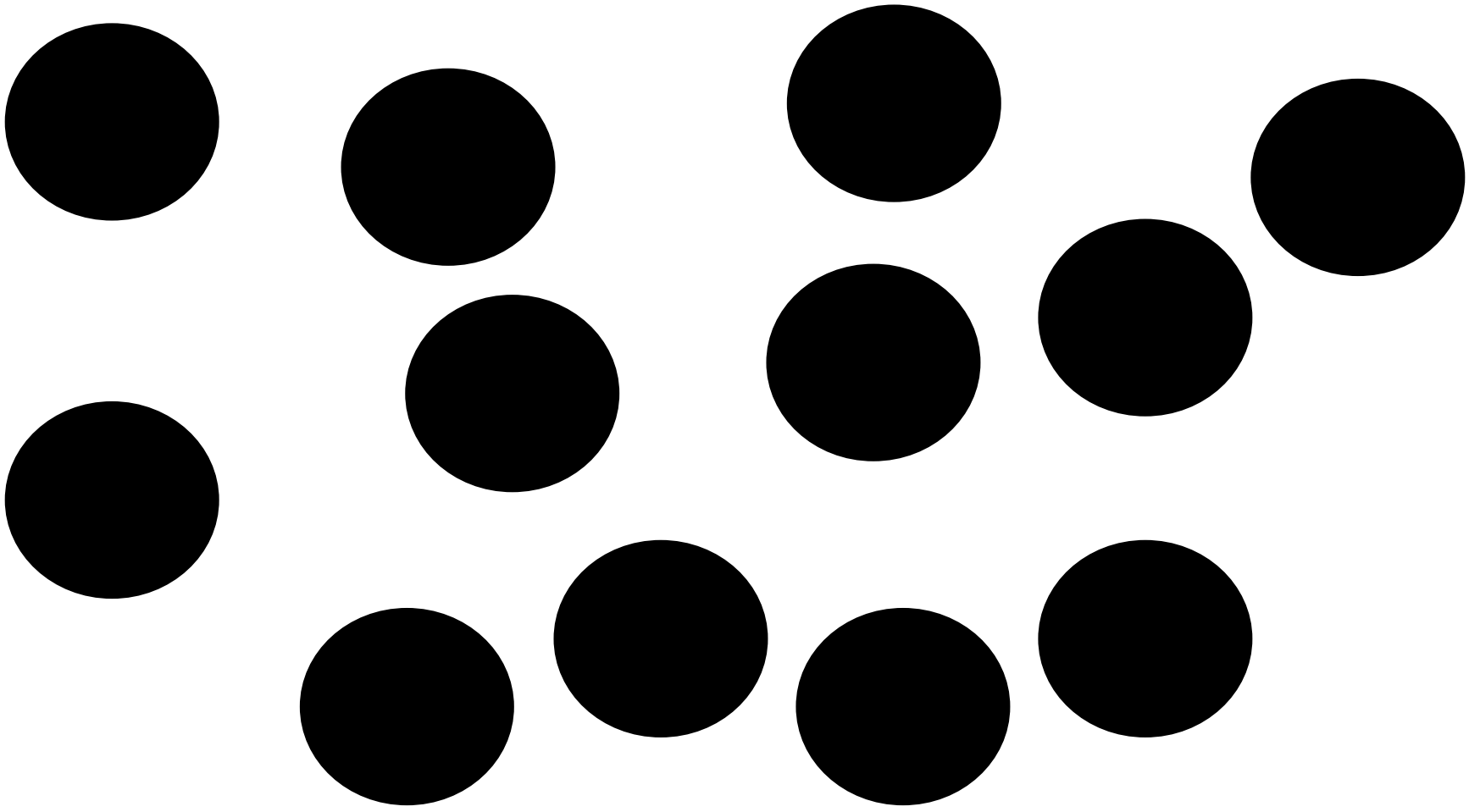
Let's practice!







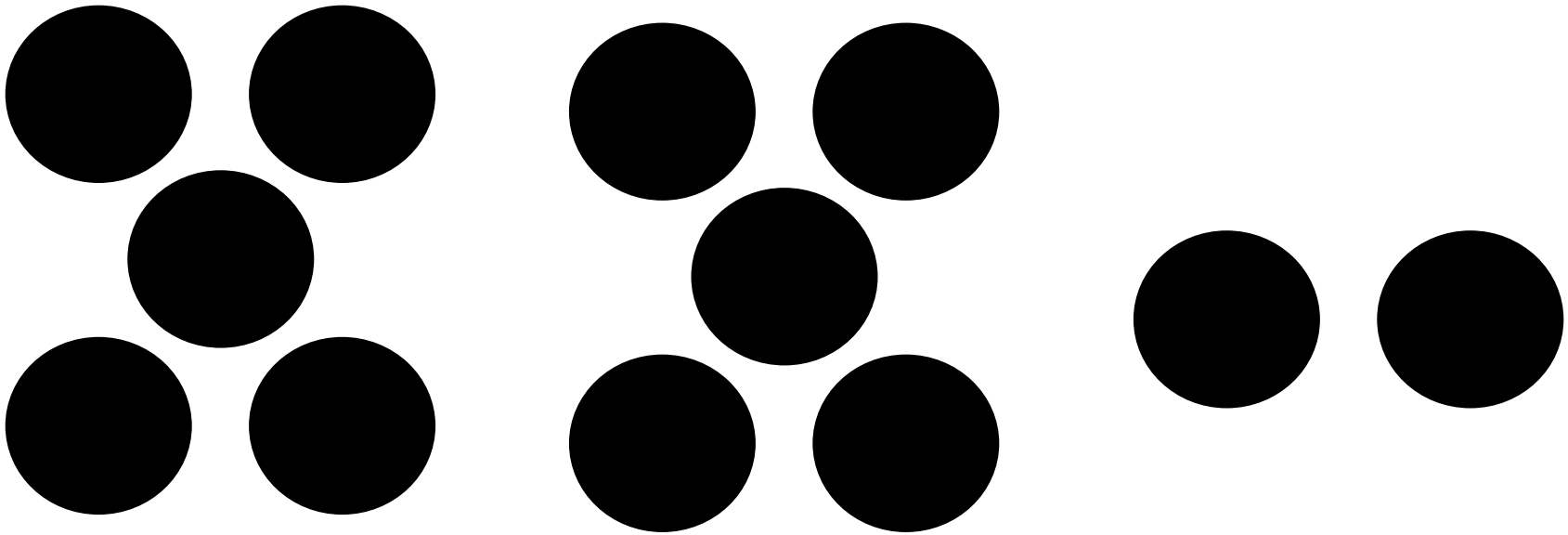




What the ?

Following the Subitising Level Instructional Guide you will see that the learning begins with numbers no larger than five or six because these values represent the limit of even an adult brain's quantity processor (Clements, 1999; Dehaene, 1997).

Plain English : you can only "suddenly see" or subitise the magnitude of numbers up to 5-6. Try this one!

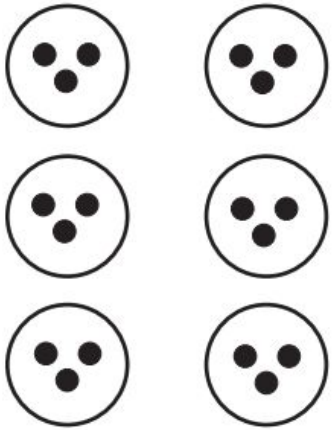


Easier yeah?

So how does this apply to 4th Grade math?

Subitising links to multiplication facts!

Subitising, specifically subitising flash cards, are fantastic for mastering facts from memory. Not only are they a visual tool, but they provide opportunities to discuss flexible thinking.



This card visually shows the magnitude of 6x3.

Here's the kind of **independent** thinking/flexibility we'd want to hear from a 4th grade student:

"I can't remember what 6x3 is but I know that 3x3 is 9, and I see 2 groups of 9 and that's 18. 6x3=18

How can I help my child?

Great question! Here are some resources:

Multiplication subitising cards

Salute (going on next door):

Salute encourages flexible algebraic thinking

Salute

Box Cars "All Hands On Deck" Mystery Number (adapted)

Concepts: Missing Addend, Factor
Equipment: Cards 0-12 (J=11 Q=12 K=0)
Goal/Object: Figure Out value of the card on your head

Usually 3 players with one player taking the role of "General". The General says "salute". The other two players take the card from the top of their deck and WITHOUT LOOKING AT IT place it on their forehead so everyone else can see what the card on their forehead is. The General Adds the two cards together and says "The sum of your two cards is...." The two players then use the sum and the card they can see on their opponent's forehead to try and figure out their own card.

Variations: (1) Mulitplication (take out 0s)
(2) 4 Players (one General, 3 soldiers)
(3) Red = neg integers / Black = pos integers

Definition of Number Sense

(a) fluency in estimating and judging magnitude

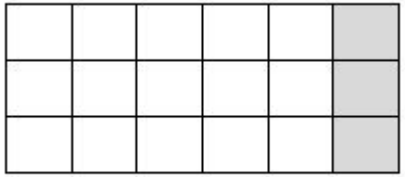
(b) ability to recognize unreasonable results

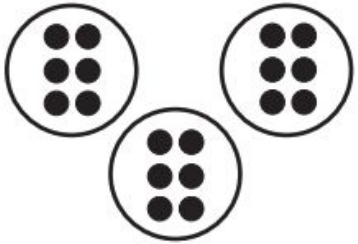
(c) flexibility when mentally computing

(d) ability to move among different representations and to use the most appropriate representations.

Kalchman, M., Moss, J., & Case, R. (2001). Psychological models for the development of mathematical understanding: Rational numbers and functions. In S. M.Carver & D. Klahr (Eds.), Cognition and instruction. Mahwah, NJ: Lawrence Erlbaum.

Ability to Move Among Different Representations and to use the Most Appropriate Representations.





18

18

2 x 9

2 x 3 x 3

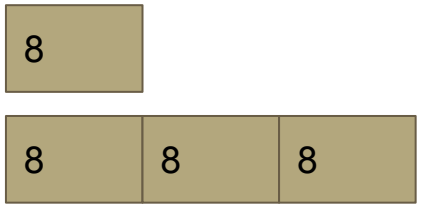
3	3	3	3	3	3

It’s your turn!

Take a ½ sheet of green paper. Try to represent the number 24 as many different ways as you can. (place value, operations, fractions, etc.)

How does this connect to 4th grade math?

At the grocery store Mohammed bought a king size pack of gum and his sister bought a regular size pack of gum. Mohammed's pack has three times as many pieces as his sister's pack. His sister's pack has 8 pieces. Write an equation using a variable for the unknown to show how many pieces of gum Mohammed has in his pack and solve.



A teacher wants to rearrange her room. She has 24 students. She wants to arrange the desks into 4 rows. How many students will be in each row? What if she wants to arrange the desks into 3 rows?

How multiple representations help with multi-digit subtraction:

$$\begin{array}{r} 3004 \\ -\ 298 \\ \hline 2706 \end{array}$$

$3004 \rightarrow 2990 + 14$

$2\ 9\ 9\ 14$

~~$300\ 4$~~

$-\ 29\ 8$

How can I help my child?

Great question! Here are some resources:

Place value games

Subitising

Factor games

All next door!

Definition of Number Sense

(a) fluency in estimating and judging magnitude

(b) ability to recognize unreasonable results

(c) flexibility when mentally computing

(d) ability to move among different representations and to use the most appropriate representations.

Kalchman, M., Moss, J., & Case, R. (2001). Psychological models for the development of mathematical understanding: Rational numbers and functions. In S. M.Carver & D. Klahr (Eds.), Cognition and instruction. Mahwah, NJ: Lawrence Erlbaum.

Ability to Recognize an Unreasonable Result

```
  3004
-  298
```

```
 299 14
 3004
-  298
------
  702
```

For whatever reason, the student made a mistake in subtraction - he/she forgot to subtract in the thousands place. What we want the student to realize is that

~700 + ~300 does not equal ~3000 so therefore there's some error here and we want him/her to go back and check the work. This is why we practice rounding at nauseum.

How can I help my child?

Great question! Here are some resources:

Rounding and place value games next door!

More resources

http://www.softschools.com/math/games/

http://maccss.ncdpi.wikispaces.net/file/view/4thgrade_GAMES_8.22.14.pdf/593155854/4thgrade_GAMES_8.22.14.pdf

http://www.stevewyborney.com/wp-content/uploads/2015/02/Number-Concept-Map-PDF.pdf

https://gfletchy.files.wordpress.com/2014/03/multiplication-subitizing-cards.pdf