



Tufts Literacy Corps

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Games To Practice Addition and Subtraction

I. Automatizing Math Facts

Cognitive psychologists have a term called “cognitive capacity,” which captures the understanding that our brains have limited space for processing information. When we first learn a complex task, it takes a relatively long time to complete because we have to focus on every part of the task. Nothing is familiar or automatic.

Think about learning to drive a manual car, for example. The first time you tried it, you had to think about stepping on the clutch while shifting from first gear to second – which meant you had to remember how the gear shift was positioned for each gear while watching the road, guiding the steering wheel, listening to your teacher, remembering to lift your foot *off* the clutch before pushing it back down because you’re gunning the engine and must now shift to *third* gear - and all the while praying that no child will sprint suddenly across the street. Two months of practice later and you pay no conscious attention to the gears at all – other than to take a bit of pleasure in a particularly smooth transition from first to fourth. You now have plenty of “cognitive capacity” to listen to the radio or map out the first chapter of your upcoming novel.

Children must automatize math facts in order to have plenty of “brain space” available for higher order thinking in mathematics. The less time and attention they must devote to figuring out what $8+5$ is, or 5×7 , the more attention they can apply to problem solving.

The following activities include the straightforward use of flash cards, and several suggestions to make memorizing math facts a bit more fun. They are not particular good for helping children gain a rich understanding of numbers, and, on their own, they will not “raise mathematicians.” Knowing the facts without having to think about them, however, will give your student the “brain space” he needs to understand numerical relationships and address higher order math problems.

Old fashion “drill”

Materials:

Flash Cards: Make flash cards that include the math facts your student needs to learn. Give her 5 minutes or so to review them each session, and have her choose five facts on which she wants to be tested.

Take Seven

Each card represents its own number value. Jacks are 11, Queens 10 and Kings 13. Divide the deck in half. Each player turns over two cards. If the two cards can be added or subtracted to make seven, the player takes all four cards. The winner is the one who winds up with the entire deck.

(You can, of course, vary this and play “take eight” or any other number.)

Number Family Memory

Materials: deck of playing cards minus the face cards

Remove the face cards from the deck and turn the rest face down on a table. Take turns turning over three cards. Whenever a player turns over three that are a fact family (e.g., 7, 3 and 10), he keeps the cards and takes another turn. The player with the most cards at the end wins.

Slap

Materials: Make your own set of number cards, from 0 to 100.

This is a game to help sharpen your student's skill multiplying and dividing smaller numbers. Use it ONLY after you are confident that the child is fairly competent with the number facts involved. If he is not, the game will not be fun and may undermine his confidence.

Goal: By slapping multiples of any target number, each player accumulates cards. The one with the most cards at the end wins.

To Play: Select a large number that has several multiples, and write it on a notecard. “Stack the deck” by using only the cards that are multiples of this number and 30 to 40 others. For example, you might choose 48 as the target product. Make sure your deck includes, 1, 2, 4, 6, 8, 12, 24, 48 and 30-40 other cards.

Before playing, review the targeted number facts with your student to make sure he has mastered them, or is close.

Divide the deck in half and take turns turning over the top card. Any time the number is a multiple of the target, you and your student race to slap it. The first to hit it, takes the pile.

Note: To play this game, you and the student have to be sitting side by side, so that your student is not reading numbers upside down.

II. Addition, Subtraction and Number Sense

The following activities are published in *About Teaching Mathematics* by Marilyn Burns. Unlike the games suggested above, which are simply sugar-coating for “skill and drill,” these activities will help children construct a deeper understanding of number concepts and think strategically. Practice with number facts is embedded in the activities, but the games are designed to provide an engaging reason to do the math.

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

Materials: one die or 0-9 spinner

The template included at the end of this handout

1. To begin the game, one player rolls the die or spins the spinner.
2. All players write the number in a square on their first chart. Once a number is recorded, it cannot be changed.
3. 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.
4. Players then find the sums of the rows, columns and diagonal, and record them in the respective circles.
5. Players examine their sums. Any sum that appears in only one circle must be crossed out.
6. The total of the sums that are not crossed out is the players score for that round.
7. 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.

3	4	2	9
2	3	4	9
6	3	5	14
11	10	11	11

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

- Each player makes a recording sheet as shown.
- Take turns rolling the die or spinning the spinner to generate six numbers.
- 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.
- After six numbers, fill in any blank spaces in ones column with zeros and add.
- 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: _____

