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# Building Number Sense

— Math IS fun! —

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# Estimation Clipboard

- When prompted - estimate the number of items and enter it into the chat BUT don't press enter yet (to give everyone some thinking time)
- Feel free to unmute and “woohoo” if you get it exactly or are very close to the actual amount

# Estimating and Counting

- Both estimating and counting (by different amounts) is a skill most students are developing from K onwards
- At home use: dried beans, cereal, buttons, etc. and ask children to estimate how many and then count how many
- Count using different sized groups (by 2's, 5's, 10's, 25's, 50's, 100's etc.)
- Choral counting along with your kids can be a useful for them

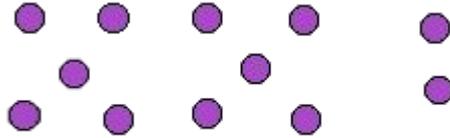
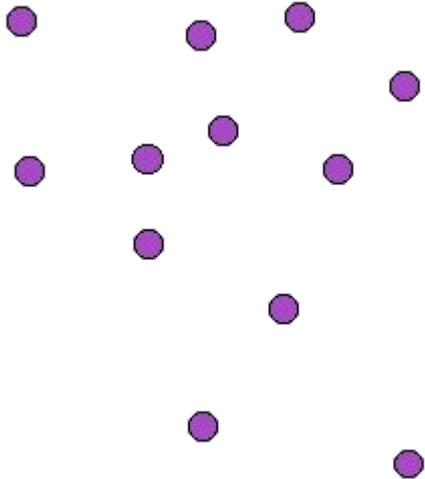
# Splat!

- Similar to the estimation clipboard - put your answer into the chat but don't press enter yet

# Subitizing

Subitizing = knowing how many there are without counting. This is an incredibly important foundation skill

Try it out: How many dots?

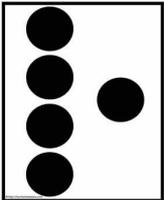


# Subitizing at Home

Play any games with dice and dominoes

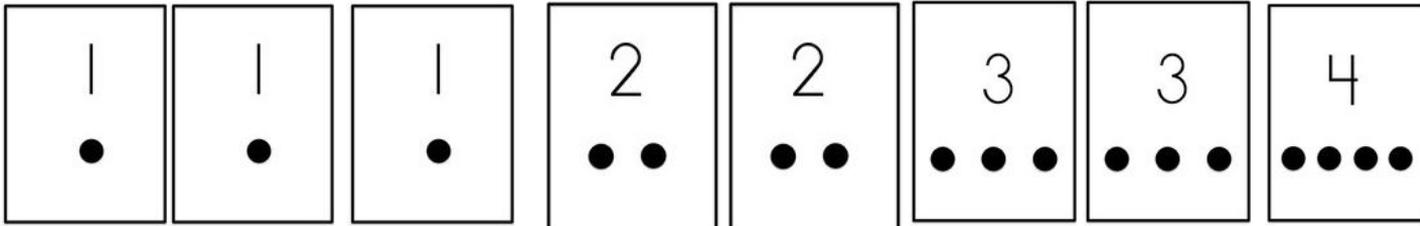
**Chutes and Ladders or Snakes and Ladders is one of the most beneficial games you can play for developing mental number lines.**

Play “how many?” → show an amount for just a few seconds and then cover it up and ask “how many”, then allow them to count to see how they did (humans can usually on subitize to 5)



# Partitioning

- Partitioning is another really important foundation skill and is just about breaking up numbers/amounts in different ways
- Using 5 items (anything you have handy) or pictures, show all the ways you can make 5
- write/say equations for each of your ways
- Make 7 (can be any number): Using the cards below, make 7 in as many ways as you can:



# Literacy + Numeracy

When reading with your children at night add in some math:

- How many noses on this page? How many eyes?
- What is bigger?
- What is smaller?
- How many more hands than heads are there on this page?

You can also borrow some math-specific books but you don't need to as there is math all around us!

# Questions?

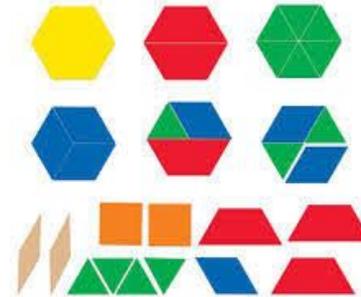
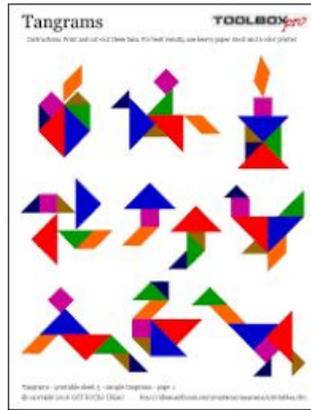
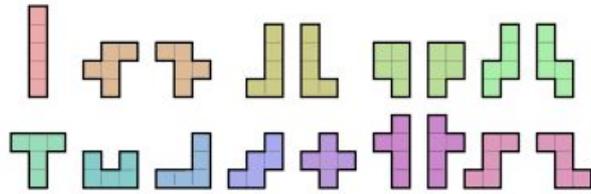
- Take a moment to stretch your body....if you want to play more math with this then...use your body to show:
  - Parallel
  - Acute angle
  - Obtuse angle
  - Right angle
  - Straight angle
  - perpendicular

# Encourage Creativity!

- Ask “What do you/we notice? What do you/we wonder?” → keep creative thinking developing as children explore the mysteries and beauties of math
- Math is literally all around us....
- Where do you SEE math around you?
- Where do you HEAR math around you?
- Where do you FEEL math around you?
- Where do you SMELL math around you?

# Develop Visual Abilities

- Children as young as 3 can benefit from visual activities such as:
  - Building with blocks → ideally they build a specific object
  - Line drawing
  - Paper folding activities
  - Playing with shapes like pentominoes, tangrams, pattern blocks and completing shapes puzzles



- Use spatial vocabulary early and often when playing with children:
  - Over, under, to the left, to the right, inside, outside, beside, in front of, behind, more than, less than, longer than, shorter than, etc.

# Understanding Math Visually

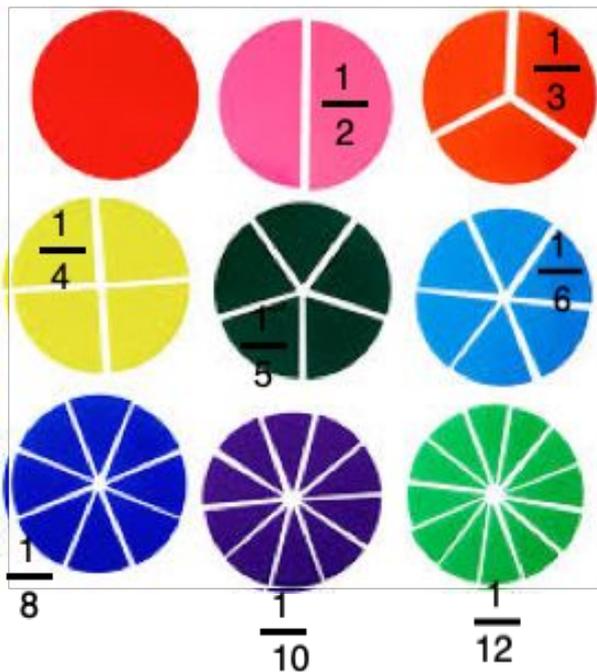
Using visuals and contexts helps support conceptual understanding:

- Real and virtual manipulatives
- Drawing diagrams to understand the concepts
- Making connections between concepts such as area and multiplication

Visuospatial ability is also strongly correlated with careers in STEM

# Visual Fractions

Consider the following image and that each circle equals one whole:



What do you notice? What do you wonder?

How do you know how to name the pieces?

What do you notice about the relationship between the piece size and the denominator? WHY does this relationship exist?

# GAMIFY EVERYTHING!

- ALL of us can improve our numeracy and math skills and games are great way to practice (when we're having fun, we actually learn more too!)
- Play games as a family - build a culture of mathematical thinking in your family (cribbage, card games, dice games, SET, dominoes, Tiny Polka Dots, Chess, Checkers, Yahtzee, etc.)
- Make a game in the car on the way to school "make 8" and then your kids list all the ways they can make 8 (or 10, 15, 23, etc.)

# How Many Missing?

2 Players, counters (coins, poker chips, blocks, etc.)

- 1) Start with a given amount of counters (like 5, or 7 or 10).
- 2) Behind your back separate the amount in any way you want and show one part to your partner
- 3) Your partner will say how many are hidden
- 4) If they are correct, it is their turn

....this isn't really a game as there is no winning or losing but kids love it and it feels like a game so I call it one :)

# Make 10 Go Fish

2-4 Players, regular playing cards or numeral cards

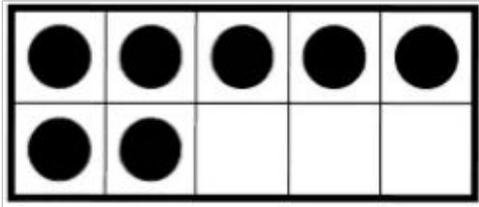
- 1) Remove all 10's and face cards
- 2) Shuffle and deal out 7 cards per person
- 3) The goal is to make PAIRS that add to 10. Pull out any 'friends of 10' in your own hand
- 4) Younger person starts and asks for what they need. If their partner has it they give it to them and they get to ask again until the partner doesn't have what they ask for and says "go fish"
- 5) If at any point a person runs out of cards, pick up 7 more from the pile
- 6) Play until the pile is gone
- 7) The winner has the most 'friends of 10' pairs

# Biggest Difference

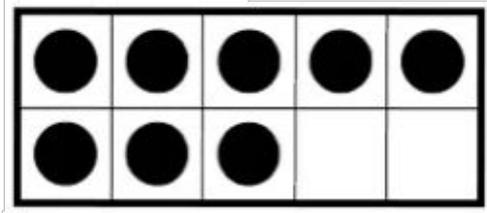
2 players, 40 counters, regular playing cards (or deca-dice or other multi-sided dice)

- 1) start with all 40 counters in the center and each student gets half the cards (face cards can either be equal to 10 or Jack = 11, Q=12, K=13, depending on students).
- 2) Each player flips one card, the person with the larger number wins the DIFFERENCE of the two.
- 3) They take that amount of chips from the center. The game is over when all the counters are gone and the winner is the person with most counters.

# What Strategies Do You See?

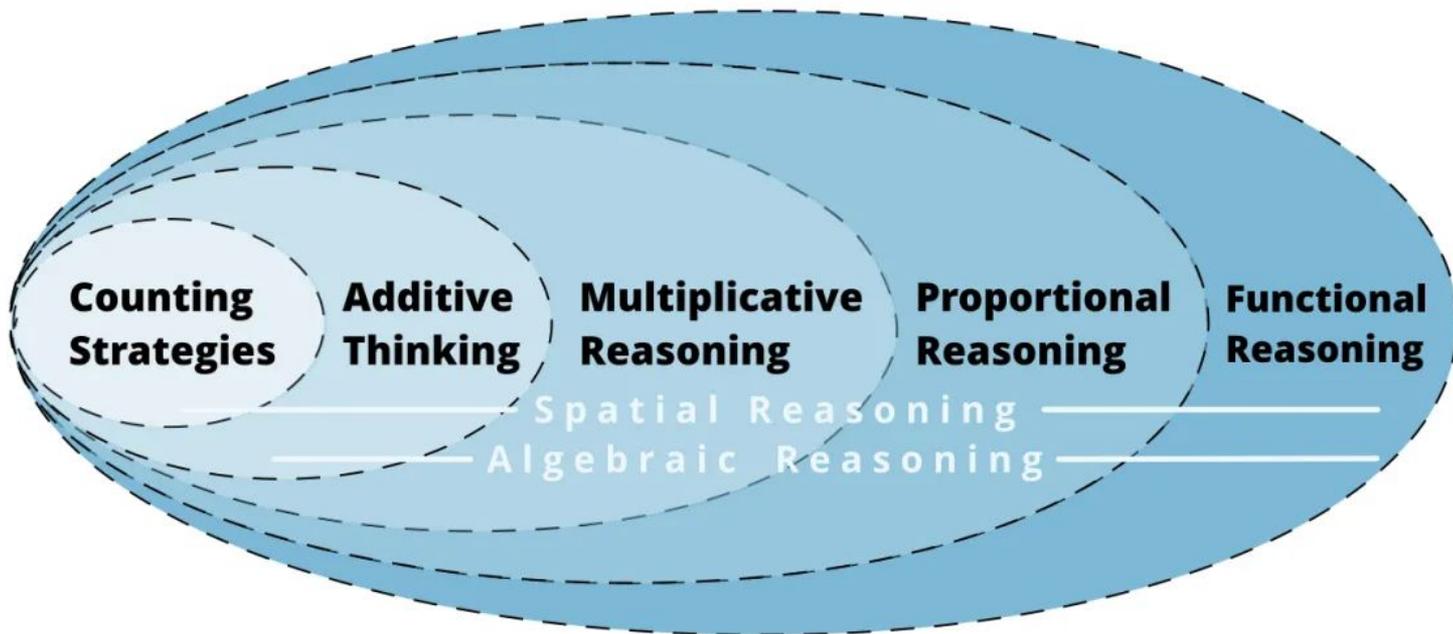


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$$7 + 8$$

# The Development of Mathematical Reasoning



# Pig

2-4 players, dice

- 1) Roll 2 dice, the sum is your score. You may bank these points or keep rolling and bank when you want EXCEPT if you roll a 1 you lose any unbanked points and if you roll double 1's you lose ALL points and start at zero again.
- 2) First person to 100 wins.
- 3) For an easier version use 1 die and rolling a 1 means you lose unbanked points only and the first to 50 wins.
- 4) You can also start at 100 and subtract - the first to zero wins.

# High/Low

2 players, regular playing cards or dice (regular, deca-dice, dodeca-dice, etc.), 1 regular die, double 10 frames

- 1) Each player flips over 2 cards and adds their two numbers (face cards = 10 if needed or J = 11, Q = 12, K = 13) or you can remove these
- 2) Each student explains their strategy and they ensure they both have the correct answer
- 3) Roll the die, if the number is EVEN the HIGH score wins a point and if it's ODD the LOW score wins a point (for younger students: The player with the high score wins when we are adding and the person with the low score wins when we are subtracting)
- 4) In the event of a tie, flip again and the winner earns TWO points
- 5) First person to 10 points wins the game.

# Fraction War

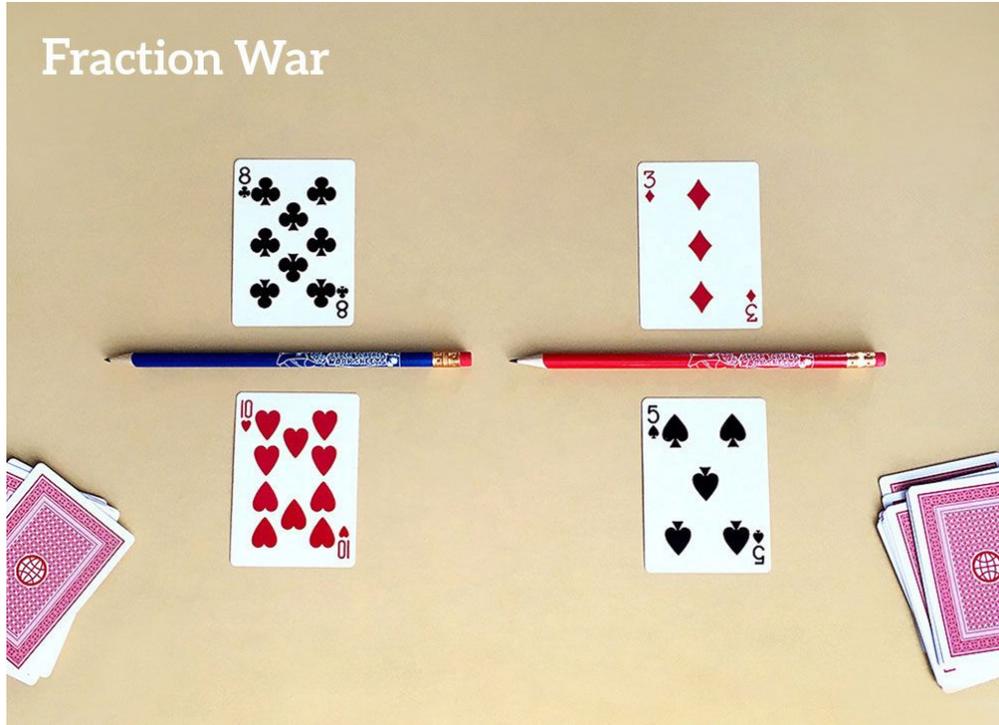
Play a game of Fraction War:

Each player gets half the deck. Each player flips over 2 cards and makes them into a proper fraction. The player with the larger fraction **MUST** explain why they think theirs is larger and if both players agree, then they win all 4 cards. In the event of a TIE - you have a WAR.

Beginner Version = all face cards equal 10

Advanced Version = Jack = 11, Queen = 12, King = 13

# Fraction War



Who wins and how do you know?

Can you prove it in more than one way?

# Resources

See my blog for many more ideas: <http://educatingnow.com/parents/>

Estimation Clipboard: <https://stevevyborney.com/2018/04/the-estimation-clipboard/>

Splat!: <https://stevevyborney.com/2017/02/splat/>

Cube Conversations: <https://stevevyborney.com/2017/12/cube-conversations/>

Virtual manipulatives:

[http://www.glencoe.com/sites/common\\_assets/mathematics/ebook\\_assets/vmf/VMF-Interface.html](http://www.glencoe.com/sites/common_assets/mathematics/ebook_assets/vmf/VMF-Interface.html)

Which One Doesn't Belong: <https://wodb.ca/>