Building Basic Facts Fluency with FactsWise

Dear Parents,

Research has shown that long-term success in mathematics is closely tied to strong number sense, including fluency with basic facts. The sooner your child becomes fluent with her or his addition and subtraction facts, the better! Addition and subtraction of larger numbers will be much easier to master, and multiplication and division are easier to learn. Even algebra, introduced now in elementary school, will be easier to learn if your child does not have to use mental energy counting to solve addition and subtraction facts.

The FactsWise basic facts program has been designed based on international research. We know that countries where children learn their facts quickly and fluently seem to have at least three things in common:

- Children work on their facts at school and at home
- Children learn their facts with fives (e.g. 5+3 and 7+5) and within tens (e.g. 2+8 and 6+4) to build relationships that support strategic number sense
- Children are encouraged to develop strategies beyond counting (e.g., 9+7=10+6 and 13-4=(13-3)+1 or 13-4=(10-4)+3)

With this information in mind, this program progresses from facts less than five to facts with fives, to facts within tens and facts with tens. Once your child is fluent with these facts, we can then work on developing strategies that work equally well with the basic facts and with larger sums and differences (e.g., 8+7=10+5 uses the same strategy as 28+37=30+35).

The nine goals listed on the back of this letter are the same goals we will be studying at school. As part of your daily homework plan, we are asking that you spend 5 or 10 minutes working on basic facts. Please start with Goal ____ and use the following activities (or others like them) to help your child move beyond counting to more efficient strategies and memorization.

- FactsWise Pairs Practice – you will receive each goal's practice page when your child matriculates to that goal
- FactsWise activities and games described on the following pages
- FactsWise online flashcards, games, and quizzes – access to these online resources can be purchased from www.ellipsismath.com

Once your child no longer needs to count (using fingers or mentally) to solve the goal's addition problems, move to the related subtraction facts. After this goal has been learned to automaticity, practice with all of the flashcards your child has worked on so far.

Repeat this procedure for each new goal, making sure that you first work with the new goal, and then review previous goal facts, before moving on to the next goal.

FactsWise Goals for Basic Facts Success

Once a child is fluent with the addition facts in each goal, begin work on the related subtraction facts.

Goal 1 – Within 4s & 5s

Add: 1+3, 2+2, 3+1, 1+4, 2+3, 3+2, 4+1
Sub: 4-1, 4-2, 4-3, 5-1, 5-2, 5-3, 5-4

Goal 2 – With 5s (part 1)

Add: 1+5, 2+5, 3+5, 4+5, 5+5
Sub: 6-1, 6-5, 7-2, 7-5, 8-3, 8-5, 9-4, 9-5, 10-5

Goal 3 – Within 10s

Add: 0+10, 1+9, 2+8, 3+7, 4+6
Sub: 10-0, 10-10, 10-1, 10-9, 10-2, 10-8, 10-3, 10-7, 10-4, 10-6

Goal 4 – With 10s

Add: 10+1, 10+2, 10+3, 10+4, 10+5, 10+6, 10+7, 10+8, 10+9, 10+10
Sub: 11-1, 11-10, 12-2, 12-10, 13-3, 13-10, 14-4, 14-10, 15-5, 15-10, 16-6, 16-10, 17-7, 17-10, 18-8, 18-10, 19-9, 19-10, 20-10

Goal 5 – With 5s (part 2)

Add: 5+6, 5+7, 5+8, 5+9
Sub: 11-5, 11-6, 12-5, 12-7, 13-5, 13-8, 14-5, 14-9

Goal 6 – Doubles

Add: 3+3, 4+4, 6+6, 7+7, 8+8, 9+9
Sub: 6-3, 8-4, 12-6, 14-7, 16-8, 18-9

Goal 7 – Under Tens

Add: 2+4, 2+6, 2+7, 3+4, 3+6
Sub: 6-2, 6-4, 8-2, 8-6, 9-2, 9-7, 7-3, 7-4, 9-3, 9-6

Goal 8 – With 9s

Add: 2+9, 3+9, 4+9, 6+9, 7+9, 8+9
Sub: 11-2, 11-9, 12-3, 12-9, 13-4, 13-9, 15-6, 15-9, 16-7, 16-9, 17-8, 17-9

Goal 9 – With 7s & 8s

Add: 4+7, 6+7, 3+8, 4+8, 6+8, 7+8
Sub: 11-4, 11-7, 13-6, 13-7, 11-3, 11-8, 12-4, 12-8, 14-6, 14-8, 15-7, 15-8

FactsWise Family Activities and Games

Goal 1 (1+3, 2+2, 3+1, 1+4, 2+3, 3+2, 4+1 & related subtractions)

- One-Hand Recognition – help student show these problems using the fingers on one hand.
- Try the Five-Frame online activities at http://illuminations.nctm.org/ (go to Activities and then K-2)

Goal 2 (with 5s to 5: 5+1, 5+2, 5+3, 5+4, 5+5, reversals, & related subtractions)

- Try the Ten-Frame online activities at http://illuminations.nctm.org/ (go to Activities and then K-2).
- Yellow is the Sun – go to www.alabacus.com to find a song to practice these facts.
- The Lego Game – This game can be played with 2 or more people, using 2 dice (or number cubes) and a set of 20 or more Lego pieces.
  - Place one die (or number cube) in the center of the table with the 5 facing up. Each player takes turns rolling the other die and adding this number to the 5. The player with the highest sum gets to select a Lego piece. If a tie occurs for the largest sum, then all players with the largest sum select one Lego piece each.
  - At the end of the game, each player gets to make a Lego creation to share. For older children, this game can be adapted to play with points, or using a Cribbage board, rather than building with Legos.

Goal 3 (within 10s: 0+10, 1+9, 2+8, 3+7, 4+6, reversals, & related subtractions)

- Go to the Dump Game (adapted from *Math Card Games* from www.alabacus.com) – This game can be played with 2 to 4 people, using 4 or more sets of number cards 1 to 9. (You can use Aces through Nines from a regular deck of cards, or use index cards for a homemade deck.) Hand out 5 cards to each player.
  - At the beginning of each turn, the players check over their hands for pairs that total 10. An abacus can be useful for an early learner. Paired cards are placed face up in two piles in front of each player, allowing easy checking and no need for shuffling between games.
  - After all pairs are played, the player asks the player on the left for a number that will complete a 10. If the second player has it, it must be given to the first player, who lays the two cards down. If the player does not have the requested card, the player says "Go to the Dump," at which time the first player takes the top card from the dump (all cards not handed out at the beginning of the game). This player's turn is now over.
  - If a player runs out of cards, the player takes 5 new cards, but then must wait until the next turn to play them.
  - At the end of the game, players combine the two stacks of cards in front of them and decide who has the most (by comparing heights or by counting). Cards can then be stacked together for the next game – no need to shuffle.

Goal 4 (with 10s: 10+1, 10+2, 10+3, 10+4, 10+5, 10+6, 10+7, 10+8, 10+9, 10+10, reversals, & related subtractions)

- The Lego Game with Tens – this game can be played with 2 or more people, using all of the aces through 10s from one deck of cards and a set of 20 or more Lego pieces.
  - Place one of the 10 cards in the center of the table and the rest of the cards face down in a pile. Each player takes turns drawing a card from the pile and adding this number to the 10. The player with the highest sum gets to select a Lego piece. If a tie occurs for the largest sum, then all players with the largest sum select one Lego piece each.
  - At the end of the game, each player gets to make a Lego creation to share. For older children, this game can be adapted to play with points, or using a Cribbage board, rather than building with Legos.

Goal 5 (with 5s to 10: 5+6, 5+7, 5+8, 5+9, reversals, & related subtractions)

- The Lego Game with Cards – This game can be played with 2 or more people, using one 5 and all of the 6s, 7s, 8s, and 9s from one or two decks of cards, and a set of 20 or more Lego pieces. (Once the student is confident with these four facts, you can add in the aces through 5s to solidify all of the with 5s.)
  - Place one of the 5 cards in the center of the table and the rest of the cards face down in a pile. Each player takes turns drawing a card from the pile and adding this number to the 5. The player with the highest sum gets to select a Lego piece. If a tie occurs for the largest sum, then all players with the largest sum select one Lego piece each.
  - At the end of the game, each player gets to make a Lego creation to share. For older children, this game can be adapted to play with points, or using a Cribbage board, rather than building with Legos.

Goal 6 (doubles: 3+3, 4+4, 6+6, 7+7, 8+8, 9+9, & related subtractions)

- Concentration (from http://www.capousd.org/gwes/finn/math.html). Two or more people can play, "Concentration." The object of the game is to find pairs of matching cards among an array of face down cards. Help your child write addition or subtraction facts (e.g., 6+6 or 14-7) on one set of index cards and the answers (e.g. 12 or 7) on another set. Use a limited number of cards to start with, maybe 8 pairs, and slowly increase the number when your child seems ready for more.
  - Shuffle the cards and lay them out face down. The first player turns over two cards, if they match (i.e., 6+6 and 12), the player keeps the two cards and takes another turn. If the two cards are different (i.e., 6+6 and 8), the cards must be placed back in their same positions face down. The next player takes a turn trying to find two matching cards. As the game

progresses, players must concentrate and try to remember where the different numbered cards are located. When all the cards have been collected, the person with the most pairs wins.

Goal 7 (under tens: 2+4, 2+6, 2+7, 3+6, 3+4, reversals, & related subtractions)

- Concentration (from http://www.capousd.org/gwes/finn/math.html). Two or more people can play, "Concentration." The object of the game is to find pairs of matching cards among an array of face down cards. Help your child write addition or subtraction facts (e.g., 6+6 or 14-7) on one set of index cards and the answers (e.g. 12 or 7) on another set. Use a limited number of cards to start with, maybe 8 pairs, and slowly increase the number when your child seems ready for more.
  - Shuffle the cards and lay them out face down. The first player turns over two cards, if they match (i.e., 6+6 and 12), the player keeps the two cards and takes another turn. If the two cards are different (i.e., 6+6 and 8), the cards must be placed back in their same positions face down. The next player takes a turn trying to find two matching cards. As the game progresses, players must concentrate and try to remember where the different numbered cards are located. When all the cards have been collected, the person with the most pairs wins.

Goal 8 (9s: 9+2, 9+3, 9+4, 9+6, 9+7, 9+8, reversals, & related subtractions)

- Play the Lego Game with Cards using 2, 3, 4, 6, 7, 8, and 9
- Play Concentration after making the cards for the Goal 8 facts
- Play strategy games including Yahtzee, Monopoly, cribbage, dominoes, …

Goal 9 (7s and 8s: 7+4, 7+6, 8+3, 8+4, 8+6, 8+7, reversals, & related subtractions)

- **ADDITION WAR** (from **http://www.capousd.org/gwes/finn/math.html**)
  - Use a regular deck of playing cards. Divide the cards evenly among the players. Cards are dealt face down. Each player turns over two cards and adds the numbers on the cards. The player with the greatest sum keeps all the cards played that round.
  - Variations: Change the rule and the player with the lowest sum wins. Another version would be to remove the jokers, tens and face cards. Each player turns over 3 cards, adds the numbers together and the player with the greatest sum collects the cards.

Pay the Difference (from http://www.capousd.org/gwes/finn/math.html)

- **Number or players**: two
- **Materials:** Deck of cards (jokers removed), chips, pennies, tokens or small squares of paper cut up. The Ace equals 1, the King equals 13, the Queen equals 12 and the Jack equals 11.
- **Directions**: Each player begins the game with 30 or more chips, pennies or other types of markers. The deck of cards is placed between the players. Each turns over a card from the top of the deck. The one with the low number must "pay" the difference between his/her number and the opponent's number.
- **Winning**: The round is over when one player wins all of the other player's tokens. Play several rounds. You should establish the winner before you start the game. For example; the first person to win five rounds, or the person who wins the most rounds out of six. It would depend on the amount of time you have to play.
- **Note**: If your child is having difficulty, he/she may use a number line (1 2 3 4 5 etc.), a 12 inch ruler, or similar device. In order to establish how many numbers in between, your child would mark the lower number with a finger and count up to the higher number.
- **Since the playing deck would be limited to 13, you could make up your own number cards using index cards. On the index cards, include numbers up to 18 so your child can practice subtraction facts through 18. For example, the difference between 15 and 9, 17 and 8, 16 and 7. The rest of the game would be played the same, except each player may need to start the game with more than 30 chips or tokens.

Goal 10 (mental math with double-digit numbers)

- **UP TO A HUNDRED** (from http://www.capousd.org/gwes/finn/math.html)
  - **Number of players**: two or more
  - This is an addition game, and is great fun for the mathematically inclined. It would be a great game to remember while you are waiting for the food to arrive at a restaurant or your turn at the dentist's office. All you need is paper and pencil.
    1. The first player writes down any number from one to nine.
    2. The next player adds any other number from one to nine and writes the sum underneath the first number.
    3. The players continue like this, each person adding any number from one to nine. The object of the game is to be the person whose final addition brings the sum to exactly 100.
    4. This is harder than it sounds. You are trying to be the first person to bring it up to 100, and you are also trying to keep all the other players from finishing before you do. (Easier version: use a hundred's chart to add the numbers.)
    5. Variations: Try playing it in reverse - subtract one-digit numbers from 100, the first player to reach zero is the winner. You could also try with numbers between one and 20 to reach a final sum of 517 or 739, or whatever. For these variations, a calculator may be used.