

Math Fact Fluency

Three Keys to Helping Your Child Learn Basic Facts for Life AND Like Math



#1 Focus on *Real* Math Fluency...use strategies (rather than just memorize the facts with worksheets or flash cards). Why?

- Your child is *much more* likely to remember facts later on
- Your child is *much less* likely to have stress and anxiety
- The strategies will be used with larger numbers, fractions, and higher-level mathematics to support your child as a confident mathematician.

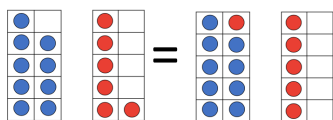


#2 Help your child 'see' the reasoning strategies that generalize to numbers beyond basic facts. Set them up for life! Two addition and two multiplication strategies are provided here for you.

ADDITION STRATEGIES

Making 10 Strategy

Imagine moving some over to make a full 10, then add.



$$9 + 6 = 10 + 5$$

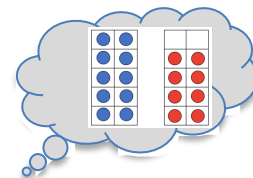
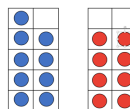
Talk

Ten Frames

Numbers

Pretend-a-10 Strategy [Compensation]

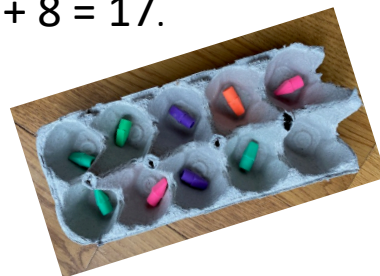
Pretend the biggest number is 10. Add. Fix your answer to remove the extra you added.



$10 + 8 = 18$, subtract the extra one I pretended, so $9 + 8 = 17$.

Homemade Ten Frame: Cut off two cups of an egg carton. Use any [safe] household objects (erasers, legos, coins, game pieces, candies) as counters.

Home Made Materials for Hands-On Learning



Why Strategies Matter: Addition Strategies Extended to 3-digit Addition and Subtraction

Note: A child with math fluency looks to see when these strategies can save them from doing the more time-consuming standard algorithms.

$198 + 237 = ?$ Or $198 + 237 = ?$ Pretend: 198 is 200
Think: Make 200. $200 + 237 = 437$.
 $200 + 235 = 435$. $437 - 2 = 435$.

$504 - 98 = ?$ Pretend: 504-100.
 $504 - 100 = 404$. Add back in the two extra you took away.
 $404 + 2 = 406$.

Multiplication Strategies

Doubling (and Halving)

Whenever there is an even number, I can use half that number to multiply and then double my answer.

$4 \times 7 =$
 Think: $2 \times 7 = 14$
 $2 \times 7 = 14$
 So, $4 \times 7 = 28$
 $6 \times 8 =$
 Both are even – pick one to half and double!
 Think: $3 \times 8 = 24$ OR $6 \times 4 = 24$
 So, $6 \times 8 = 48$



Egg Carton Ten Frames (see above). Use small objects (jelly beans) as counters. For 4×7 , fill 4 cups with 7 beans each.
Cupcake Cups (or Bowls). Start with counters, but then just put numbers in each cup (using post-its). See how you can move the cups to show Doubling.

Talk

Numbers

Tip: To help students see why these strategies work, use concept language like 4 groups of 7, 4 sets of 7, 4 rows of 7 to help them understand the meaning of 4 times 7.

Home Made Materials for Hands-On Learning

Break Apart [Distributive Property]

I can take either factor and break it into two 'friendly' numbers, find the product of each part and add them back together to find the product.

$7 \times 7 =$
 Think: Which 7 facts do I know?
 Let's say it is 5s and 2s. Then:
 $5 \times 7 = 35$
 $2 \times 7 = 14$
 So, $7 \times 7 = 49$
 $6 \times 8 =$
 Think: $5 \times 8 = 40$
 One more group of 8 is 48.



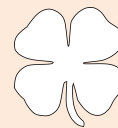
#3 Make practice enjoyable and meaningful. Play games. Talk through strategies. Do not focus on speed. Speed will come with strategy practice.

Here are two favorite, easy to adapt card games. Enjoy!

Lucky 13

- Deal 4 cards to each player.
- Players pull 2 of their cards to get as close to 13 as they can.
- If you get lucky and get 13, score 0! Otherwise, your score is how far away you are from 13 (if your two cards add to 15, your score is 2).
- Play 5 rounds. Lowest score wins!

More ways to play: Deal 5 cards. Play Lucky 10 or Lucky 15.



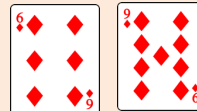
Questions to Ask While Playing Fact Fluency Games

- How did you figure it out?
- Why did you pick that strategy?
- Is there another way you could figure out that fact?
- What other facts can be solved with that strategy?
- When do you like to use that strategy (when is that strategy a good idea)?

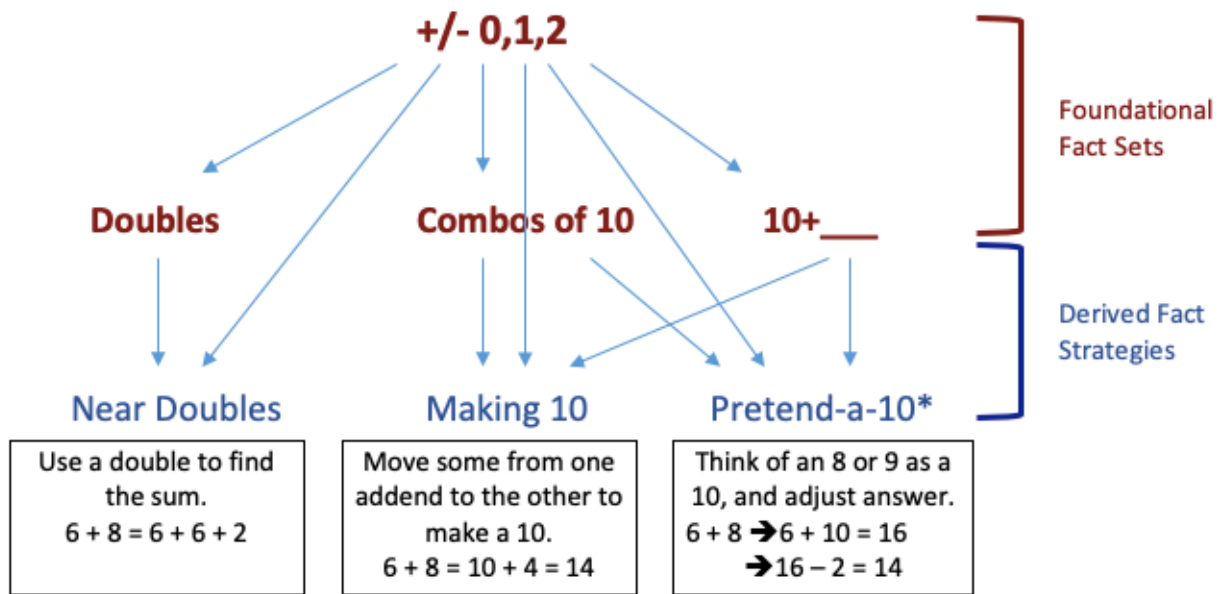
Factor War [think classic game of war]

- Share the cards equally among the players.
- Players flip up 2 of their cards and say the product.
- Highest [correct] product wins those cards.
- A tie means – War. Repeat steps 2 and 3. Winner has most cards when time is up!

More ways to play: Sum War for Addition. **Fixed** Factor [or Sum] War. You pick a number (e.g., 9 if you are working on your 9 facts). Place it in center for reference. Players only flip one card and multiply their card by that number. Highest [correct] product wins.

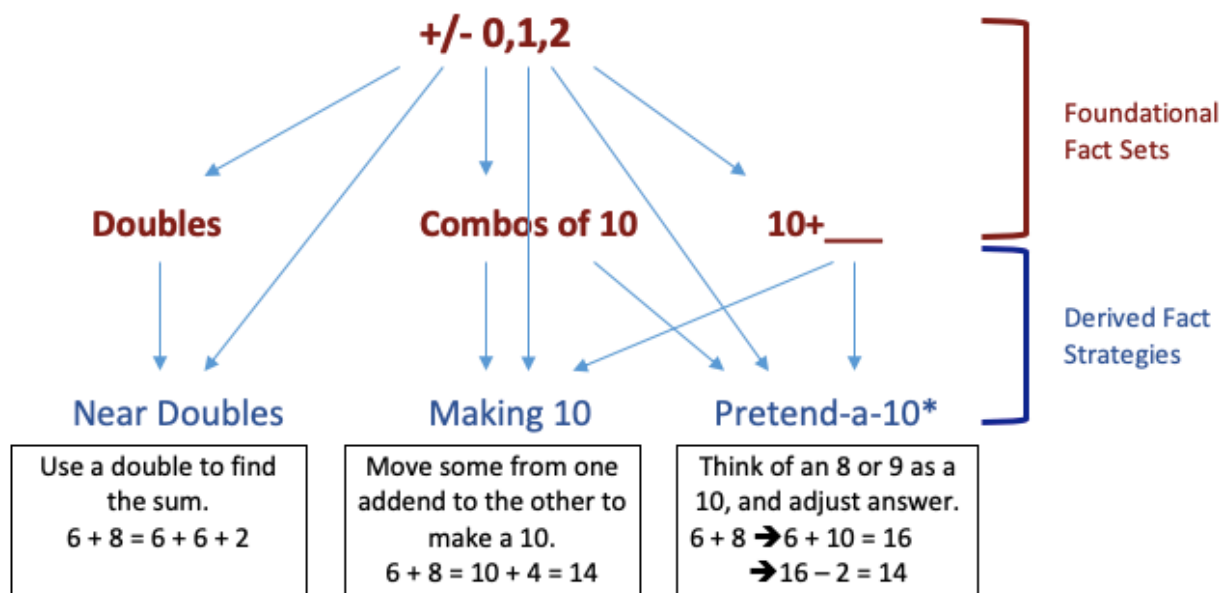


Addition Fact Fluency Flexible Learning Progression



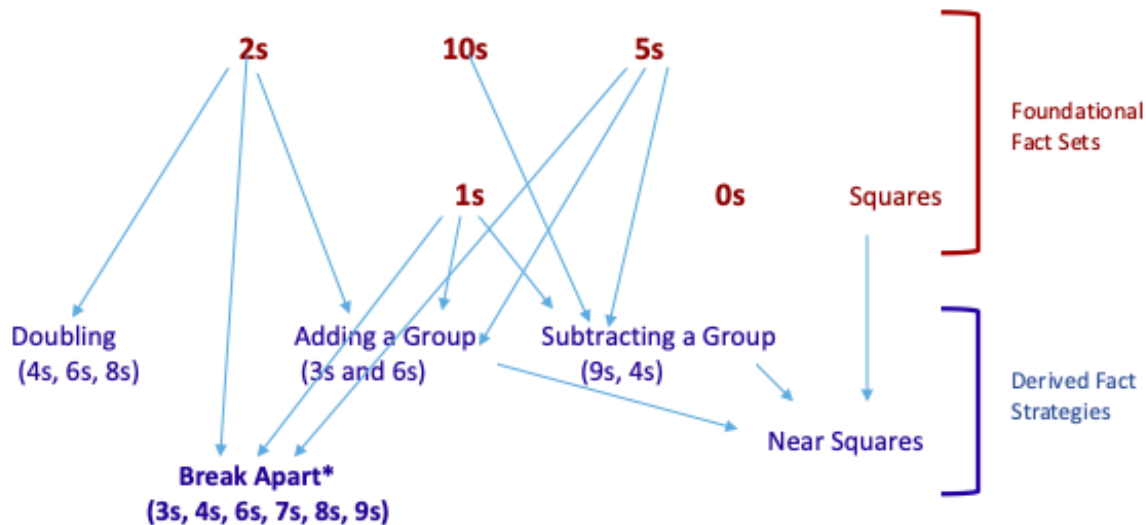
*Also called Compensation and Use 10; we have found that young learners remember the strategy and distinguish it from Making 10 when we use this name. Research indicates that this strategy is more accessible than Making 10, and therefore should be explicitly taught (Baroody, Eiland, Reid, & Paliwal, 2016).]

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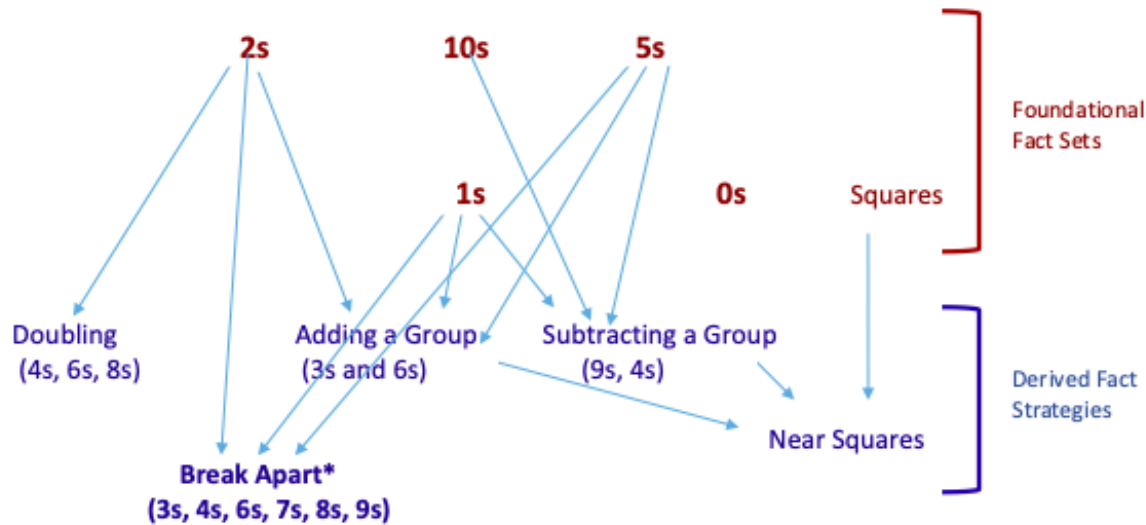
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Multiplication Fact Fluency Flexible Learning Progression



*We acknowledge that all the derived fact strategies are break apart (distributive property) strategies. We focus on specific ways to break apart (e.g., adding a group) and move towards generalizing the Break Apart strategy.

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Questions to Ask While Playing Basic Facts Games

Questions that focus on reasoning strategies and fluency:

- *How did you figure it out?*
- *Is there another way you could figure it out?*
- *If someone didn't know the answer to _____, how would you tell them to figure it out?*
- *I see you used _____ strategy. When do you like to use that strategy?*
- *Which strategies have you used during this game?*

Based on Math Fact Fluency by J. Bay-Williams & G. Kling (2019).

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